Shire of Collie

Local Planning Scheme No. 5

Amendment No. 7

Standard Amendment to expand land uses within Schedule 4 – Special Use Zones No. 11 and Structure Plan Areas No. 1 for the purpose of allowing Strategic Industry of state or regional significance.

FORM 2A

Planning and Development Act 2005

RESOLUTION TO ADOPT AMENDMENT TO LOCAL PLANNING SCHEME

Shire of Collie Local Planning Scheme No. 5
Amendment Number 7

Resolved that the Local Government pursuant to section 75 of the *Planning and Development Act* 2005, amend the above Local Planning Scheme by:

1. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following land uses permissiblities:

   - ***Industry – P***
   - Industry Extractive – D
   - Industry Light - D
   - ***Mining Operations – A***
   - ***Office – I***
   - ***Renewable Energy Facility – A***
   - ***Resource Recovery – D***
   - ***Telecommunications Infrastructure – P***
   - ***Waste Disposal Facility – A***
   - ***Waste Storage Facility – A***

2. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to delete the following land uses permissiblities:

   - ~~Industry – rural ('D' use)~~
   - ~~Industry – general ('D' use)~~
   - ~~Industry – noxious ('A' use)~~

3. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following objectives

   a) To allow for the development of industries of State or regional significance and supporting/ancillary activities, reflective of its role as a Strategic Industrial Area.

   b) To provide for industrial development that:

   (i) is sufficiently flexible to accommodate the diversification of primary industries within Collie;

   (ii) encourages activities consistent with the principles of industrial ecology; and

   (iii) provides sufficient flexibility to accommodate varying needs and future forms of development.

4. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to delete the following objectives

- ~~allow for the development of industry associated with the coat resource and other support or related industries.~~

5. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to replace the following conditions:

~~**2. Structure Plan**~~

~~(a) land use and development within the Special Use Zone No. 11 shall comply with a Structure Plan adopted by the local government and approved by the Commission in accordance with the Scheme or any subsequent Structure Plan adopted by the local government and approved by the Commission.~~

~~**3. EPA Approval**~~

~~All applications for planning approval within the Special Use Zone No. 11 shall be referred to the EPA for assessment unless –~~

~~(a) The EPA has agreed that a specific class of industry will not have any additional environmental impacts in the area; or~~

~~(b) The application is for a minor or ancillary development with no significant environmental impacts.~~

2. A Structure Plan is to contain such details as, in the opinion of the local government and Western Australian Planning Commission, is required to satisfy the planning requirements for the proposed development, and shall include, but not be limited to, the following details:

i. Identification and proposed management of any likely environmental impacts or emissions generated from the envisaged industrial development, including cumulative impacts, to ensure that these impacts are appropriately managed and contained within the Shotts Strategic Buffer (SCA);

ii. The identification and management of environmentally sensitive locations, including possible contaminated sites, underground mine workings, wetlands, and significant flora, vegetation, fauna habitat and habitat corridors;

iii. Establishment of appropriate separation between strategic and general industrial land uses, if applicable.

iv. The apportionment of land suitable for general and strategic land uses, and typical lot sizes;

v. The indicative lot pattern and staging;

vi. The provision of major infrastructure, including main drainage, power, sewerage, water supply and other key infrastructure services.

vii. The proposed major road network and other transport and movement systems.

viii. Bushfire management, including consideration of hazard separation, water supply, and emergency access.

3. All applications for development approval shall be referred to the Department of Water and Environmental Regulation for comment unless:

i. The Department of Water and Environmental Regulation has agreed that a specific class of industry will not have any additional environmental impacts in the area; or

ii. The application is for minor or ancillary development with no significant environmental impacts.

4. Where a structure plan has been advertised and approved in conjunction with an Amendment to the Scheme it shall be deemed to have complied with the requirements of Clause 6.3.5 of the Scheme.

6. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following Condition:

5. Development Standards

a) Setbacks and carparking shall be designed and demonstrated to meet operational needs.
b) All development shall have general regard to the development standards for the general industry zone in Schedule 11.

7. Amend Schedule 14 – Structure Plan Areas No. 1 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to delete the following:

~~Land Use Expectation~~

- ~~Industrial uses;~~
- ~~Char Plant;~~
- ~~Urea Plant;~~
- ~~Power Generation; and~~
- ~~Support / Industries.~~

8. Amend Schedule 1 – Dictionary of defined terms and expressions to include:

- Industry - means premises used for the manufacture, dismantling, processing, assembly, treating, testing, servicing, maintenance or repairing of goods, products, articles, materials or substances and includes premises on the same land used for:

  (a) the storage of goods;

  (b) the work of administration or accounting;

  (c) the selling of goods by wholesale or retail; or

  (d) the provision of amenities for employees, incidental to any of those industrial operations;

  (e) incidental purposes

- ***Mining Operations - mining operations means premises where mining operations, as that term is defined in the Mining Act 1978 section 8(1) is carried out;***

- ***Renewable Energy Facility - means premises, buildings or structures used to generate energy from a renewable energy source. It does not include solar panels or a wind turbine principally used to supply energy for an individual lot's private domestic or rural supply.***

- ***Resource Recovery - resource recovery centre means premises other than a waste disposal facility used for the recovery of resources from waste;***
- Telecommunications infrastructure means land used to accommodate ~~any part of~~ the ***used by or in connection with*** ~~of~~ a telecommunications network and includes any line, equipment, apparatus, tower, antenna, tunnel, duct, hole, pit or other structure ~~used, or for use in or in connection with, a telecommunications~~ ***related to the*** network;
- ***Waste Disposal Facility - means premises used —***

(a) for the disposal of waste by landfill; or

(b) the incineration of hazardous, clinical or biomedical waste;

- ***Waste Storage Facility - means premises used to collect, consolidate, temporarily store or sort waste before transfer to a waste disposal facility or a resource recovery facility on a commercial scale;***

8. Amend Table 1:Zoning Table to include the following uses and include I – Incidental in the legend:

Use Class	Rural 1	Rural 2	General Industry	Light and service Industry	Mixed Use	Residential	Residential Development	Rural Residential	Town Centre
Industry	X	X	P	A	X	X	X	X	X
Mining operations	A	A	D	X	X	X	X	X	X
Renewable energy facility	A	A	P	A	X	X	X	X	X
Resource recovery centre	A	A	P	D	X	X	X	X	X
Waste disposal facility	A	A	A	X	X	X	X	X	X
Waste storage facility	X	X	A	A	X	X	X	X	X

Legend

X ***Not Permitted***

D ***LG Discretion***

P ***Permitted***

I ***Incidental***

A ***Advertising***

9. Amend Table 1 Zoning Table to update the permissibility for the following uses:

Use Class	Rural 1	Rural 2	General Industry	Light and service Industry	Mixed Use	Residential	Residential Development	Rural Residential	Town Centre
Office	I	I	I	I	D	X	X	X	P
Telecommunications Infrastructure	D	D	P	P	A	A	A	A	A

10. Amend Clause 4.3.2 to include the "I" definition:

4.3.2 The symbols used in the cross reference in the Zoning Table have the following meanings:

"P" means that the use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme;

"D" means that the use is not permitted unless the local government has exercised its discretion by granting planning approval;

"I" means that the use is permitted if it is consequent on, or naturally attaching, appertaining or relating to the predominant use of the land and it complies with any relevant development standards and requirements of this Scheme

"A" means that the use is not permitted unless the local government has exercised its discretion by granting planning approval after giving special notice in accordance with clause 9.4;

"X" means a use that is not permitted by the Scheme.

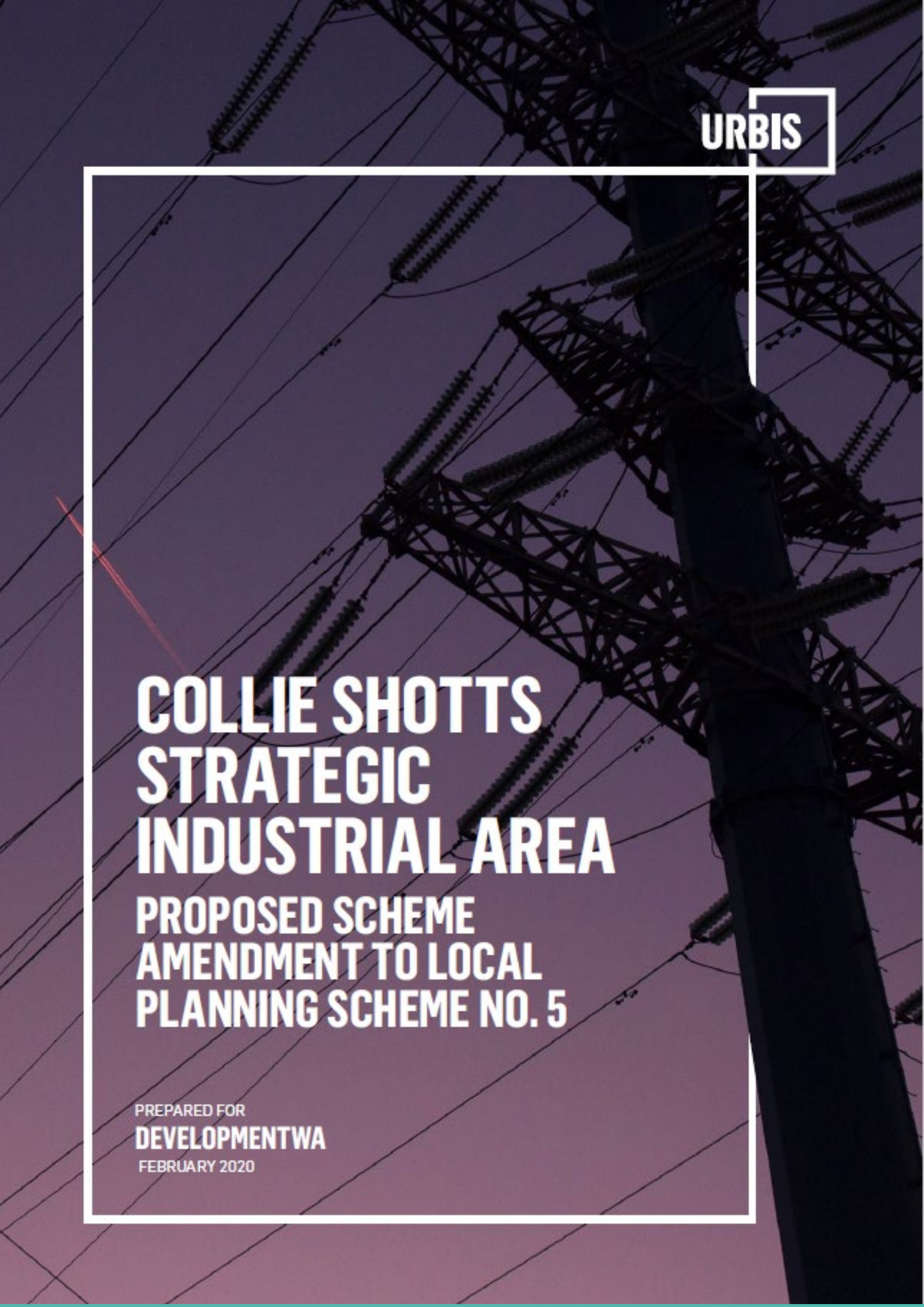
The amendment is standard under the provisions of the *Planning and Development (Local Planning Schemes) Regulations* 2015 for the following reason(s):

- The proposal is a text only amendment to add and/or delete provisions to the existing Special Use Zone and Structure Plan Areas Schedules.

- The proposal is consistent with the Local Planning Strategy 2020 which notes that expansion of land uses outside of coal should be investigated within the Shotts Strategic Industrial Area.

Dated this _____ day of _____ 20___

_____
(Chief Executive Officer)



URBIS

COLLIE SHOTTS STRATEGIC INDUSTRIAL AREA

PROPOSED SCHEME AMENDMENT TO LOCAL PLANNING SCHEME NO. 5

PREPARED FOR

DEVELOPMENTWA

FEBRUARY 2020

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Karen Wright
Senior Consultant	Emma Dunning

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FIGURES:

List of Acronyms

DevelopmentWA – Western Australian Land Authority trading as DevelopmentWA (formally LandCorp)

DWER – Department of Water and Environmental Regulation

EPA – Environmental Protection Agency

EPBC – Environment Protection and Biodiversity Conservation Act 1999

SIA – Strategic Industrial Area

SPP – State Planning Policy

INTRODUCTION

This report has been prepared by Urbis on behalf of DevelopmentWA to support the proposal to amend the provisions within the Shire of Collie Local Planning Scheme No.5 relating to Shotts Strategic Industrial Area (SIA).

DevelopmentWA and The Department of Jobs, Tourism, Science and Innovation are seeking to diversify the land uses to allow for a range of strategic industry/ noxious uses within the Shotts SIA. The diversification seeks to help attract a broader range of downstream processing industries to the Collie area and make the Shotts SIA similar in its use category to other SIAs across the State. This approach is consistent with the State Government direction for the economic development of Collie.

A review of the current planning framework has highlighted that the Collie Local Planning Scheme does not allow for the diversification of strategic industrial land uses within Shotts SIA. The Shire of Collie Local Planning Scheme No. 5 provides for a range of industrial activities within Shotts SIA, provided they are directly related to coal. These requirements are reiterated within the Shotts SIA Structure Plan.

This amendment seeks to undertake the following amendments to the Schedules 1, 4 and 14 of the Scheme:

1. Amend the objectives under Special Use Zone 11 (Schedule 4) to allow for more expansive objectives relating to the type of industry sought within Shotts SIA
2. Removing the requirement for industry to be linked to coal
3. Amending the permitted land uses to ensure flexibility for potential proponents
4. Including reference to environmental considerations and development standards within Schedule 4
5. Amending the provisions within Structure Plan Area 1 (Schedule 14) to remove the guidance on land uses
6. Including additional definitions to Schedule 1 to guide the land uses included within Schedule 4

The diversification of the land uses within Shotts SIA is consistent with the strategic direction for Shotts SIA as identified within the Shire of Collie draft Local Planning Strategy 2018. As such, this is deemed to be a standard amendment under Clause 34 of the *Planning and Development (Local Planning Schemes) Regulations 2015.*

This report will demonstrate the appropriateness of the proposed amendment through the following structure:

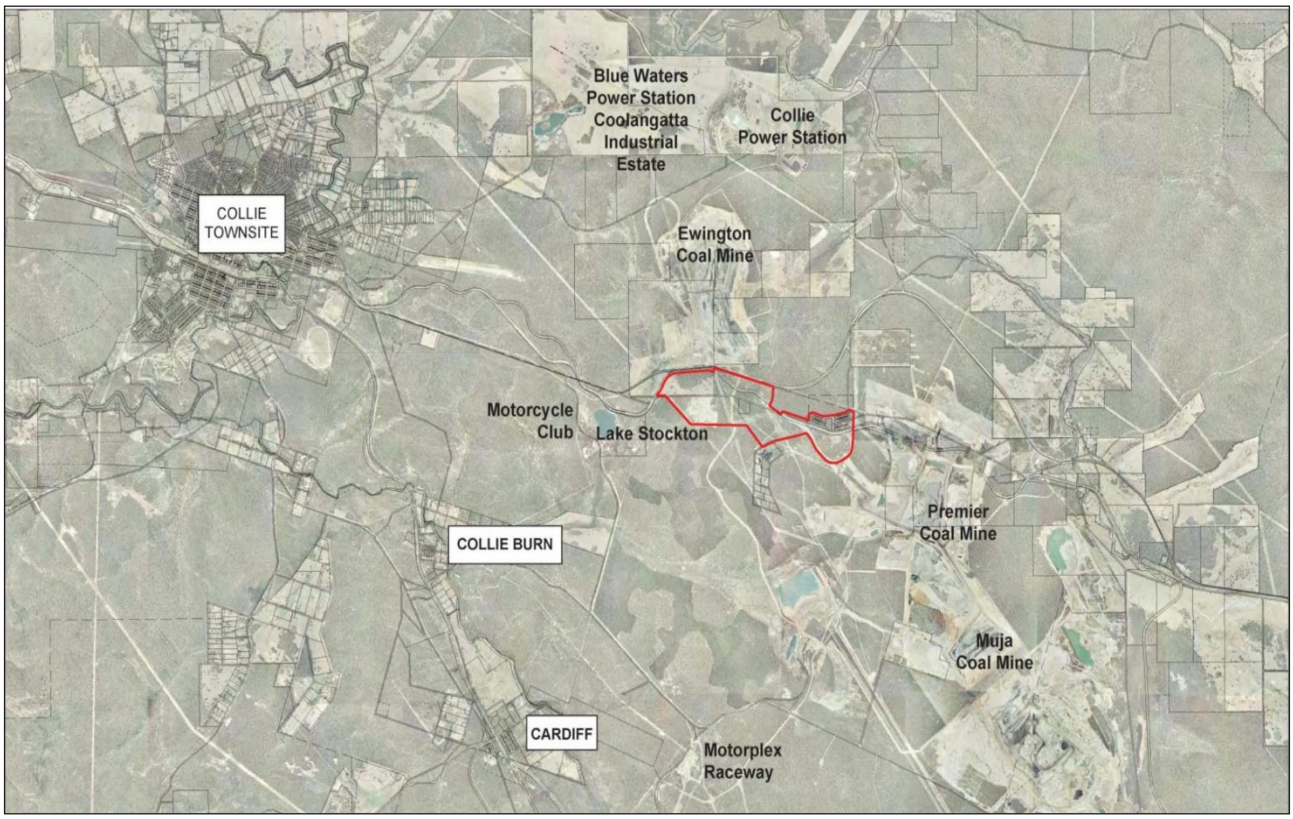
1. Background information on the land
2. Justification from a State and local planning perspective
3. Confirmation that the land can facilitate the diversification of land uses
4. Demonstration that there is no technical impediment to the rezoning

An amendment to the Shotts SIA Structure Plan has been prepared concurrent to this scheme amendment to ensure consistency in the approach to the planning framework for Shotts SIA and to allow for the diversification of land uses.

1. BACKGROUND AND CONTEXT

The subject land is located at the Shotts townsite approximately 7.5km east of Collie and the proposed industrial estate has an area of 235 hectares as detailed in **Figure 1**. There is complex array of existing infrastructure within the subject land including transmission lines, coal conveyor, haul road, borefield and water pipelines. The main access to the subject land is from Premier Road which also provides access to the Premier Coal loading facility. Premier Coal has developed a rail siding "loop" to service this facility.

Figure 1 – Locational Context



1.1. LANDOWNERSHIP

The Shotts SIA comprises land which is in the ownership of the Western Australian Land Authority (DevelopmentWA) and the State of Western Australia. The lots within Shotts SIA were acquired by DevelopmentWA in 2010 and 2011 and a subdivision undertaken over the subject lots to amalgamate and re-subdivide the lots into the current format which aligns with the proposed Development Areas, railway and road infrastructure.

Table 1 – Land Ownership details

LOT	DP	VOL / FOLIO	RESERVE	OWNER
557	67882	2796/123		Western Australian Land Authority
558	67882	2796/124		Western Australian Land Authority
559	67882	2796/125		Western Australian Land Authority
560	67882	2796/126		Western Australian Land Authority
561	67882	2796/127		Western Australian Land Authority

LOT	DP	VOL / FOLIO	RESERVE	OWNER
562	67882	3162/713	Local Reserve (Premier Road)	State of Western Australia
563	67882	3162/714	Local Reserve (Premier Road)	State of Western Australia
571	67882	3162/717	Local Reserve	State of Western Australia
572	67882	3162/718	Local Reserve	State of Western Australia
573	67882	3162/719	Local Reserve	State of Western Australia

1.2. HISTORY

The eastern sector of the subject land comprises some of the original mining tenements of Premier Coal Mine. The mine commenced underground works in 1911 but halted in 1914 as a result of creep, fire and water problems on Lease 261. A further tunnel was put down some 0.5km south west of the original mine and mining commenced again in 1916 but problems such as soft roof and floors that required extensive shoring up continued. The mineworks ceased in 1927.

The settlement of Shotts, located in the north-east sector of the project area, commenced at the same time as mining at Premier Coal Mine. There is little information pertaining to the Shotts town area but it is understood that there were approximately twenty permanent houses within the town, with 4-5 lots of 5 acres located outside of the township and small farms occupied within a mile from the town.

The residential area was situated immediately north of the Narrogin railway line and forms part of the study area. The mine workers preferred to live in the village or on small farm holdings close enough to the mine to commute by walking or riding a horse.

Planning for Shotts SIA as an industrial area started in 2008 with a range of technical reporting being undertaken to determine the suitability of the subject land for large scale industrial development. The establishment of the planning framework (as detailed in Section 3) was undertaken with the intention of establishing Char and Urea plants within Shotts SIA to link to the coal mining and power generation activities being undertaken in Collie.

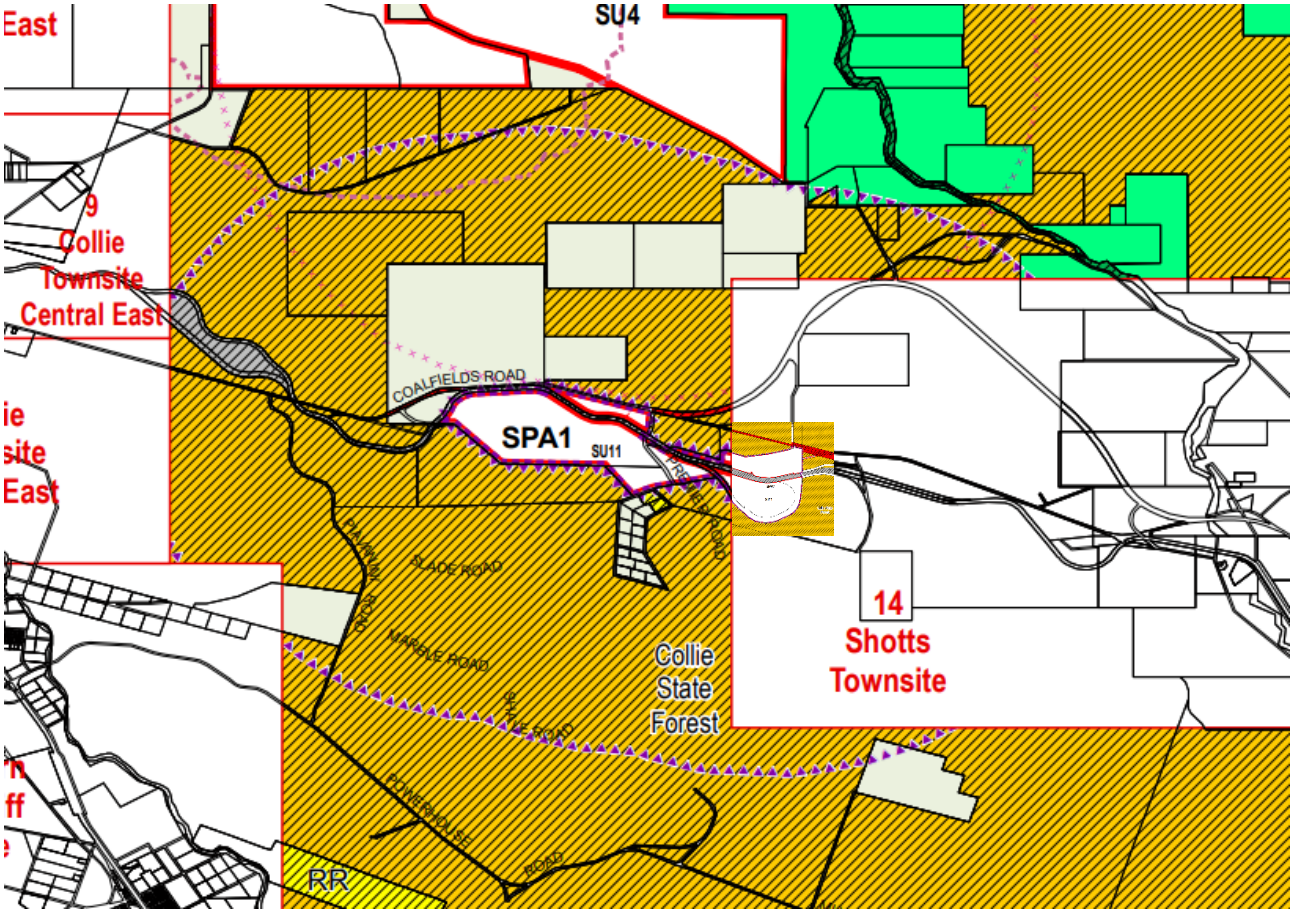
2. PLANNING CONTEXT

2.1. ZONING AND RESERVATIONS

2.1.1. Local Planning Scheme

The Shire of Collie Local Planning Scheme No. 5, zones the Shotts SIA industrial core “Structure Plan Area 1” and “Special Use 11” and includes Special Control Area ‘Shotts Industrial Park Buffer’.

Figure 2 – Local Planning Scheme



2.2. STATE PLANNING

This section summarises the relevance of these strategies/policies within the context of Shotts SIA:

Table 2 – State Planning Framework

DOCUMENT	SUMMARY
South West Regional Planning and Infrastructure Framework 2015	Shotts SIA is classified as a strategic industrial area at the State level anticipated to accommodate heavy industry.
State Planning Policy 2 – Environment and Natural Resources Policy	State Planning Policy No. 2 Environment and Natural Resources Policy sets out the broad environment and resource management policies for ecologically sustainable development. It notes that careful assessment will be required to resolve conflicts between land use and protection of natural resources, giving consideration to potential impacts on the environment, community lifestyle preferences, and economic values. This requires an understanding of the competing pressures of development and environmental protection, together with the economics of sustainable land use and management practices, advances in technology, and the priorities of the community.
State Planning Policy 2.7 – Public Drinking Water Source	A key strategic statement in the State Planning Strategy (1997) is to 'ensure that water resources are conserved and their quality protected'. This is recognised in various criteria for plans and key actions in the Strategy to protect existing and future public drinking water supplies. The subject land is located within the Public Drinking Water Source Area of the Wellington Dam.
State Planning Policy 3.7 - Planning in Bushfire Prone Areas	The Bushfire policy seeks to utilise land use planning to assist in the preservation of life and reducing the risk of bush fire on property and infrastructure. The policy provides a range of measures such as: • Appropriate design and location of development • Management of potential fuel loads • Implementation of Bushfire Management Plans and Bushfire Risk Management Plans Any development which is located within a Bushfire Prone Area is to be accompanied by a Bushfire Attack Level Assessment and if required a Bushfire Management Plan.
State Planning Policy 4.1 – State Industrial Interface	The objectives of the policy are to: • avoid conflict between industry and/or essential infrastructure and sensitive land uses; • protect industry and/or essential infrastructure from encroachment by those land uses that would be sensitive to impacts and adversely impact the efficient operations;

DOCUMENT	SUMMARY
	• provide for the development of industry and/or the provision of essential infrastructure in a way that maximises amenity, minimises environmental and health impacts and takes account of risk to nearby sensitive land uses; and • promote compatible uses in areas affected by off-site impacts of industry and/or essential infrastructure. A “compatible land use” is a use that when located in a buffer will tolerate exposure to off-site emissions without impairment to its own operation. Hence the buffer is the area in which sensitive land uses are restricted because of the likely impacts upon it. The definition of the buffer must take into account a number of factors including, odour, noise, risk, health hazard, light spill, dust, air quality, water quality and cleaner production and resource recovery. Local planning schemes are the preferred basis for identifying and managing use and development within the buffer. It is noted that the Policy states that proposals which satisfy recommended buffer distances in Environmental Protection Agencies Guidance Statement No 3 are deemed to comply with the objectives of SPP 4.1.

2.3. LOCAL PLANNING

The following section provides an overview of the local planning policies, which influence the development of the Shotts SIA.

Table 3 – Local Planning Framework

DOCUMENT	SUMMARY
Shire of Collie Local Planning Strategy	Shotts SIA is noted as a Development Investigation Area. At the time of the strategy being prepared the estate was not appropriately zoned and was strategically identified for further investigation. Specifically, the strategy objectives in regard to Shotts are to develop a heavy industrial estate over 250ha to complement the Coolangatta Industrial Estate.
Shire of Collie Local Planning Strategy 2020	Section 9: Shotts SIA is identified as Strategic Industry. The strategy notes the estate provides for the strategic development of coal related industries however acknowledges there are possibilities to investigate a more diversified industrial development. Specifically, the diversification could provide opportunities to accommodate lots to complement the expansion of the Collie Light Industrial Area and service local needs, especially those uses which may generate impacts which are not compatible with the Collie townsite. STRATEGY: Shotts strategic industrial land retained as strategic industrial land.

DOCUMENT	SUMMARY
	ACTION 40. Shotts industrial park to be incorporated into the new LPS 6 as a Strategic Industry zone with a 3km special control area buffer and provisions to ensure only compatible land uses can occur within the buffer. ACTION 41. Investigate the potential for Shotts to accommodate other strategic industrial uses and for a portion of the site to be used for larger industrial lots for local general industrial needs.
Shire of Collie Local Planning Scheme No. 5	The core industrial area is zoned Special Use 11 and Structure Plan Area 1 while the buffer is included as a special control area. Schedule 14 identifies the land use expectation as • Industrial Uses • Char Plant • Urea Plant • Power Generation and • Support Industries Inserted into the scheme by Amendment 1 – 19/11/10 Special Use Zone 11 provisions controls objectives and the land use permissibility of the zone. The objective of the zone is to allow for the development of industry associated with the coal resource and other support or related industries. Land use permissibilities are as follows: • Industry – rural – D • Industry – general – D • Industry – extractive – D • Industry – light – D • Industry – noxious – A • Telecommunications Infrastructure – D Land use and development to be in accordance with the structure plan adopted by local government and approved by the Commission. All applications require EPA approval. The buffer is controlled by a 3km special control area and buffer uses are limited to 'compatible land uses' and no 'sensitive land use' is permitted within the buffer.

3. LAND USE CONSIDERATIONS

The development of Shotts SIA was enabled through Amendment 1 to the Shire of Collie Town Planning Scheme No.5 and a supporting Structure Plan gazetted in 2010.

The Shotts SIA Structure Plan (previously called the Shotts Industrial Park Structure Plan) was prepared in 2010 by Thompson McRobert Edgeloe Group for the purposes of supporting Scheme Amendment No. 1 to the Shire of Collie Town Planning Scheme No. 5. The documentation included both the Amendment reporting and Structure Plan in a single document.

The Structure Plan focussed on the development of Shotts SIA for coal related uses supporting the existing mining and power station uses within the locality. The aim was for the structure plan area to take advantage of the existing infrastructure and supply connections associated with the power and coal industry within the locality.

The Structure Plan established the development framework for the Shotts SIA through five development areas for industrial uses and the industrial buffer which has since been incorporated into the Scheme as a Special Control Area. While the Shotts SIA zoned industrial core has a total area of 235 hectares, the net developable land is 187 hectares across the five development areas. The remainder of the land is within infrastructure and road reserves/easements or within retained vegetated areas.

A breadth of technical reporting was undertaken to support the development of the Structure Plan, noting the key environmental and infrastructure considerations for the subject land, including:

- Underground subsidence
- Water Management:
- Vegetation and Fauna
- Heritage
- Traffic and Access
- Soil Contamination
- Acid Sulphate Soils
- Dieback
- Bushfire Management
- Buffer Management

The Structure Plan targeted Urea and Char operators as the likely foundation proponents to establish in Shotts, however this has not eventuated with changes to the economic and market conditions surrounding the coal industry.

Amendment 1 to the Shotts SIA Structure Plan

Amendment No. 1 to the Shotts SIA Structure Plan has been prepared concurrently to this Scheme Amendment allowing for consistency between the planning documents guiding development within the Shotts SIA.

In line with the intentions of the scheme amendment, Amendment 1 seeks to amend to the terminology within the structure plan to allow for the diversification of land uses. In particular, Amendment 1 seeks to amend the objective of the structure plan to remove the reference to coal related industries and to allow for developments of state or regional significance to develop within the Shotts SIA. Amending the objective provides for greater flexibility surrounding the potential uses within the Shotts SIA and ensures the land uses permissibilities line up with those within Strategic Industrial Areas across Western Australia.

The change in direction for Shotts SIA is supported by the outcomes of an Industrial Ecology Study undertaken by DevelopmentWA and the Department of Jobs, Tourism, Science and Innovation which identified significant potential for a range of strategic industry/ noxious uses within the Shotts SIA. This will help attract a broader range of downstream processing industries to the Collie area and make the Shotts SIA similar in its use category to other strategic industrial areas across the State. The Study highlighted opportunities for key cluster industries such as; forest products, paper and biomass; cement and construction; mineral sands and downstream coal and chemicals. This is further detailed in the section 4: Technical Capability.

4. TECHNICAL CAPABILITY

This section outlines the technical capability of the land to accommodate the proposed changes and the final forms of land use and development which will result from this amendment.

The ability for the subject land to be developed for strategic industry has been demonstrated through the significant reporting that was undertaken in order to support Scheme Amendment 1 to the Shire of Collie Local Planning Scheme No.5 and the Structure Plan.

The ability for Shotts SIA to accommodate a diversification of land uses as proposed by this amendment is supported by a review of the Industrial Ecology and the Engineering servicing requirements of Shotts SIA.

4.1. INDUSTRIAL ECOLOGY

In response to the changing direction of the State towards the future industries within Collie, DevelopmentWA and the Department of Jobs, Tourism, Science and Innovation engaged Advisian to undertake an Industrial Ecology study (refer **Appendix A**) to determine industries beyond coal which could be established within Shotts SIA.

Advisian assessed 66 potential industries, and four industrial clusters were shortlisted based on a number of criteria including (**bolded** criteria being the key considerations):

- **Heavy Industry** (does the use fall under the definition of heavy industry)
- **Local Resource Availability** (is there a source of resources within a 75km radius)
- Buffer Zone Requirements (greater than 500m)
- Electricity Intensive (is the use electricity intensive)
- Direct Transport links (are there direct transport links for associated resources)
- No competing sites (no competing sites within 50km radius)
- Propensity for Greenfield Investment
- Co-location and By-product synergies

The clusters included industries which would benefit from co-location and by-product synergies, and which would not require significant infrastructure upgrades to make the site development ready, thus being more enticed to establish at Shotts SIA. These industries include:

1. Forest products, paper and biomass
2. Downstream coal and chemicals
3. Mineral sands, chlor-alkali and pigment; and
4. Cement and construction material

Whilst the assessment indicated that coal related uses had a potential to located within Shotts SIA, it highlighted a number of other non-coal related industries and industry clusters which have the potential to establish within Shotts SIA.

Further, it is acknowledged that a wider range of industries could develop at Shotts SIA, however the screening process undertaken noted the above clusters as those with the highest potential to locate within Shotts SIA.

It is also noted that the development of diversified industries within Shotts SIA provides numerous benefits in regard to the infrastructure and servicing required to support development. This includes the further breakdown of the development areas into small development lots in order to provide for a range of industries at the point in time when they are required.

4.2. ENGINEERING / SERVICING

Calibre undertook an Engineering Services assessment in mid-2019 (refer **Appendix B**) which reviewed the potential options for servicing strategic industry (in line with the Industrial Ecology reporting) within Shotts SIA. The reporting determined that a range of servicing options are available for development within the Shotts SIA. The servicing options selected will depend on final demands for each of the required services.

Based on the following servicing demands high level estimates have been developed for the servicing of Shotts SIA:

- **Non Potable Process Water** = 12 Gigalitres / year.
- **Potable Water** = 25 Megalitres / year
- **Electricity Supply** = 200 MW peak (250 MVa)
- **Gas** = 30,000 Nm3/day.
- **Earthworks** = by site developers.
- **Communications** = by site developers depending on own requirements.
- **Roads** = no additional new roads, Shotts Road intersection already constructed. Usage of Premier Road to be negotiated.
- **Domestic Waste Water treatment / disposal** = 25 ML/yr or by site developers depending on own requirements.
- **Process Waste Water treatment / disposal** = by site developers depending on own requirements.
- **Storm Water Drainage** = provided by each site developer to suit their site and comply with an overall drainage strategy which meets the environmental objectives of the Department of Water and Environmental Regulation and Department of Water and Environmental Regulation and Environmental Regulation (now combined as DWER), and State and Federal Environmental Protection Departments.
- **Emergency Services** = an emergency management committee is formed which answers to and includes representatives of DFES.

5. FORMAL PROPOSAL

This section is aimed at providing a summary of what each proposed amendment to LPS5 is intended to achieve and why it is important.

The diversification of the land uses within Shotts SIA is consistent with the strategic direction for Shotts SIA as identified within the Shire of Collie Local Planning Strategy 2020. The planning strategy expressly includes the development of Shotts SIA for strategic industrial purposes beyond that of the current coal based uses permitted by the Scheme.

Table 4 – Justification for proposed Amendments

Proposed Amendments	**Justification**
Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to amend the following land uses permissiblities: • ***Industry – P*** • ~~Industry – rural ('D' use)~~ • ~~Industry – general ('D' use)~~ • ~~Industry – extractive ('D' use)~~ • Industry – light ('D' use) • ~~Industry – noxious ('A' use)~~ • ***Mining Operations – A*** • ***Office – I*** • ***Renewable Energy Facility – A*** • ***Resource Recovery – D*** • ***Telecommunications Infrastructure – P*** • ***Waste Disposal Facility – A*** • ***Waste Storage Facility – A***	The inclusion of the additional land uses allows for the diversification of land uses. The definition of 'Industry' in addition to the existing land use permissibliities provides a large degree of flexibility to capture uses which may wish to establish within Shotts SIA. The land use permissiblities have been determined through review of the proposed permissbilities for LPS6 and through review of land use permissibilities in other SIAs across Western Australia. The proposed land uses are consistent with the *Planning and Development (Local Planning Schemes) Regulations 2015* and futureproof the uses which may be approved within Shotts SIA. This is an approach taken in many other strategic industrial areas across the state.
Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following objectives: ***a) To allow for the development of industries of State or regional significance and supporting/ancillary activities, reflective of its role as a Strategic Industrial Area.*** ~~Allow for the development of industry associated with the coat resource and other support or related industries.~~ ***(b) To provide for industrial development that:*** ***(i) is sufficiently flexible to accommodate the diversification of primary industries within Collie;*** ***(ii) encourages activities consistent with the principles of industrial ecology; and***	Expanding the objectives of the Shotts SIA is a critical component of this amendment. Under the current objective, proposed development must be related to coal to be considered/approved within Shotts SIA. This restricts the development potential for Shotts SIA and as such the objective must be reworded to allow for the diversification to occur. The objective is important in providing the guiding direction for the future development and land uses within Shotts SIA. As such providing both certainty and flexibility for the future form of develop is considered necessary. Providing additional guidance in the form of an expanded objective is consistent with the approach taken within other strategic industrial areas across the state.

Proposed Amendments	Justification
(iii) provides sufficient flexibility to accommodate varying needs and future forms of development.	Specifically, the objective seeks to provide certainty for the local government and relevant state departments that the form of industry that will develop within Shotts SIA will be strategic in nature, thus ensuring compatibility of uses within the estate and the potential for synergies in terms of uses, infrastructure requirements and buffers. The objective also seeks to provide flexibility for a range of uses to establish, provided they are of State or regional significance. This will allow for the development to be delivered in a form which is suited to the end user, acknowledging the unique characteristics of the operators likely to establish within Shotts SIA. This also ensures the estate can continue to meet user demands over time as the market changes and technology improves strategic industrial practises.
. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to replace the following conditions: ~~**2. Structure Plan**~~ ~~(a) land use and development within the Special Use Zone No. 11 shall comply with a Structure Plan adopted by the local government and approved by the Commission in accordance with the Scheme or any subsequent Structure Plan adopted by the local government and approved by the Commission.~~ ~~**3. EPA Approval**~~ ~~All applications for planning approval within the Special Use Zone No. 11 shall be referred to the EPA for assessment unless –~~ ~~(a) The EPA has agreed that a specific class of industry will not have any additional environmental impacts in the area; or~~ ~~(b) The application is for a minor or ancillary development with no significant environmental impacts.~~ ***2. A Structure Plan is to contain such details as, in the opinion of the local government and Western Australian Planning Commission, is required to satisfy the planning requirements for the proposed development, and shall include, but not be limited to, the following details:*** ***i. Identification and proposed management of any likely environmental***	These amendment of conditions 2 and 3, and renumbering of condition 2(b) to 4 has been requested through consultation with the EPA. The recommended provisions as provided by the EPA seek to provide additional clarity on the environmental considerations and reporting process and have been developed in conjunction with the amendments they have recommended to proposed LPS6 to ensure consistency.

Proposed Amendments	Justification
impacts or emissions generated from the envisaged industrial development, including cumulative impacts, to ensure that these impacts are appropriately managed and contained within the Shotts Strategic Buffer (SCA); ***ii. The identification and management of environmentally sensitive locations, including possible contaminated sites, underground mine workings, wetlands, and significant flora, vegetation, fauna habitat and habitat corridors;*** ***iii. Establishment of appropriate separation between strategic and general industrial land uses, if applicable.*** ***iv. The apportionment of land suitable for general and strategic land uses, and typical lot sizes;*** ***v. The indicative lot pattern and staging;*** ***vi. The provision of major infrastructure, including main drainage, power, sewerage, water supply and other key infrastructure services.*** ***vii. The proposed major road network and other transport and movement systems.*** ***viii. Bushfire management, including consideration of hazard separation, water supply, and emergency access.*** ***3. All applications for development approval shall be referred to the Department of Water and Environmental Regulation for comment unless:*** ***i. The Department of Water and Environmental Regulation has agreed that a specific class of industry will not have any additional environmental impacts in the area; or*** ***ii. The application is for minor or ancillary development with no significant environmental impacts.*** 4. Where a structure plan has been advertised and approved in conjunction with an Amendment to the Scheme it shall be deemed to have complied with the requirements of Clause 6.3.5 of the Scheme.	
Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following Condition: **5. Development Standards** **(a) Setbacks and carparking shall be designed and demonstrated to meet operational needs and/or on site considerations.**	The provision of development standards for Shotts SIA has been requested by DPLH in order to bring the area in line with proper and orderly planning practises. In determining the appropriate development standards a review of development standards for Kemerton SIA and Ashburton North SIA was

Proposed Amendments	Justification
(b) All development shall have general regard to the development standards for the general industry zone in Schedule 11.	undertaken in order to ensure consistency across SIAs. It is noted through the Ashburton North SIA process it was determined that in order to provide flexibility for strategic industrial uses with a wide range of site requirements that allowing development to demonstrate development standards meet operational requirements or site considerations is the optimal outcome. By nature of strategic industrial use, the proposals onsite buffers that are required to be maintained will provide for sufficient setbacks, and car parking is directly linked to staffing numbers on site. For other development standards, it is noted these are generally consistent with those of general industrial areas, as such general regard should be given to these.
Amend Schedule 14 – Structure Plan Areas No. 1 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to remove the following: ~~Land Use Expectation~~ • ~~Industrial uses;~~ • ~~Char Plant;~~ • ~~Urea Plant;~~ • ~~Power Generation; and~~ • ~~Support / Industries.~~	These provisions have been removed at the direction of the DPLH. Structure Plans can no longer provide guidance on land uses within the structure plan area and this update reflects this stance. The guidance for land uses is now solely through the land use permissbilities located within Schedule 4 No. 11. In addition to meeting statutory requirements, this allows for the diversification of land uses to be achieved through the objectives and land use permissiblities.
Amend Schedule 1 – Dictionary of defined terms and expressions to include: 2. Industry - means premises used for the manufacture, dismantling, processing, assembly, treating, testing, servicing, maintenance or repairing of goods, products, articles, materials or substances and includes premises on the same land used for: (a) the storage of goods; (b) the work of administration or accounting; (c) the selling of goods by wholesale or retail; or	These definitions have been taken from the Planning and Development (Local Planning Schemes) Regulations 2015 and the DPLH position statement on renewable energy facilities to ensure definitions which are consistent with those which will be included within LPS 6. The definitions are required in order to ensure the land use permissbilities can be included within the amendment/Scheme as they are not currently defined within LPS5.

Proposed Amendments	Justification
(d) the provision of amenities for employees, incidental to any of those industrial operations; ***(e) incidental purposes*** ***3. Mining Operations - mining operations means premises where mining operations, as that term is defined in the Mining Act 1978 section 8(1) is carried out;*** ***4. Renewable Energy Facility - means premises, buildings or structures used to generate energy from a renewable energy source. It does not include solar panels or a wind turbine principally used to supply energy for an individual lot's private domestic or rural supply;*** ***5. Resource Recovery - resource recovery centre means premises other than a waste disposal facility used for the recovery of resources from waste;*** ***6.*** Telecommunications infrastructure means land used to accommodate ~~any part of~~ the ***used by or in connection with*** ~~of~~ a telecommunications network and includes any line, equipment, apparatus, tower, antenna, tunnel, duct, hole, pit or other structure ~~used, or for use in or in connection with, a telecommunications~~ ***related to the*** network; ***7. Waste Disposal Facility - means premises used —*** ***(a) for the disposal of waste by landfill; or*** ***(b) the incineration of hazardous, clinical or biomedical waste;*** ***8. Waste Storage Facility - means premises used to collect, consolidate, temporarily store or sort waste before transfer to a waste disposal facility or a resource recovery facility on a commercial scale;***	
Amend Table 1:Zoning Table to include the following uses and associated legend:	The introduction of the additional uses for the Special Use Zone requires the uses to be inserted into the scheme definitions. In order to ensure proper and orderly planning is maintained land use permissibilities for these is required to be included within the zoning table.

Proposed Amendments	Justification
<table><tr><th></th><th>Rural 1</th><th>Rural 2</th><th>General</th><th>Light an</th><th>Mixed U</th><th>Residen</th><th>Residen</th><th>Rural Re</th><th>Town Ce</th></tr><tr><td>Industry</td><td>X</td><td>X</td><td>P</td><td>A</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Mining operations</td><td>A</td><td>A</td><td>D</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Renewable energy facility</td><td>A</td><td>A</td><td>P</td><td>A</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Resource recovery centre</td><td>A</td><td>A</td><td>P</td><td>D</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Waste disposal facility</td><td>A</td><td>A</td><td>A</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Waste storage facility</td><td>X</td><td>X</td><td>A</td><td>A</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr></table> ***Legend*** ***X Not Permitted*** ***D LG Discretion*** ***P Permitted*** ***I Incidental*** ***A Advertising***	The land use permissibilties have been determined at the direction of the Shire and in accordance with the permissibilites proposed under draft LPS6 to ensure consistency.
Amend Table 1 Zoning Table to update the permissibility for the following uses: <table><tr><th>Use Class</th><th>Rural 1</th><th>Rural 2</th><th>General Industry</th><th>Light and service Industry</th><th>Mixed Use</th><th>Residential</th><th>Residential Development</th><th>Rural Residential</th><th>Town Centre</th></tr><tr><td>Office</td><td>I</td><td>I</td><td>I</td><td>I</td><td>D</td><td>X</td><td>X</td><td>X</td><td>P</td></tr><tr><td>Telecommunications Infrastructure</td><td>D</td><td>D</td><td>P</td><td>P</td><td>A</td><td>A</td><td>A</td><td>A</td><td>A</td></tr></table>	The updates to the permissibility for Office and Telecommunications Infrastructure have been requested by the Shire to ensure proper and orderly planning is maintained.
Amend Clause 4.3.2 to include the “I” definition: 4.3.2 The symbols used in the cross reference in the Zoning Table have the following meanings: “P” means that the use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme; “D” means that the use is not permitted unless the local government has exercised its discretion by granting planning approval; ***“I” means that the use is permitted if it is consequent on, or naturally attaching, appertaining or relating to the predominant use of the land and it complies with any relevant development standards and requirements of this Scheme***	This update is an administrative change to include the definition for the “I” use introduced for the Office land use.

Proposed Amendments	Justification
“A” means that the use is not permitted unless the local government has exercised its discretion by granting planning approval after giving special notice in accordance with clause 9.4; “X” means a use that is not permitted by the Scheme.	

6. CONCLUSION

This report has been prepared by Urbis Pty Ltd on behalf of DevelopmentWA in support of an application to amend the provisions relating to the Shotts SIA under the Shire of Collie Local Planning Scheme No. 5

The report addresses the site context and relevant planning framework and provides a comprehensive justification in support of the proposed Amendment along with providing an outline of the amendments to the supporting structure plan prepared concurrent to this report.

The amendment is justified as follows:

- The amendment is a standard text amendment seeking to remove the requirement for development to be linked solely to coal.
- The diversification of land uses is supported by the Industrial Ecology and Engineering Servicing reporting.
- The diversification of land uses is consistent with the State's economic development goals for Collie.

The Shire of Collie's support to the amendment as proposed, is therefore respectfully requested.

Shotts Strategic Industrial Area

Economic and Market Analysis

28-May-19

Level 4, 600 Murray St
West Perth WA 6005
Australia

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WorleyParsons Group

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Project No: 301012-02665-TBA Shotts Strategic Industrial Area: Economic and Market Analysis

Rev	Description	Author	Review	Advisian Approval	Date
A	Issued for Internal Review	D Foster/ Y Cho	V Fok	P Mann	10-Apr-19
B	Issued for Client Review	D Foster/ Y Cho	V Fok	P Mann	12-Apr-19
C	Final Report Issued to Client	D Foster/ Y Cho	V Fok	P Mann	28-May-19

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Acronyms and Abbreviations

Table 1-1 Acronyms and Abbreviations

Definition	Acronym/Abbreviation
Australian Bureau of Statistics	ABS
Australian and New Zealand Standard Industrial Classification	ANZSIC
Department of Energy	DoE
Environmental Protection Authority	EPA
Department of Jobs, Tourism, Science and Innovation	JTSI
Kilowatt per hour	kWh
Mines and mineral deposits database	MINEDEX
Request for Service	RFS
Strategic Industrial Area	SIA

Executive Summary

The objectives of the Shotts Strategic Industrial Area (SIA) as set out in the 2010 Structure Plan report is to provide for the development of coal related industries and associated uses, which by the nature of their operations, should be separated from and not have an adverse impact on residential and other sensitive land uses[1]. LandCorp, JTSI and the Shire of Collie are now considering other non-coal related industries that may involve downstream processing and require a buffer zone. Advisian has been engaged to identify and prioritise the likely downstream processing industries/products that may be attracted to establish in the Shotts SIA.

Advisian developed a methodology to determine industries beyond coal most likely to be attracted to the Shotts SIA. Potential industries satisfying the two primary criteria of local resource availability and are classified as Heavy Industry, were further screened against six secondary criteria. A shortlist was developed based on a scoring system which identified a list of industries considered with a "high" likelihood to locate in the Shotts area.

A standalone industry was considered unlikely to develop in the area, however the likelihood for development increased when industries were grouped into clusters due to benefits from co-location and by-product synergies. The shortlisted industries consisted of four industrial clusters which include:

1. Forestry, paper and biomass
2. Downstream coal and chemicals
3. Mineral sands, chlor-alkali and pigment; and
4. Cement and construction material

A draft concept plan has been prepared to outline a potential site layout. A parallel study has also been undertaken to identify key servicing requirements for the industries and industrial clusters. It was found that existing infrastructure and/or environmental constraints in the area acted as barriers to development and restrict the size of the developable areas within the SIA.

The forestry, paper and biomass cluster make up the largest number of industries with developable areas allowing for the development of key servicing requirements. The other clusters consist of industries requiring land areas larger than currently available. The creation of larger sites would require significant site works and incur high costs to develop the smaller sites to service these industries.

The options for industries and industrial clusters to locate in the Shotts SIA based on the assumed screening methodology are currently limited due to infrastructure and environmental constraints. A broader range of industries could potentially locate within Shotts with revisions to the current screening criteria and/or the development of larger developable areas which would involve significant costs associated with relocation of existing infrastructure.

[1] Thompson McRobert Edgeloe Group, *"Shotts Industrial Park, Research, Design & Delivery of Sustainable Development"*, August 2010

1 Introduction

Advisian has prepared a market and economic analysis of the Shotts Strategic Industrial Area (SIA) for LandCorp. The objectives of the study are to identify and prioritise the likely downstream processing industries/products that may be attracted to establish in the Shotts SIA and determine the key servicing requirements. The industries identified are those with downstream processing satisfying the primary criteria of local resource availability and are classified as Heavy Industry.

Advisian developed a screening methodology to determine a shortlist of industries most likely to benefit from co-location and by-product synergies in the Shotts SIA. Industries satisfying the primary screening criteria, were further screened on a secondary criteria. Scoring was based on a points system to determine a shortlist of industries and industrial clusters with a "high" likelihood to locate in the Shotts SIA.

A concept plan outlining a potential layout for the site with key servicing requirements for the shortlisted industries was identified. This consisted of the identification of land areas and key services required for downstream processing in the SIA.

2 Background

2.1 Shotts Strategic Industrial Area

The Shotts SIA is located approximately 7.5km to the east of the township of Collie in Western Australia's south west. The SIA incorporates 235ha of land zoned for industrial development. The site is serviced by existing road (Coalfields Highway) and freight rail connections providing strong transport links to the wider region including the Port of Bunbury located approximately 70km to the west. This is shown in Figure 2-1.

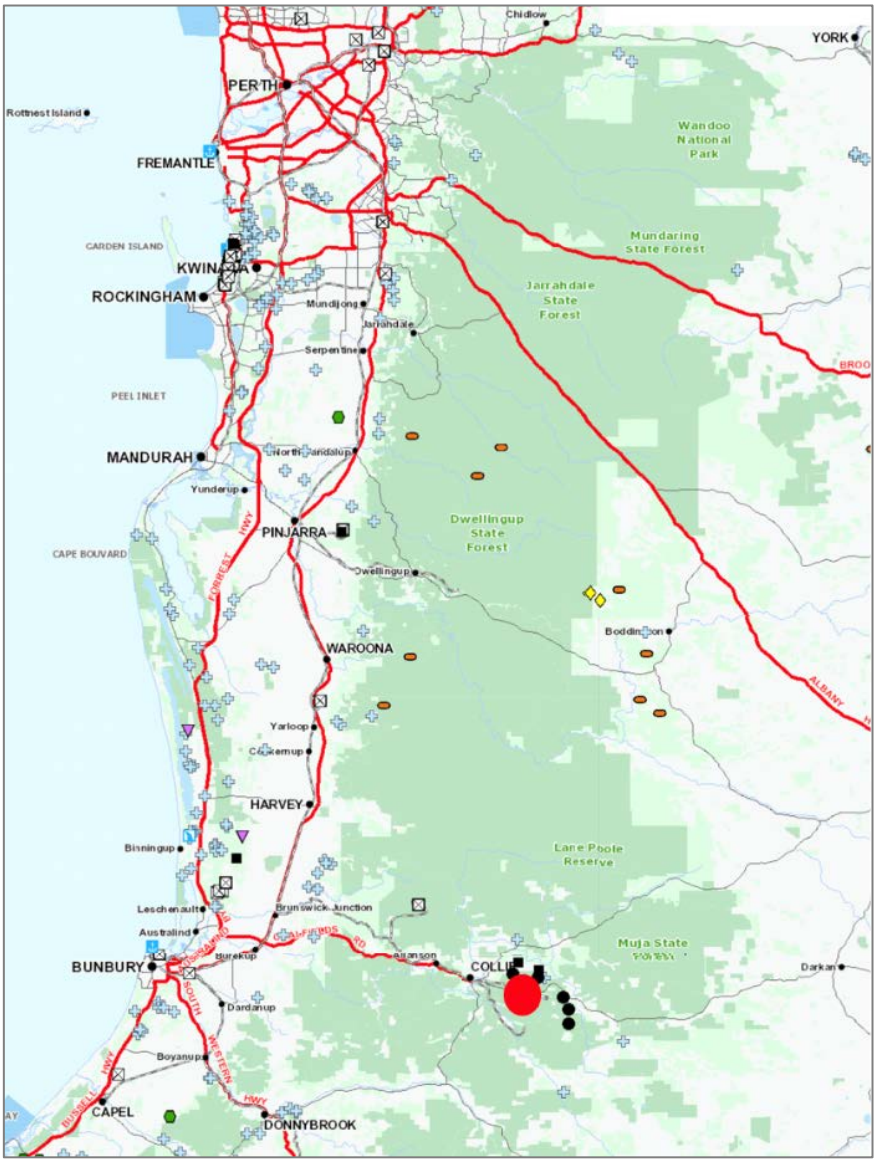


Figure 2-1: Shotts Strategic Industrial Area

A Structure Plan was prepared for the SIA in 2010.[2] The plan identifies several different development areas within the SIA. Taking into consideration environmental constraints, drainage and infrastructure the total net developable area of the SIA is 187.4ha.

Table 2-1: Shotts SIA Development Areas

Development Area	Area	Vegetation	10% Vegetation Retention	Detention Basins	Easement	Net Developable Land
DA1	17.2	13.7	1.4	0.3	0.8	14.6
DA2	13.8	10.1	1.0	0.3	2.0	10.4
DA3	12.2	6.1	0.6	0.4	0.8	10.4
DA4	123.3	56.3	5.6	1.6	12.5	103.6
DA5	54.2	32.4	3.2	1.3	1.3	48.4
Railway	11.3	2.5	0.3			
Roads	3.1	0.2	0.0			
TOTAL	235.1	121.3	12.1	3.9	17.4	187.4

Note: All areas above are in hectares
For the purposes of this table the area of the detention basins has been derived from the required volume and assuming an average depth of 2m

Table 2-1 provides a summary of the available development areas within the SIA. It should be noted that the current site is also constrained by existing infrastructure including conveyors and haul roads supporting other industrial operations in the surrounding area (see Figure 2-2).

Initial advice from Calibre who have been engaged to develop servicing plans for the SIA is key infrastructure (power, water, telecommunications and gas) can all be extended to the site should they be required.

[2] Ibid

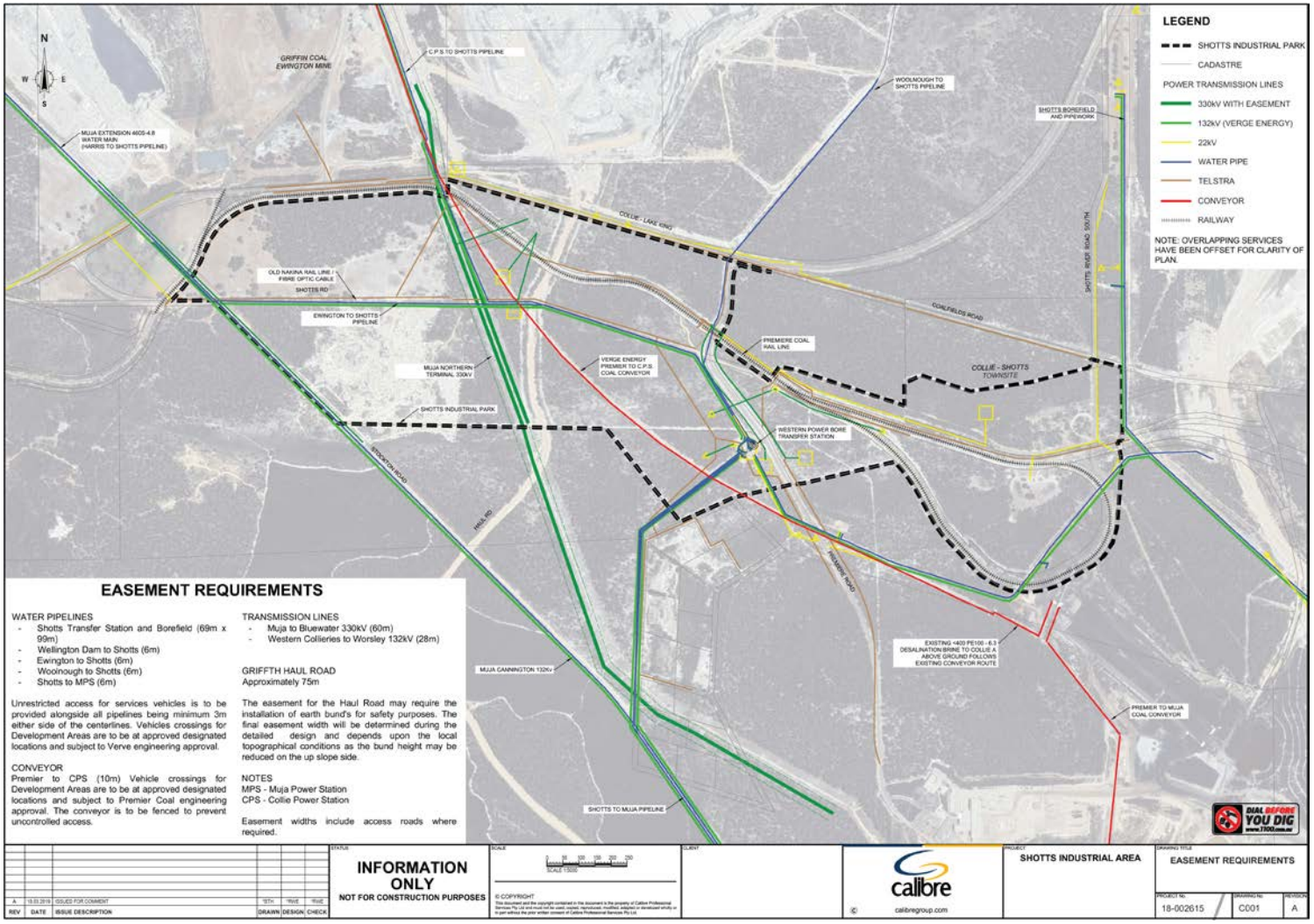


Figure 2-2: Existing Infrastructure

3 Study Methodology

A methodology was established to determine a shortlist of industries likely to locate in the Shotts SIA. A list of potential industry options was identified, with options categorised into an industry classification and key feedstock required. Each option was also grouped into industrial clusters.

The screening process assumed there were no constraints in the availability or deliverability of inputs required for downstream processing. For example, if gas was required, it was assumed that gas could be delivered despite of any cost or supply constraints. Further details of land and key servicing requirements will be addressed in Section 8.

Industries were screened on a total of eight screening criteria consisting of two primary and six secondary criteria. Industries satisfying the primary criteria were further screened on a set of secondary screening criteria. Industries were classified into low, medium and high likelihood for industry engagement to locate in the Shotts SIA. The classification was based on a total score calculated on the number of criterion satisfied.

The site layout and servicing requirements for industries and industry clusters identified as "high" likelihood for industry engagement to locate at Shotts was then undertaken.

An overview of the methodology undertaken as part of this study is illustrated in Figure 3-1.

Figure 3-1: Screening Methodology

4 Industry Screening

A preliminary list of possible industries was created as a starting point for the screening process. The preliminary list had a total of 66 industry options compiled from publicly available company, government and industry information. The following factors were considered in creating a preliminary list of land-use options:

- Industries requiring processing and a buffer zone
- Metallic and non-metallic minerals that are mined or have projects in Western Australia
- Existing and new technologies
- Social and environmental influences on existing and new industries
- Changes in the investment landscape for industrial processes

A two-stage screening process was applied to the preliminary list of 66 options. Details of the primary and secondary screening processes are outlined below.

4.1 Screening Criteria

Each industry option was screened on two primary and six secondary criteria. Based on the strategic vision and objectives of the Shotts SIA outlined in the Request for Service (RFS) document[3] and the Structure Plan Report[4], Advisian considers the two primary criteria selected as critical and prerequisites for an option to satisfy prior to being assessed against the secondary criteria.

The list of primary and secondary screening criteria is shown in Table 4-1. For this study a scoring system was established to rank the different options to determine the "likelihood" of industry engagement for potential development in Shotts. One point is allocated for each criterion satisfied (i.e. "yes" = 1 point), with each point weighted equally.

[3] LandCorp. "*LandCorp Request for Services, Request for Consultancy Services Economic and Market Analysis, Shotts Strategic Industrial Area,*" 2018
[4] Refer to 2

Table 4-1: Primary and Secondary Screening Criteria

Criteria		Screening Criteria
Primary	1	**Heavy Industry** Q: *Does the industry option fall into the category of "Heavy Industry" (as defined by the ABS)?*
	2	**Local Resource Availability** *Q: Is there a local source of resources/feedstock available within a 75km radius of Shotts?*
Secondary	3	**Buffer Zone** *Q: Is a buffer zone equal to or greater than 500m required?*
	4	**Electricity Intensity** *Q: Is the production process electricity intensive?*
	5	**Direct Transport Links** *Q: Is there direct transport links with feedstock source/s and markets?*
	6	**No Competing Sites** *Q: There are no competitive locations within a 50 km radius?*
	7	**Propensity for Greenfield Investment** *Q: Would investors/sponsors have a propensity to invest in a greenfield project in the SIA?*
	8	**Co-location and By-product Synergies** *Q: Is there an opportunity and can the option benefit from co-location and by-product synergies with other options?*

The full list of 66 industries screened against each criterion is shown in Appendix B.

The 66 industry options were narrowed down to eight industries made up of four industrial clusters, representing the final shortlist classified having a "high" likelihood for industry engagement in Shotts (see Figure 4-1). The site layout and servicing requirements for the shortlisted industries and industrial clusters is outlined in Section 8.

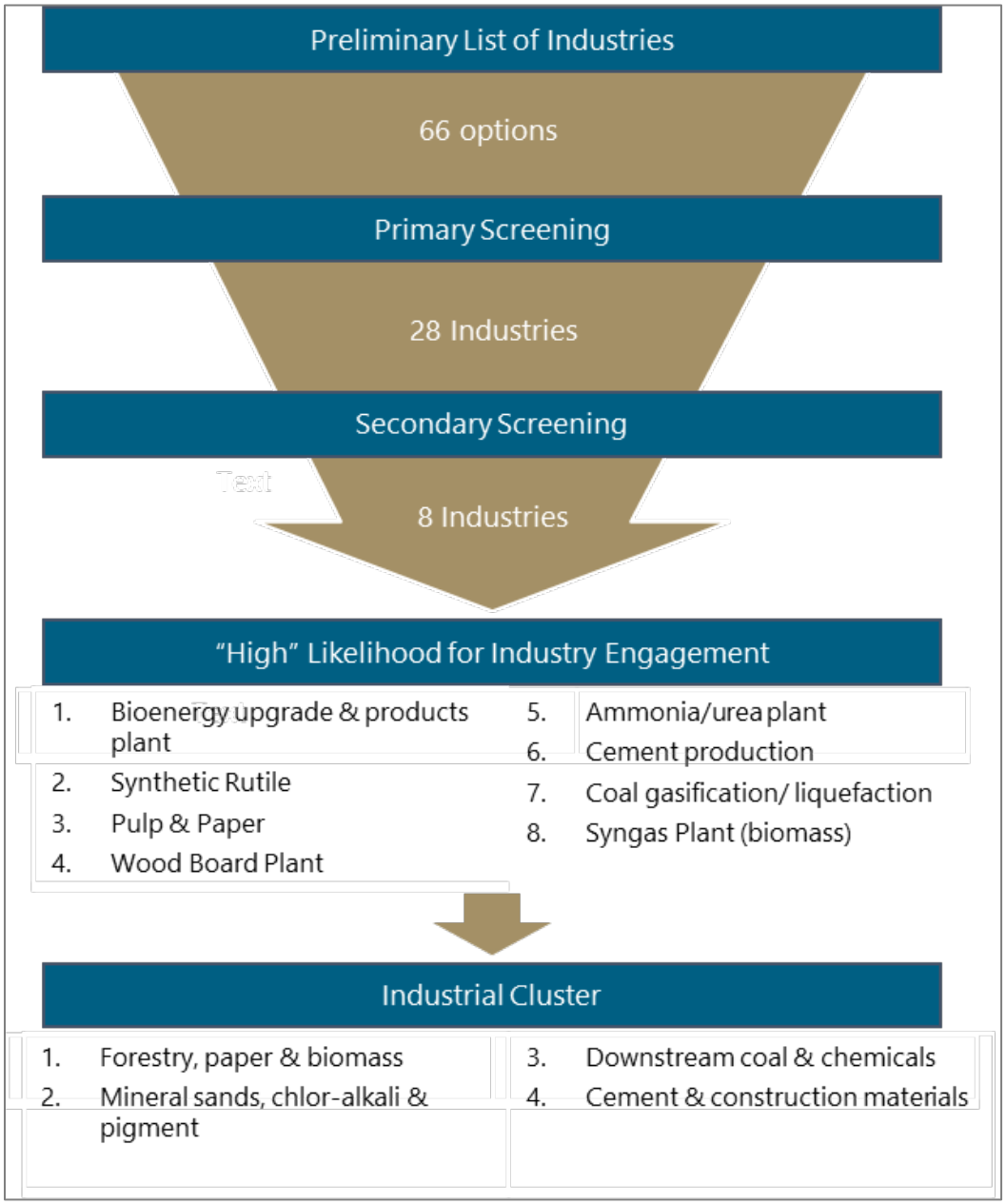


Figure 4-1: "High" likelihood of Industry Engagement

Details of the primary and secondary criteria have been outlined in the following sections.

4.1.1 Primary Screening Criteria

The two primary criteria each industry option is required to satisfy consist of:

1. Heavy industry; and
2. Local resource availability

4.1.1.1 Heavy Industry

Based on the RFS and discussions with LandCorp and JTSI, in addition to coal related industries, heavy industries with downstream processing requiring a buffer zone was a requirement for potential industries to locate in the Shotts SIA. Therefore, a "heavy industry" process/option was considered a primary criterion.

The Australian Bureau of Statistics (ABS) definition of "Heavy Industry" was used to determine options classified as heavy industry. Under the ABS definition[5], "Heavy Industry" comprises of:

- Industries related to '*oil, gas, coal, bauxite, alumina and other minerals*' – '*including the construction of production, storage and distribution facilities; refineries; pumping stations and construction of mines'; and*
- *'Other heavy industry' which includes 'construction of chemical plants; blast furnaces; steel mills; other industrial processing plants; ovens.'*

Of the 66 initial options considered, 53 options were classified as heavy industry. Each option from the preliminary list has been classified further into an industry category based on the ABS *Australian and New Zealand Standard Industrial Classification (ANZSIC)*[6]. The industry divisions and subsections are shown in Table 4-2.

Table 4-2: Relevant Australian and New Zealand Standard Industrial Classifications

Division	Subsection
Division B: Mining	▪ Coal Mining ▪ Oil and Gas Extraction ▪ Metal Ore Mining ▪ Non-Metallic Mineral Mining and Quarrying ▪ Exploration and Other Mining Support Services
Division C: Manufacturing	▪ Wood Product Manufacturing ▪ Pulp, paper and Converted Paper Product Manufacturing ▪ Petroleum and Coal Product Manufacturing ▪ Basic Chemical and Chemical Product Manufacturing ▪ Polymer Product and Rubber Product Manufacturing ▪ Non-Metallic Mineral Product Manufacturing ▪ Fabricated Metal Product Manufacturing ▪ Machinery and Equipment Manufacturing

[5] Australian Bureau of Statistics (ABS), "*Engineering Construction Activity, Australia Glossary, ABS cat no. 8762.0,*" 2019

[6] ABS, *"Australian and New Zealand Standard Industrial Classification, ANZSIC ABS cat no. 1292.0,"* 2006

Division	Subsection
Division D: Electricity, Gas, Water and Waste Services	▪ Electricity Supply ▪ Gas Supply ▪ Water Supply, Sewerage and Drainage Services ▪ Waste Collection, Treatment and Disposal Services
Division M: Professional, Scientific and Technical Services	▪ Professional, Scientific and Technical Services ▪ Computer System Design and Related Services
Division O: Public Administration and Safety	▪ Defence

4.1.1.2 Local Resource Availability

The availability and proximity of feedstock or raw materials are critical factors in the overall viability and economics of an option and was therefore considered to be a primary criterion. Although the degree of importance may vary for different industries, it is vital for process driven industrial operations to have access to cost efficient and sustainable source/s of feedstock.

A radius of 75km around Shotts was used to define the "Catchment Area" for this analysis. A radius of 75km was used to include the heavy mineral sands operations and projects near Busselton, and to exclude the industrial sites in and around Kwinana. The defined Catchment Area is shown in Figure 4-2.

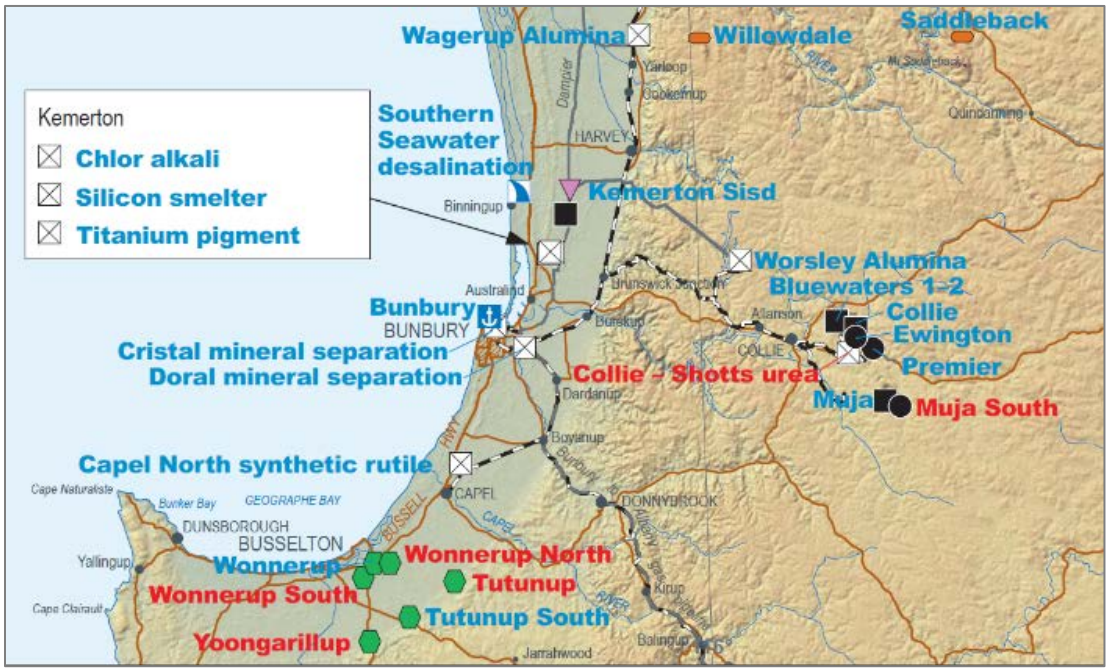
Source: Department of Mines, Industry Regulation and Safety

Figure 4-2: Shotts SIA Catchment Area

Within the Catchment Area, a total of 113 mineral operations and 37 major projects were identified. The operations identified were mainly producers of construction materials including sand, gravel and aggregates, basalt and granite. In addition, 19 limestone/lime-sand operations were identified along the coast between Bunbury and Preston Beach. Excluding construction materials and industrial minerals, the Catchment Area contained 18 operating mines and 9 major

projects (currently at stages of being proposed, under development or undeveloped[7]). Operations identified include heavy mineral sands, coal, silica, bauxite (alumina) and gold mines.

From the preliminary list, 34 options were considered to have local feedstock available within the Catchment Area. The major mining operations and projects included in the analysis are shown in Figure 4-3.



Source: Department of Mines & Petroleum

Figure 4-3: Major mining operations and projects

4.1.2 Secondary Screening Criteria

The six secondary screening criteria consist of:

1. Buffer Zone
2. Electricity Intensity
3. Direct transport links
4. Competitive options for location
5. Propensity to invest in Greenfields Plant; and

[7] Department of Mines, Industry Regulation and Safety; GeoVIEW.WA

6. Process/Product benefit from co-location and by-product synergies

4.1.2.1 Buffer Zone

Buffer zones are required to minimise or avoid potential land use conflicts due to operational elements such as air, noise and gaseous emissions generated by industrial, commercial and rural activities and infrastructure. Heavy industries generally require larger buffer zones to prevent any adverse impacts on properties and communities in the surrounding areas.

For this report, the buffer zone area for each industry was established from the Environmental Protection Authority (EPA) guidelines[8]. The guidelines were based on industries which were historically associated with amenity impacts from gas, dust, noise and odorous emissions as well as elevated levels of off-site risk to the public. The guidelines provide generic separation distances that have been developed by the Department of Energy (DoE) for a range of industrial land uses. The separation distances vary for different land uses according to four key emissions that may impact surrounding areas:

- Gaseous and particulate emissions
- Noise
- Dust; and
- Odour

The screening criteria used in the screening methodology was based on a buffer zone equal or greater than 500m. Industries satisfying this criterion were given a score of one. A size of 500m was selected based on collaboration and discussions with LandCorp and JTSI. Of the 28 options assessed, 26 options satisfied this criterion.

4.1.2.2 Electricity Intensity

Access to electrical power is considered as an attractive feature of the Shotts SIA. Most heavy industries are energy intensive but not all processes require high levels of electrical power. Focus has been placed on identifying power intensive land-use options that would benefit from being near and having easy access to electrical power sources.

The electricity intensity of each industry was determined based on Advisian's internal data sources. Electricity intensity was based on a relative basis, with intensity calculated on a kilowatt hour (kWh) per dollar of revenue generated, i.e. total electrical power consumed per unit of product value[9]. Internal data sources provided a relative measure of electricity intensity per tonne, and price per tonne. This metric gave a representation of industries that consider supply and access to electricity as a key strategic decision point impacting location.

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[8] Environmental Protection Authority of Western Australia, "*Guidance for the Assessment of Environmental Factors. Separation Distances between Industrial and Sensitive Land Uses No.3, Appendix 1,*" June 2005

[9] Product values based on 2008 data

Industries considered as high electricity intensive scored one point. Of the 28 options assessed against the secondary criteria, 20 options were ranked as high electricity intensity.

4.1.2.3 Emissions Intensity

Advisian completed an assessment of the emissions intensity of options, however this criterion was not used as a screening criterion based on feedback and advice from LandCorp and JTSI. Emissions intensity was based on a relative industry screen only, with intensities varying widely between industrial processes. Industry ranking of emissions intensity has not been completed as part of this study. The options considered as high emissions intensive have been identified in Appendix A and Appendix B.

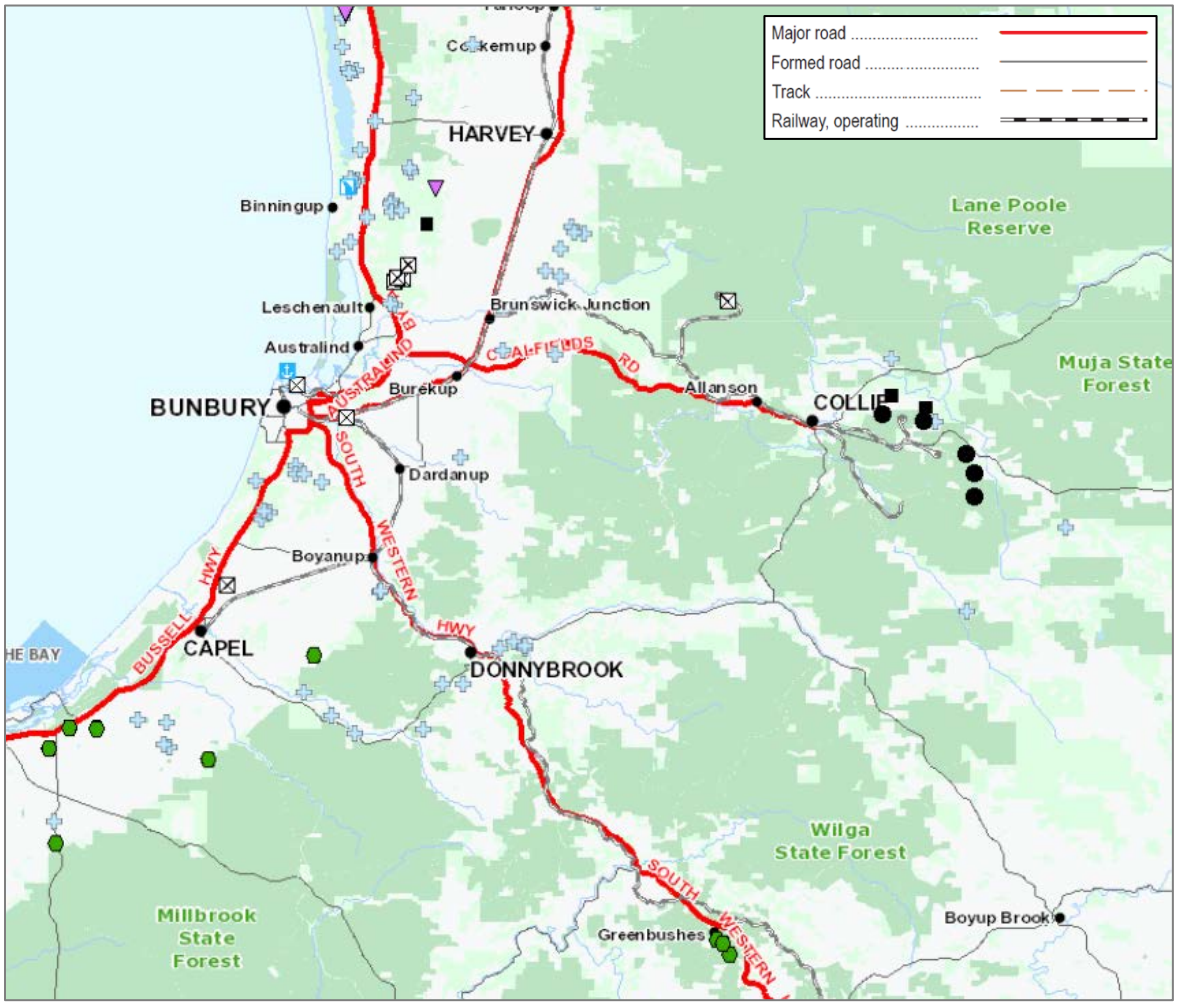
4.1.2.4 Direct Transport Links

Connectivity to feedstock sources and target markets is considered an important factor in determining the economic viability of an option and the attractiveness of the Shotts SIA compared to other competing industrial areas in the region such as the Kemerton SIA.

The following factors were used to determine whether an option values direct transport links:

- Proximity to feedstock source or target market
- Availability and accessibility to transport infrastructure comprising of road and/or rail
- Connectivity between feedstock source and target market to Shotts by primary road (highway or major arterial road) or rail
- Transport efficiency based on the directness of the travel route (i.e. deviation required along primary road/s or rail) and the possible need for multiple forms of transport

Main transport links to and from Shotts SIA is by the Coalfields Highway and existing railway line. The Coalfields Highway connects the South Western Highway and the Australind Bypass / Forrest Highway in the East. For the purposes of this assessment only road connections via highways or major arterial roads were considered in assessing this criterion. Figure 4-4 outlines the major road and rail routes considered in the analysis.



Source: Department of Mines, Industry Regulation and Safety

Figure 4-4: South-West Western Australia major road and rail map

Subject to capacity constraints and approvals, the Coalfield Highway can provide road connectivity to limestone/lime-sand operations north of Bunbury, bauxite mines near Waroona and heavy mineral sands operations in the south-west between Capel and Busselton (via Bussell Highway). The existing freight rail can also provide connections to mineral operations near Waroona in the North and Capel in the South-West.

Options requiring lithium as a feedstock did not satisfy this criterion. Although road (i.e. highways or major arterial roads) and rail connections are possible for lithium operations located in Greenbushes, a significant detour is required (the need to go north west to the outskirts of Bunbury before heading back east to Shotts), thus it was considered this transport solution was not viable. Of the 28 options reviewed, 21 options were considered to benefit from having access to direct transport links.

4.1.2.5 Competitive options for location

This criterion was used to assess other alternative sites to Shotts. The factors considered include:

- The availability and distance to feedstock sources
- Transport advantages and disadvantages
- Existence of competing operations
- Opportunities to co-locate and synergise with other complementary operations

For this criterion a point was scored if there were no competing locations or if Shotts was considered a more favourable site. For example, given Shotts' proximity to coal mines, industries requiring coal would result in Shotts being the favoured location.

Competing industrial areas within a 50km radius of Shotts was considered as shown in Figure 4-5. A 50km radius was assumed based on the RFS. The Kemerton SIA was the only dedicated industrial area falling within this radius, with the major industrial hubs in Kwinana and Rockingham falling outside the Catchment Area.

The industries and utilities currently located in the Kemerton SIA that represent potential competition includes:

- Silicon smelter - Simcoa Operations Pty Ltd
- Titanium dioxide / pigment production plant - Cristal Pigment
- Chlor-alkali plant - Nufarm-Coogee Pty Ltd
- Oxygen and nitrogen (air separation) – BOC Gases
- Lime hydration plant - Cockburn Cement
- Silica Sand (quarry) - Kemerton Silica Sand
- Power Station (gas) - Transfield Services Kemerton
- Kemerton Wastewater Treatment Plant
- Lithium hydroxide plant (under development) – Albemarle

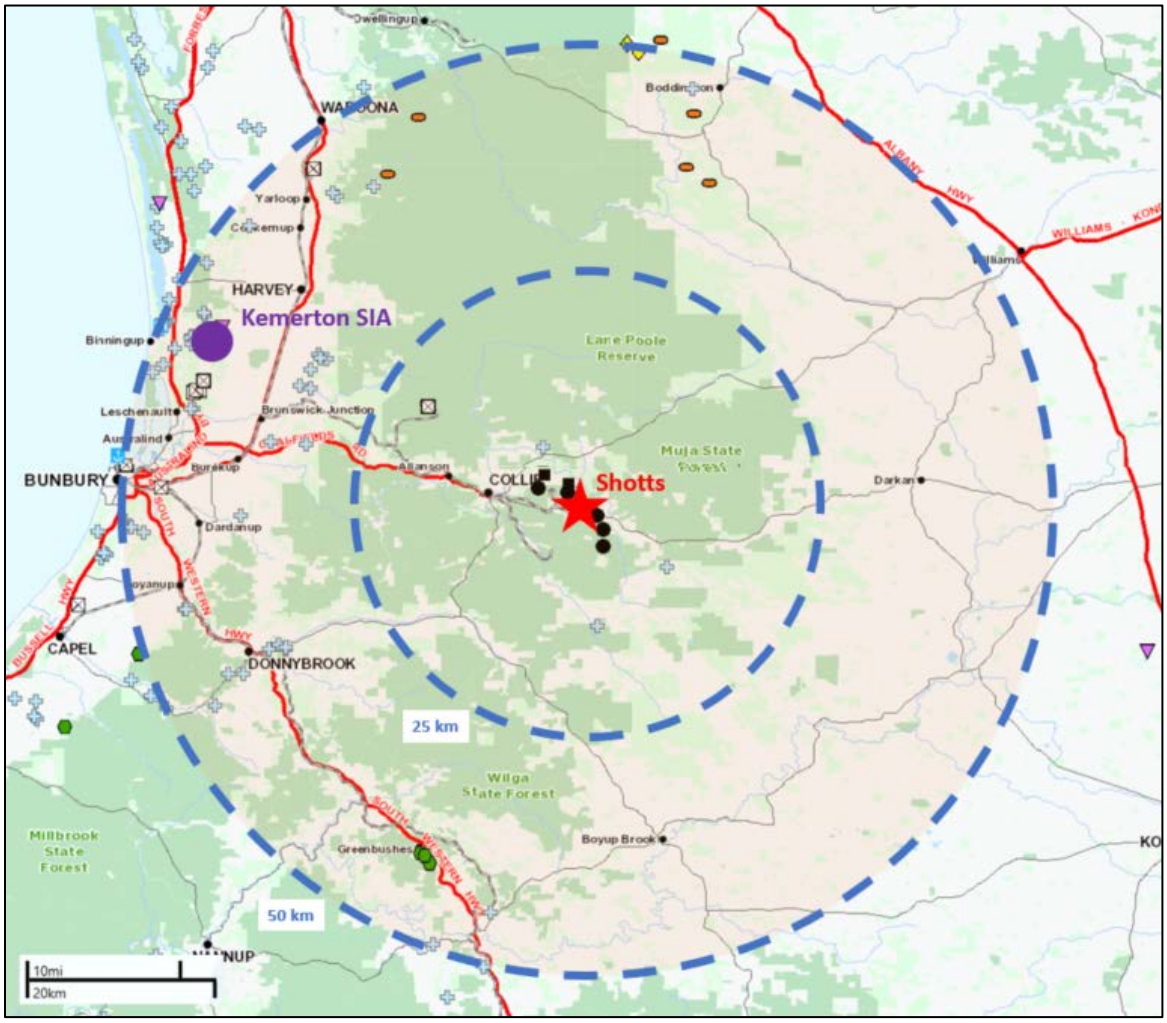


Figure 4-5: Shotts road and rail connectivity

4.1.2.6 Propensity to invest in Greenfields Plant

This criterion provides a high-level assessment on the general propensity the market or companies may have to invest in new industrial projects located in Shotts. Factors considered in determining the appetite for greenfield investments include:

- *Availability and access to local feedstock* - minerals that are relatively close and easily accessible to Shotts are more likely to make Greenfield investments. Feedstocks include coal, biomass, construction materials, limestone and mineral sands.
- *Cost* – the capital and operating costs are key determinants impacting investment decisions. This includes the capital costs associated with development plus financing costs. The cost competitiveness of products produced at Shotts will depend heavily on the total delivered cost– i.e. total cost of production plus transport costs.

- *Level of competition* – the extent of local and global competition will have a bearing on investment decisions. The degree of competition will be dependent on the end-product and target markets. Downstream production processes currently in operation in the region include power plants, alumina refineries, silicon smelter, pigment plant, silica sand production, chlor-alkali plant, lithium hydroxide plant and lime production.
- *Access to demand* – investment decisions will be influenced by market accessibility which will impact delivered costs. In addition, the level of competition will influence a company's ability to penetrate the market or gain market share.
- *Policy and regulatory influences and challenges* – this can have significant impacts on project approvals and in turn development costs and project timelines, and thus impacting investments
- *Market conditions and outlook* – demand and supply balances and price outlook for the products produced are key drivers impacting revenue potential and investment decisions

A rationale for options assumed to have "no" propensity for Greenfield investment, have been provided in Appendix A and Appendix B.

4.1.2.7 Process/Product benefit from co-location and by-product synergies

Options were assessed on their potential to achieve efficiency and economic benefits by co-locating with other industries. To identify possible synergies, options were grouped into specific clusters based on the following characteristics:

- Industry type and similarity of process and/or product/s
- Common or similar feedstock
- Availability of multiple feedstocks at site
- Potential for vertical integration which include co-locating the production of intermediary and end-use products
- Opportunity for operational and transport efficiencies, including the potential for cost savings

An option may not be sustainable on its own, however, economic and efficiency benefits from co-location and by-product synergies may exist. This is due to improvements in the operational and economic viability due to the synergy benefits of being part of a cluster/precinct. As such, a point was allocated to options that were able to benefit from being grouped into an industry precinct. From the 66 industrial options considered, nine possible industrial clusters/precincts were identified. A summary of the industrial clusters and associated downstream processing options are shown in Table 4-3.

Table 4-3: Industry precinct / cluster

Industrial Precinct / Cluster	Process/Product Options
Aluminium	▪ Aluminium smelter ▪ Alumina refinery ▪ Aluminium alloy production
Waste, rehabilitation and water centre	▪ Coal mine rehabilitation centre ▪ Waste water treatment - de-acidifying coal water waste ▪ Waste storage - waste burial
Renewable, water and hydrogen	▪ Hydrogen - from electrolysers (splitting water) ▪ Renewable energy – production and/or storage ▪ Desalination
Mineral sands, chlor-alkali and pigment production	▪ Synthetic rutile ▪ Pigment production - titanium dioxide ▪ Chlor-alkali process (electrolysis) ▪ Polyvinyl chloride (PVC)
Glass and soda ash	▪ Soda ash ▪ Glass
Forestry, paper and biomass	▪ Bioenergy upgrade & products plant ▪ Syngas plant (biomass) ▪ Pulp and paper ▪ Wood board plant ▪ Anaerobic digester ▪ Tanneries ▪ Ethanol ▪ Biomass combustion plant
Downstream lithium	▪ Lithium processing ▪ Lithium grease/soap ▪ Lithium cathode / lithium ion batteries components
Downstream coal and chemicals	▪ Coal gasification/liquefaction (syngas, diesel, methanol, gasoline, hydrogen, ammonia, urea) ▪ Coal based waxes, resins and polymers ▪ Ammonia / urea plant ▪ Char/ briquettes / pellets ▪ Coal preparation plant ▪ Coal use as soil conditioner / additive ▪ Coal-fired power
Cement and construction materials	▪ Cement production ▪ Ceramics / fly ash products ▪ Lime / limestone

5 Likelihood of Industry Engagement

Industry options were classified based on the likelihood for industry engagement to locate in the Shotts SIA. 28 options satisfied the primary criteria and were further ranked on the secondary criteria. A total score was calculated based on the total number of criteria satisfied (i.e. points scored).

Each industry option was classified as low, medium and high likelihood of industry engagement, based on total scores. Each criterion is ranked equally with no weighting assumed. The scoring methodology for industries passing the primary criteria is summarised in Table 5-1.

Table 5-1: Likelihood of Industry Engagement

Likelihood of Industry Engagement	Total Score (number of criteria satisfied)	Number of Industry Options
High	7 or greater	8
Medium	4 – 6	20
Low	0 - 3	None

The complete list of industries identified as part of the analysis is shown in Appendix B. From the 28 industries satisfying the primary criteria, eight industries scored 7 points or higher which represent industries with a "high" likelihood of industry engagement to establish in the Shotts SIA. 20 industries were shortlisted as "medium" with a score of 4-6, with no industries categorised as "low." Other remaining industries satisfied the scores for "medium" and "low" but did not pass the primary screening criteria.

The eight industry options short-listed as having a "high" likelihood for industry engagement includes:

1. Bioenergy upgrade and products plant
2. Cement production
3. Coal gasification/liquefaction (including hydrogen) – for production of downstream coal products
4. Ammonia / urea production
5. Syngas plant – using biomass
6. Pulp and Paper

7. Wood board plant

8. Synthetic Rutile

Details of the shortlisted industry options scoring seven points or higher is shown in Table 5-2 representing industries with a "high" likelihood of industry engagement.

From the eight industry options classified as "high", four main industrial clusters were identified consisting of:

1. Forestry, paper and biomass

2. Downstream coal and chemicals

3. Mineral sands, chlor-alkali and pigment; and

4. Cement and construction material

Table 5-2: Shortlist of "High" Likelihood for Industry Engagement

Industrial Cluster	Industry Options	Key Feedstock	Criteria 1 (Primary): Heavy Industry?	Criteria 2 (Primary): Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Criteria 8: Benefit from co-location and by-product synergies	Total Score
Forestry, Paper & Biomass	Bioenergy Upgrade & Products Plant	Waste wood Other biomass	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8
	Syngas Plant (biomass)	Waste wood Other biomass	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	7
	Pulp and Paper	Wood Waste wood	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	7
	Wood Board Plant	Wood Waste wood	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	7
Downstream Coal and Chemicals	Coal Gasification / Liquefaction Coal based waxes, resins and polymers	Coal	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	7
	Ammonia / Urea Plant	Natural gas	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	7
Cement & Construction Materials	Cement Production	Coal tailing / Fly-ash Silica fumes Limestone	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	7
Mineral sands, Chlor-alkali & Pigment	Synthetic Rutile	Mineral sands	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	7
	Scoring: *Yes = 1 point; No = 0 Point*										

6 Industrial Clusters

The screening process identified four industrial clusters with a high likelihood for locating in the Shotts SIA. Industries may not be possible on a standalone basis but may be feasible within a cluster due to potential synergies. This assumes one or more industries acting as an anchor for other potential industries within a cluster.

The four clusters and associated industries considered as "high" likelihood for industry engagement for the Shotts SIA include:

- **Cluster 1: Forestry, paper and biomass** - This cluster consist of four processes using waste wood and other biomass as key feedstocks:
  - bioenergy upgrade & products plant
  - syngas plant (using biomass)
  - pulp and paper production plant, and
  - wood board plant.
- **Cluster 2: Downstream coal and chemicals**

  The industries included in this cluster include:
  - Coal gasification/liquefaction plant. This includes syngas, diesel, methanol, gasoline, hydrogen, ammonia and urea which utilise coal as a key feedstock
  - Ammonia and urea plant.
- **Cluster 3: Cement and construction materials** - Only the cement production option was ranked as "high"
- **Cluster 4: Mineral sands, chlor-alkali and pigment production** - Only the synthetic rutile production option was ranked as "high"

The industrial clusters were determined on the following factors:

- Downstream processes that could utilise the major resources in the region
- Resources and industry outputs that could provide major feedstock to further downstream processing in the region
- Industries which are likely to benefit from co-location and by-product synergies which have been grouped into industrial clusters (those satisfying Criteria 8)
- Industries that can produce chemical and material inputs for emerging regional industries; and
- Industries which are viewed to have favourable market conditions which have been determined by the propensity for greenfield investments (those satisfying Criteria 7)

Cluster 1 made up of forestry, paper and biomass was the only cluster that satisfied all the screening criteria outlined in the methodology. The other clusters satisfied some but not all factors. Details were shown in Table 5-2.

7 Industry Benchmarking

Based on the four shortlisted industry clusters identified through the screening methodology, a high-level benchmarking study was undertaken. The purpose of this exercise was to identify the following key characteristics for different plant types within each cluster. These include:

- Site area requirements
- Supporting infrastructure
- Transportation and logistics requirements
- Compatibility with other proposed industry

In all cases the size/scale of industry within each cluster will be influenced by the type of process applied and the capacity of the proposed plant (which is in turn influenced by market demand).

7.1 Forestry, Paper and Biomass Cluster

This cluster would contain industries whose primary feedstocks are either wood or other organic materials. These may be sourced from plantations or land clearing undertaken as part of mining in the wider region.

Within this cluster the following types of activities may occur:

Table 7-1: Potential Forestry, Paper and Biomass Industries

Industry	Processes	Feedstocks	Products	Approximate Site Area
Wood pelletising	Hammer mill Hot press Cooling	Wood Waste wood	Wood fuel pellets	15-60ha
Charcoal briquettes	Wood burning Coal mixing Hot press	Waste wood Coal	Briquettes	
Wood chipping	Chipping	Wood Waste wood	Wood chips	10-30ha
Woodchip composting	Decomposition	Wood Waste wood Urea/manure	Compost	1-5ha
Pulp mill (mechanical)	Grinding Bleaching	Wood/wood chips Bleach	Wood pulp	45-60ha

Industry	Processes	Feedstocks	Products	Approximate Site Area
Pulp mill (chemical)	Digester Water suspension By-product recovery Bleaching Pressing	Wood/wood chips Sodium hydroxide Sodium sulphide	Wood pulp	
Paper mill	Pulp mixing Pulp press Rolling	Pulp	Paper	
Laminated timber mill	Milling Lamination Clamp	Wood Resin	Laminated timber	20-40ha
Particle board	Chipping Resin spray Cold press Hot press	Wood chips Resin	Particle board	20-40ha
Biogas (anaerobic digestion)	Mixer Digester Scrubber	Commercial waste Biomass Urea/manure	Biogas Fertiliser Heat	1-30ha
Syngas (gasification)	Heating	Biomass Steam	Syngas	
Ethanol	Grinding Hydrolysis Fermentation Distillation	Sugar based crops	Ethanol	

It should be noted that this is not an exhaustive list and other compatible/similar industry could be considered for development within the cluster. Land requirements for this cluster will depend on the number, type and scale of industry seeking to locate within the SIA. This cluster could potentially occupy all available land within the SIA.

Of the proposed industry types, pulp and paper mills require the largest site footprint (potentially up to 60ha for a combined pulp/paper mill). Other plants require substantially less land, however the area required is highly dependent on the scale operations. This cluster could potentially occupy all the available land within Shotts SIA.

All plants within this cluster have a common logistics requirement to bring feedstock to site by either road or rail. Product export could also be done by road or rail depending on volumes and end markets.

Key infrastructure required to support this cluster will include:

- Power
- Water
- Telecommunications
- Gas
- Rail
- Road

7.2 Downstream Coal and Chemical Products Cluster

This cluster is proposed to target industries directly related to the coal industry taking advantage of the location of Shotts being adjacent to Western Australia's largest coal mines. With feedstock available nearby, suitable logistics options will include road and conveyor depending on the volume of feedstock to be transported.

Export of final products through the Port of Bunbury is possible via rail or road.

Within this cluster the following types of activities shown in Table 7-2 may occur.

Table 7-2: Potential Downstream Coal and Chemicals Industries

Industry	Process	Feedstocks	Products	Approximate Site Area
Ammonia/Urea plant	Gasification (coal) Zinc oxide adsorption Steam reforming Shift conversion Carbon dioxide removal Methanation Ammonia synthesis Urea conversion	Natural gas/coal Nitrogen Steam Zinc Oxide	Ammonia Ammonium Nitric acid Urea	30-100ha
Coal gasification	Oxidation	Coal Oxygen Steam	Hydrogen Carbon dioxide	25-50ha
Coal liquefaction	Heating & pressurisation Mixing	Coal Hydrogen Catalyst	Syncrude	25-50ha

Land requirements for industry within this cluster will vary depending on scale/capacity. Ammonia and urea plants (as previously proposed for Shotts) can occupy over 100ha of land which would

leave only a small portion of the site available for other activities. This cluster could potentially occupy all available land within the SIA.

Due to common feedstock requirements it may be possible to support this cluster through the development of common user infrastructure to transport coal to a common stockpile. It may also be possible for ammonia to be produced from coal gasification.

Key infrastructure required to support this cluster will include:

- Power
- Water
- Telecommunications
- Gas
- Conveyors
- Rail
- Road

7.3 Cement and Construction Materials Cluster

This is a small cluster relying on the availability of fly ash from existing coal fired power stations as a feedstock to produce cement. Other feedstock (limestone, coke and waste wood) can also be sourced from within the region and transported to site by road.

A logical extension from cement production is then the manufacturing of precast concrete building materials (concrete panels, barriers etc). The two key activities within this cluster are therefore:

- Cement production
- Precast concrete

Table 7-3: Potential Cement and Construction Materials Industries

Industry	Process	Feedstocks	Products	Approximate Site Area
Cement plant	Heating Water mixing Evaporation Grinding	Limestone Fly-ash	Cement	20-50ha
Precast concrete	Mixing Casting Curing	Cement Sand/gravel Water Steel	Precast concrete	

The land area required for these activities relates to the planned capacity of the proposed plants. As a guide this cluster may occupy an area of 20-50ha. It is assumed that products from this cluster will be targeted at local markets, therefore road transport is the most likely solution.

Key infrastructure required to support this cluster will include:

- Power
- Water
- Telecommunications
- Gas
- Road

7.4 Mineral Sands Cluster

This cluster has the potential to draw on mineral sands deposits located within the surrounding region. The presence of rail within Shotts SIA creates the potential for an efficient logistics system for either feedstock import or product export.

The types of industry proposed within this cluster could potentially occupy all available land within Shotts SIA depending on their scale. Potential industry types are outlined in Table 7-4.

Table 7-4: Potential Mineral Sands Industries

Industry	Process	Feedstocks	Products	Approximate Site Area
Synthetic rutile plant	Rotary kiln oxidation Rotary kiln reduction Aeration Acid leach	Ilmenite Oxygen Coal Sulphur Ammonium chloride Sulphuric acid	Synthetic rutile Iron oxide	50-250ha
Titanium dioxide pigment plant	Chlorination Oxidation Milling	Synthetic rutile Coke Chlorine Oxygen Nitrogen	Titanium dioxide pigment	10-20ha
Chlor-alkali plant	Electrolysis	Salt Water	Chlorine Sodium hydroxide (caustic soda) Sodium hypochlorite	20-120ha

Key infrastructure required to support this cluster include:

- Power
- Water
- Telecommunications
- Gas
- Road
- Rail

8 Site Layout and Servicing Requirements

The intention of creating industry clusters is to promote mutually beneficial synergies among different types of industries. Successful clusters reduce operational costs for industry through the following:

- Availability of common user infrastructure
- Ability of industry to utilise well developed supply chains
- Proximity to feedstock/suppliers
- Proximity to markets/customers for products

8.1 Industry Synergy

Within the 4 clusters identified for Shotts SIA there exist internal (within a cluster) and external (between clusters) synergies. It should also be noted that some clusters or activities within clusters may preclude the development of industry within the Shotts SIA.

8.1.1 Forestry, Paper and Biomass Cluster

Within this cluster the following opportunities/synergies exist:

- Commonality of feedstock (wood, waste wood and organic materials) creates an opportunity to share supply chains and potentially common user facilities within the SIA
- Pulp and Paper mills could potentially be constructed as part of a single development or independently with pulp forming a feedstock for the paper mill
- Oxides produced in the mineral sands cluster might potentially be used in the production of paper products
- Biofuels produced in this cluster may be used as an energy source by other industry within Shotts SIA

It should be noted that pulp and paper production are not considered compatible with activities identified in the downstream Coal, Mineral Sands and Cement and Building Products Clusters.

8.1.2 Cement and Construction Materials Cluster

Within this cluster the following opportunities/synergies exist:

- Proximity to fly ash produced at nearby coal fired power stations
- Proximity to other potential feedstocks within the broader region
- Production of prefabricated concrete products is a logical extension of cement production and could be part the cement plant itself or standalone business

8.1.3 Downstream Coal and Chemicals Cluster

Within this cluster the following opportunities/synergies exist:

- Proximity of feedstock due to nearby location of coal mines means that feedstock can potentially be brought to site via conveyor or truck
- Where multiple plants share a common feedstock, there may be a potential to share some elements of the supply chain

8.1.4 Mineral Sands Cluster

Within this cluster the following opportunities/synergies exist:

- Proximity to feedstock from mineral sands deposits located throughout the region
- Access to the rail loop for the import of feedstock and export of products
- A Chlor-Alkali plant could potentially utilise brine produced from the proposed de-salination plant located nearby
- Pigments produced in this cluster may be used in paper production

8.2 Site Layout Considerations

In preparing a high-level concept for the layout of industry within the Shotts SIA, Advisian have considered the following:

- The four clusters identified each have the potential to occupy all or a significant proportion of the site in their own right
- It is critical that the layout of Shotts maintains maximum flexibility so that multiple or single cluster/industry options can be achieved
- Supporting infrastructure is critical as the cost of extending to the site may be prohibitive for some industries
- Creation of common user infrastructure (or the ability for this to be created)
- Efficient distribution of infrastructure throughout the site minimising land take and cost
- Preserve the ability of multiple users to access the rail loop

With these factors in mind the site layout approach for Shotts must ensure maximum flexibility. The proposed layout includes the following key features:

- A central infrastructure corridor aligned with the current rail loop. This corridor will include all utility and service infrastructure as well as provision for conveyors or other major infrastructure associated with the movement of large volume raw materials.
- Locations for specific clusters have not been identified. In the interest of maintaining maximum flexibility and opportunities for the future, it would not be productive to allocate land to specific industry types.

The development areas identified in the structure plan should be retained to provide a general structure for the site, however as proponents seek to develop a project it is likely that they will require modification. When a proponent does seek to develop a project within Shotts the impact of their project/proposed site layout on remaining development sites should be considered.

8.3 Concept Site Layout Overview

The Shotts SIA is highly constrained by existing infrastructure in addition to other constraints including wetlands and undermining. Figure 8-1 illustrates existing environmental constraints identified within the project area.

Areas that have been undermined have suffered from subsidence. Significant ground improvements would be required to support large structures in these locations.

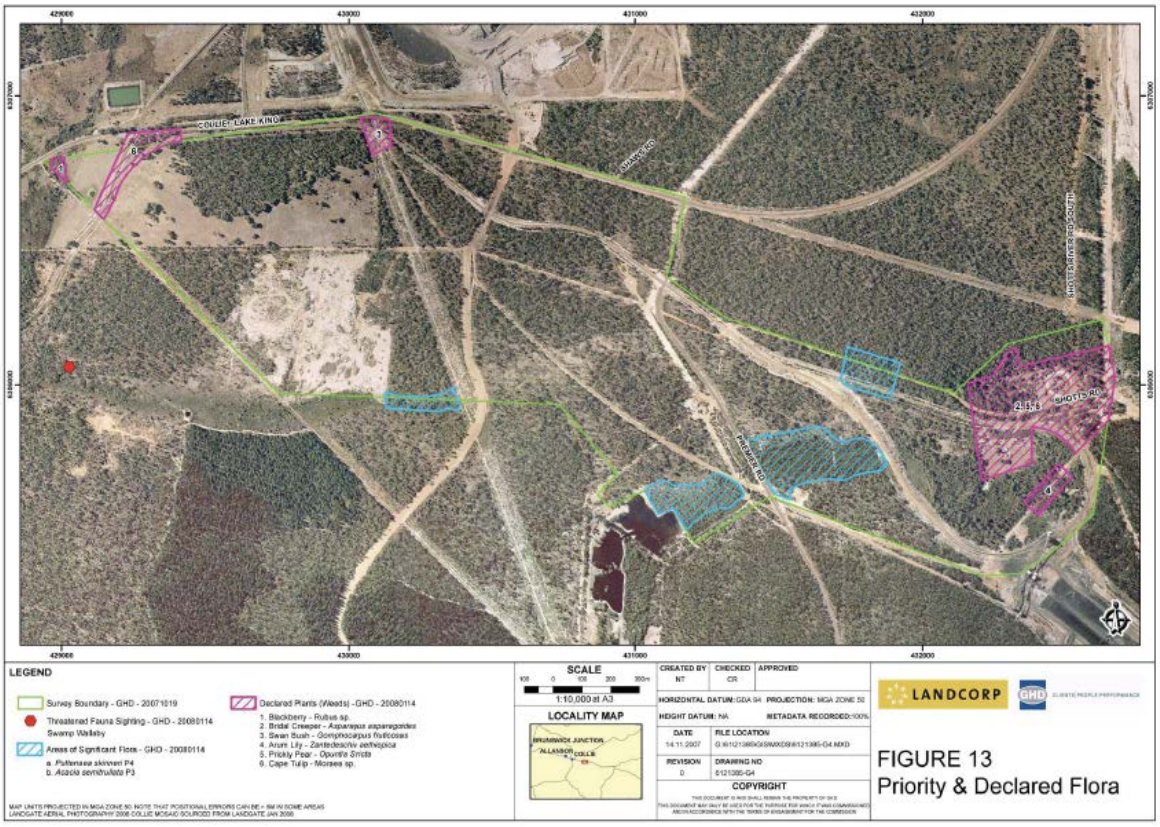


Figure 8-1 Existing Environmental Constraints

Figure 8-2 illustrates the location of existing infrastructure throughout the site. The location of this infrastructure divides the site and creates significant barriers to its development. Key issues identified in Figure 8-2 include:

- 330kV and 132kV power lines. These powerlines are expensive to relocate and have restrictions regarding the placement of other infrastructure near them and crossing their corridors. The 330kV line requires a corridor width of 60m.
- Griffin Haul Road. The haul road requires a significant corridor through the site (75m wide). Although it may be possible to cross this corridor it is assumed that crossings will need to be minimised and possible grade separated.
- Griffin Conveyor. The existing conveyor through the site could be crossed by roads and other infrastructure however this would require the installation of bridges/culverts and it is assumed that the number of crossings would need to be minimised. The existing corridor is 10m wide.

- Water Pipelines. Various water pipelines cross the site. In most cases these can be crossed by roads and infrastructure however this adds expense and access to each pipeline is required along their dedicated easement.

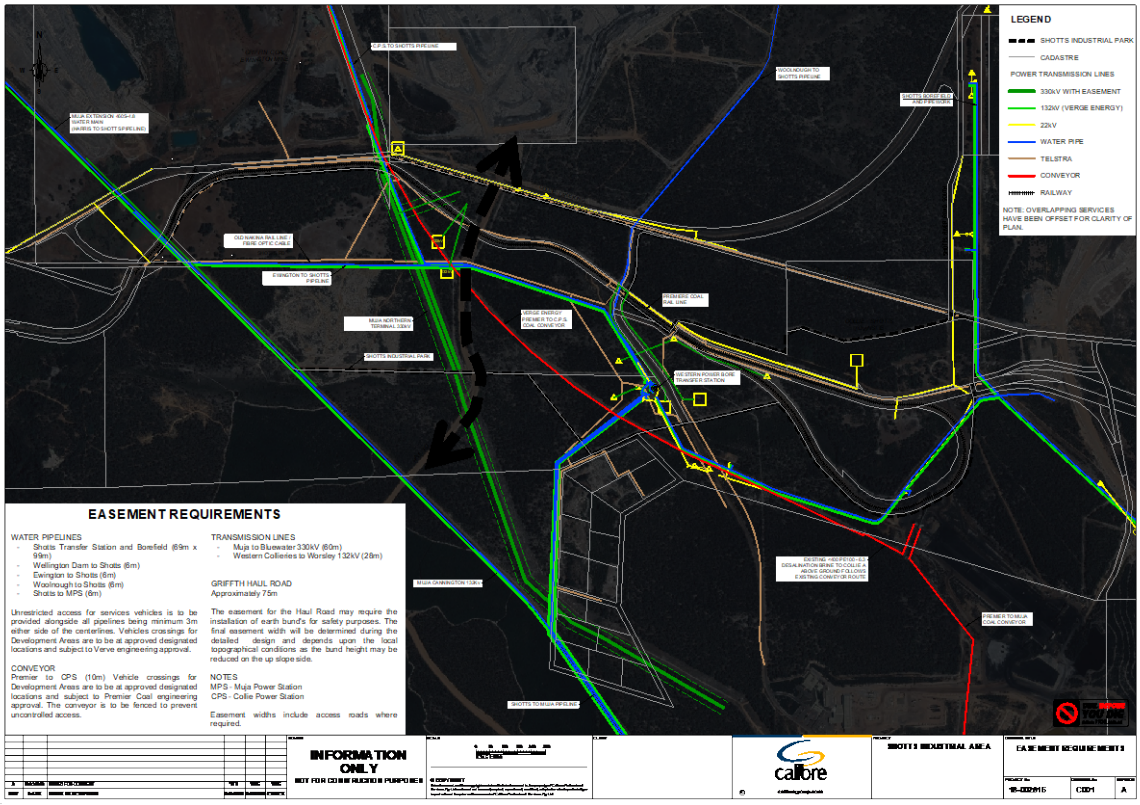


Figure 8-2 Existing Infrastructure

The various constraints across the site make development of land with Shotts complex and expensive. The creation of large sites for industry is difficult and would require relocation of infrastructure to consolidate sites within Shotts.

Figure 8-3 identifies potential development sites within the Shotts SIA taking into consideration the layout of existing infrastructure. Further investigations are required to determine if/how existing infrastructure might be relocated or crossed to create larger development sites. Although Sites B and C are not considered as development sites, it may be possible to use these for infrastructure purposes (pump stations/sub-stations etc). Site A could potentially become a small development site if direct access to the Coal Fields Road can be achieved.

When comparing the developable area of the SIA and the potential requirements of different industry, it becomes apparent that to accommodate large industry types significant work will be required to relocate infrastructure. This will limit the types and scale of industry attracted to Shotts. Additionally, to accommodate some industry, further investment in infrastructure will be required increasing the cost of development at Shotts in comparison to other locations.

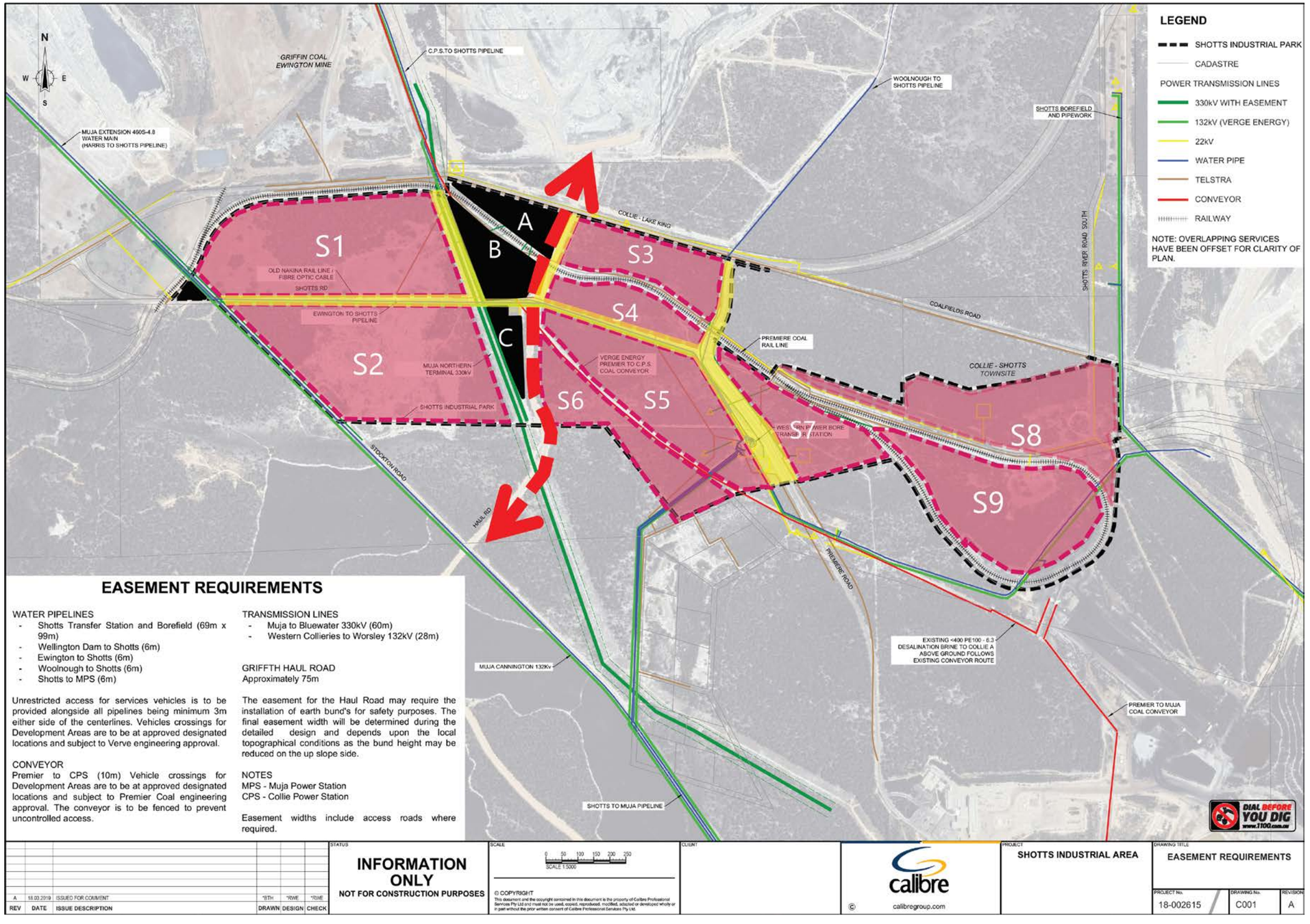


Figure 8-3 Developable Land

Potential infrastructure corridors (indicated in yellow) incorporate existing easements and provide access to Coal Fields Road. The width and location of these corridors requires confirmation following development of a comprehensive servicing strategy. This may have further impacts on the size and shape of available development sites within the SIA.

Table 8-1 Summary of Potential Development Sites

Site	Approximate Gross Developable Area (ha)
S1	30
S2	35
S3	10
S4	5
S5	25
S6	10
S7	10
S8	25
S9	18
A	4
B	5
C	3

Table 8-1 provides a summary of the potential development sites within Shotts SIA. The areas shown are conceptual only and further planning is required to identify appropriate site boundaries and the location of service infrastructure including roads and utilities to support development of the SIA.

9 Recommendations

The study conducted by Advisian identified the likely downstream processing industries that may be attracted to locate at Shotts. A standalone industry may be unlikely to locate within Shotts, however, grouping within an industry cluster would enable the possibility for development due to potential synergy benefits. The industries shortlisted have been identified as those most likely to benefit from co-location and by-product synergies.

The recommendations based on the results of the screening methodology consisted of eight industry options falling into four industrial clusters. The shortlisted clusters include:

1. Forestry, paper and biomass
2. Downstream coal and chemicals;
3. Mineral sands, chlor-alkali and pigment; and
4. Cement and construction materials

Most of the shortlisted industries fell into the forestry, paper and biomass cluster. The key feedstocks include waste wood and other biomass which can be sourced within a 50km radius of Shotts. It is viewed that current market conditions for investment in these industries are favourable.

A concept site layout and key servicing requirements were identified for the shortlisted industries and industrial clusters. The recommendation is for a fully flexible layout for the Shotts SIA to enable multiple or single cluster/industry options.

A potential concept layout based on existing infrastructure identified several constraints within Shotts impacting development opportunities in the area. The division of the site from existing infrastructure or environmental constraints, has created significant barriers to development. Significant investment would be required to develop a consolidated site by combining smaller sites and realigning existing infrastructure. This has limited the ability to facilitate downstream processing opportunities within the area.

From the industry shortlist identified, the forestry, paper and biomass cluster consist of industries most likely to locate in Shotts. Sites S1 and S2 shown in Figure 8-3, contain developable areas of 30-35 ha which could allow for development without developing larger areas. The other clusters and industries identified would require larger developable areas which are currently unavailable. Significant costs from upgrades would be required to enable other identified industries to locate within Shotts.

The options for industries and industrial clusters to locate in the Shotts SIA based on the assumed screening methodology are currently limited due to infrastructure and environmental constraints. The forest, paper and biomass cluster are the most feasible out of the shortlisted clusters in terms of the least amount of work required to accommodate development. A broader range of industries could potentially locate within Shotts with revisions to the current screening criteria and/or the development of larger developable areas which would involve significant costs associated with relocation of existing infrastructure.

References

- Australian Bureau of Statistics, *"Australian and New Zealand Standard Industrial Classification, ANZSIC ABS cat no. 1292.0,"* 2006
- Australian Bureau of Statistics, "*Engineering Construction Activity, Australia Glossary, ABS cat no. 8762.0,"* 2018
- Department of Mines, Industry Regulation and Safety, "*GeoVIEW.WA*"
- Environmental Protection Authority of Western Australia, "*Guidance for the Assessment of Environmental Factors. Separation Distances between Industrial and Sensitive Land Uses No.3, Appendix 1,*" June 2005
- LandCorp. "*Landcorp Request for Services, Request for Consultancy Services Economic and Market Analysis, Shotts Strategic Industrial Area,"* 2018
- Thompson McRobert Edgeloe Group, *"Shotts Industrial Park, Research, Design & Delivery of Sustainable Development"*, August 2010

Appendix A Shortlist of Industries ranked as "High" likelihood for Industry Engagement

Table A-1: Shortlist of Industries ranked as "High" likelihood for Industry Engagement

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1 (PRIMARY): Heavy Industry?	Criteria 2 (PRIMARY): Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED: Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Bioenergy Upgrade & Products Plant (production of end products) - Drying and compressing - Increase bio fuel availability - Woodchip composting - Charcoal briquette manufacturing	Basic Chemical and Chemical Product Manufacturing	Waste wood Other biomass	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	Yes	Yes		Yes	Forestry, Paper & Biomass Precinct	8
Coal Gasification / Liquefaction (Syngas, diesel, methanol, gasoline, hydrogen, ammonia, urea) Coal based waxes, resins and polymers	Petroleum and Coal Product Manufacturing	Coal	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	Yes	No	Considered a high climate change disclosure risk industry with high sensitivity to future carbon pricing and existing industry has no appetite for new investments	Yes	Downstream Coal & Chemicals Product Precinct	7
Syngas Plant (biomass)	Electricity, Gas, Water and Waste Services	Waste wood Other biomass	Yes	Yes	Medium (500-1000)	No	No	Yes	Yes	Yes		Yes	Forestry, Paper & Biomass Precinct	7
Cement Production	Non-Metallic Mineral Product Manufacturing	Coal tailing / Fly-ash Silica fumes Limestone	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Cement & Construction Materials Precinct	7
Ammonia / Urea Plant	Basic Chemical and Chemical Product Manufacturing	Natural gas	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Downstream Coal & Chemicals Product Precinct	7
Pulp and Paper	Pulp, Paper and Converted	Wood Waste wood	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Forestry, Paper & Biomass Precinct	7

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1 (PRIMARY): Heavy Industry?	Criteria 2 (PRIMARY): Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED: Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
	Paper Product Manufacturing													
Wood Board Plant	Wood Product Manufacturing	Wood Waste wood	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Forestry, Paper & Biomass Precinct	7
Synthetic Rutile	Basic Chemical and Chemical Product Manufacturing	Mineral sands	Yes	Yes	X Large (>2000)	Yes	Yes	Yes	No	Yes		Yes	Mineral sands, Chlor-alkali & Pigment Productio n	7

Key:
Green = "High" (score of 7 or greater) and primary criteria satisfied
Orange = "Medium" (score of 4-6) and primary criteria satisfied
Grey = Did not satisfy primary criteria

Scoring:
No (except Criteria 3) = 0 Point
<500m (Criteria 3) = 0 Point
Yes (except Criteria 3) = 1 Point
>500m (Criteria 3) = 1 Point
Emissions intensive is NOT included in the screening criteria

Appendix B Complete List of Industries

Table B-1: Complete List of Industries

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Bioenergy Upgrade & Products Plant (production of end products) - Drying and compressing - Increase bio fuel availability - Woodchip composting - Charcoal briquette manufacturing	Basic Chemical and Chemical Product Manufacturing	Waste wood Other biomass	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	Yes	Yes		Yes	Forestry, Paper & Biomass Precinct	8
Coal Gasification / Liquefaction (Syngas, diesel, methanol, gasoline, hydrogen, ammonia, urea) Coal based waxes, resins and polymers	Petroleum and Coal Product Manufacturing	Coal	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	Yes	No	Considered a high climate change disclosure risk industry with high sensitivity to future carbon pricing and existing industry has no appetite for new investments	Yes	Downstream Coal & Chemicals Product Precinct	7
Syngas Plant (biomass)	Electricity, Gas, Water and Waste Services	Waste wood Other biomass	Yes	Yes	Medium (500-1000)	No	No	Yes	Yes	Yes		Yes	Forestry, Paper & Biomass Precinct	7
Cement Production	Non-Metallic Mineral Product Manufacturing	Coal tailing / Fly-ash Silica fumes Limestone	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Cement & Construction Materials Precinct	7
Ammonia / Urea Plant	Basic Chemical and Chemical Product Manufacturing	Natural gas	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Downstream Coal & Chemicals Product Precinct	7
Pulp and Paper	Pulp, Paper and Converted Paper Product Manufacturing	Wood Waste wood	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Forestry, Paper & Biomass Precinct	7

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Wood Board Plant	Wood Product Manufacturing	Wood Waste wood	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		Yes	Forestry, Paper & Biomass Precinct	7
Synthetic Rutile	Basic Chemical and Chemical Product Manufacturing	Mineral sands	Yes	Yes	X Large (>2000)	Yes	Yes	Yes	No	Yes		Yes	Mineral sands, Chlor-alkali & Pigment Production	7
Char/ Briquettes/ Pellets	Petroleum and Coal Product Manufacturing	Coal	Yes	Yes	Large (1000-2000)	No	No	Yes	Yes	No	Considered a high climate change disclosure risk industry with high sensitivity to future carbon pricing and existing industry has no appetite for new investments	Yes	Downstream Coal & Chemicals Product Precinct	6
Coal Preparation Plant - aim for further improvement in coal product	Petroleum and Coal Product Manufacturing	Coal Water	Yes	Yes	Medium (500-1000)	No	No	Yes	Yes	No	Collie coal is typically lower grade (sub-bituminous) coals requiring substantial and costly processing. Further, lack of port infrastructure at Bunbury and Kwinana limits ability to enter the export market.	Yes	Downstream Coal & Chemicals Product Precinct	6
Coal as Soil Conditioner - additive for farm land	Petroleum and Coal Product Manufacturing	Coal	Yes	Yes	Small (0-500)	No	No	Yes	Yes	Yes		Yes	Downstream Coal & Chemicals Product Precinct	6
Aluminium Alloys - with Lithium	Primary Metal and Metal Product Manufacturing	Alumina Lithium	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	No	No smelter available	Yes	Aluminium Precinct	6

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Aluminium Smelter	Primary Metal and Metal Product Manufacturing	Alumina	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	No	Aluminium Industry has long range strategies to locate near green baseload power (hydro, geothermal) - See Alcan and Alcoa statements on green aluminium.	Yes	Aluminium Precinct	6
Lime / Limestone	Non-Metallic Mineral Product Manufacturing	Limestone	Yes	Yes	Large (1000-2000)	Yes	No	Yes	No	No	13 other competing locations	Yes	Cement & Construction Materials Precinct	6
Lithium Cathode / Lithium Ion Batteries Components	Basic Chemical and Chemical Product Manufacturing	Lithium compounds Nickel Cobalt Manganese Graphite	Yes	Yes	Medium (500-1000)	Yes	No	No	No	Yes		Yes	Downstream Lithium Product Precinct	6
Anaerobic Digester Produce: - Bio gas; - Livestock bedding; - Compost; - Fertilizer	Electricity, Gas, Water and Waste Services	Cereal straw Dairy effluent Cattle feedlot & Manure processing Broiler litter - Poultry litter Grape marc Waste wood Food waste	Yes	Yes	Medium (500-1000)	No	No	Yes	No	Yes		Yes	Forestry, Paper & Biomass Precinct	6
Ethanol	Basic Chemical and Chemical Product Manufacturing	Cereal straw Dairy effluent Cattle feedlot & Manure processing Broiler litter - Poultry litter Grape marc Waste wood Food waste	Yes	Yes	Medium (500-1000)	Yes	Yes	Yes	No	No	Source of suitable ethanol feedstock is limited. Large amount of feedstock required may be a limiting factor.	Yes	Forestry, Paper & Biomass Precinct	6

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Soda Ash	Basic Chemical and Chemical Product Manufacturing	Sodium chloride Limestone	Yes	Yes	Large (1000-2000)	No	Yes	Yes	No	Yes		Yes	Glass & Soda Ash	6
Pigment Production - Titanium Dioxide	Basic Chemical and Chemical Product Manufacturing	Mineral sands	Yes	Yes	X Large (>2000)	Yes	Yes	Yes	No	No	Risk of cross contamination of coal dust	Yes	Mineral sands, Chlor-alkali & Pigment Production	6
Glass	Non-Metallic Mineral Product Manufacturing	Sand - Silica Sand Soda - CaO - limestone / dolomite Lithium Quartz	Yes	Yes	Small (0-500)	Yes	Yes	Yes	No	Yes		Yes	Glass & Soda Ash	6
Hydrogen from Electrolysers (splitting water)	Electricity, Gas, Water and Waste Services	Access to clean energy Water	Yes	Yes	Medium (500-1000)	Yes	No	No	No	Yes		Yes	Renewable, Water & Hydrogen	6
Silicon Smelting - for solar panels and electronics	Primary Metal and Metal Product Manufacturing	Silica sand	Yes	Yes	Large (1000-2000)	Yes	Yes	Yes	No	Yes		No		6
Coal Mine Rehab Centre - de-acidifying coal water waste by using red-mud as neutralising agent	Waste / Rehabilitation Centre	Coal waste water Red mud	No	Yes	[TBC]	Yes	No	Yes	Yes	No	Existing coal producers are likely to use their own site	Yes	Waste / Rehabilitation / Water Centre	5
Tanneries	Textile, Leather, Clothing and Footwear Manufacturing	Livestock	No	Yes	Large (1000-2000)	No	No	Yes	No	Yes		Yes	Forestry, Paper & Biomass Precinct	5
Alumina Refinery	Primary Metal and Metal Product Manufacturing	Bauxite Caustic soda Possible extraction from fly-ash	Yes	Yes	Case by Case	Yes	Yes	Yes	No	No	Strong local competition	Yes	Aluminium Precinct	5

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Lithium Grease/Soap; Lithium Complex Grease	Basic Chemical and Chemical Product Manufacturing	Lithium compounds	Yes	Yes	Medium (500-1000)	Yes	No	No	No	No	It would be preferentially be done in Kemerton (if at all)	Yes	Downstream Lithium Product Precinct	5
Lithium Processing	Basic Chemical and Chemical Product Manufacturing	Lithium concentrate	Yes	Yes	Medium (500-1000)	Yes	No	No	No	No	It would be preferentially be done in Kemerton (if at all)	Yes	Downstream Lithium Product Precinct	5
Biomass Combustion Plant	Electricity, Gas, Water and Waste Services	Cereal straw Dairy effluent Cattle feedlot & Manure processing Broiler litter - Poultry litter Grape marc Waste wood Food waste	Yes	Yes	Medium (500-1000)	No	No	No	No	Yes		Yes	Forestry, Paper & Biomass Precinct	5
Chlor-alkali Plant - Caustic soda - Chlorine - Hydrochloric acid and sodium hypochlorite	Basic Chemical and Chemical Product Manufacturing	Salt Water	Yes	Yes	X Large (>2000)	Yes	Yes	No	No	No	Typically located near a customer for the chlorine (e.g. TiCL4 process TiO2 pigment plant)	Yes	Mineral sands, Chlor-alkali & Pigment Production	5
Waste Storage - waste burial	Waste Collection, Treatment and Disposal Services	Waste - industrial and/or nuclear	No	Yes	Case by Case	No	No	Yes	Yes	No		Yes	Waste / Rehabilitation / Water Centre	4
Cadmium	Mining	Cadmium	Yes	No	X Large (>2000)	Yes	No	N/A	Yes	No		N/A		4
Chromium & Ferrochrome	Mining	Chromium	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No		N/A		4
Copper	Mining	Copper	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No		N/A		4
Cyanide	Basic Chemical and Chemical	Cyanide	Yes	No	Large (1000-2000)	Yes	No	N/A	Yes	No	Existing plant in Kwinana and industry importing solid cyanide bricks	N/A		4

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
	Product Manufacturing													
Iron pellets	Mining	Iron ore	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Lead	Mining	Lead	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Magnesium	Mining	Magnesium	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Manganese	Mining	Manganese	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Nickel	Mining	Nickel	Yes	No	X Large (>2000)	Yes	No	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Oil refining	Mining	Oil	Yes	No	Large (1000-2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Quartz	Mining	Quartz	Yes	No	X Large (>2000)	Yes	[TBC]	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Steel	Primary Metal and Metal Product Manufacturing	Iron ore Metallurgical coal	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Titanium	Mining	Titanium	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Tungsten	Mining	Tungsten	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Vanadium	Mining	Vanadium	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Zinc	Mining	Zinc	Yes	No	X Large (>2000)	Yes	Yes	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		4
Polyvinyl Chloride (PVC)	Basic Chemical and Chemical Product Manufacturing	Chlorine Ethylene	Yes	No	X Large (>2000)	Yes	Yes	No	No	No	No local feedstock for ethylene in Shotts area	Yes	Mineral sands, Chlor-alkali & Pigment Production	4
Desalination	Electricity, Gas, Water and Waste Services	Saltwater	No	Yes	Case by Case	Yes	No	No	No	Yes		Yes	Waste / Rehabilitation / Water Centre; Renewable, Water & Hydrogen	4
Coal-fired Power	Electricity, Gas, Water and Waste Services	Coal	Yes	Yes	X Large (>2000)	No	Yes	No	No	No	Strong local competition. Little investment appetite for new coal power in current SWIS energy environment	Yes	Downstream Coal & Chemicals Product Precinct	4

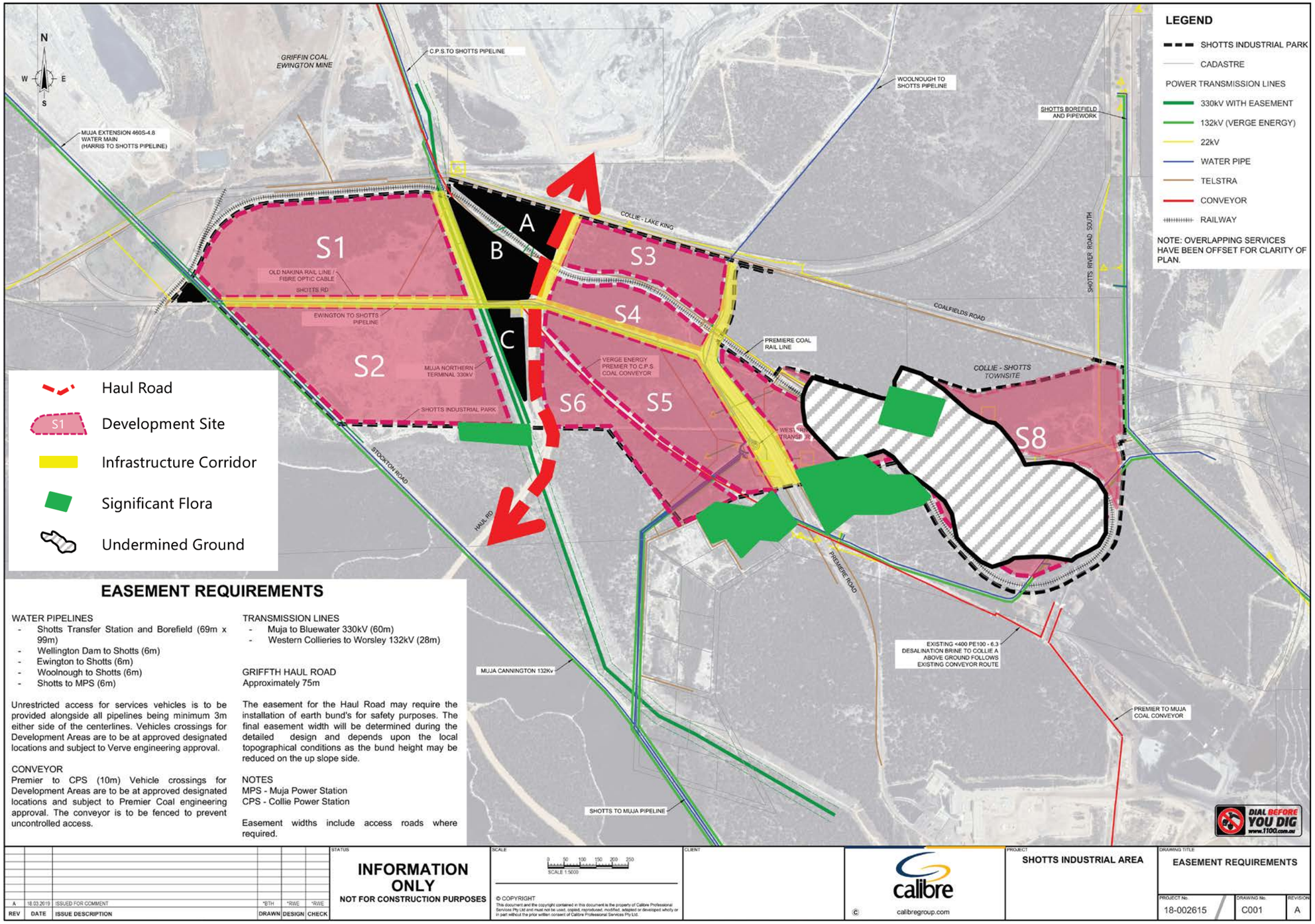
Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
											(existing Coal plants running at very low capacity factors).			
Arsenic	Mining	Arsenic	Yes	No	Medium (500-1000)	No	No	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		3
Asbestos	Mining	Asbestos	Yes	No	X Large (>2000)	No	[TBC]	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		3
Granite	Mining	Granite	Yes	No	Large (1000-2000)	No	No	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		3
Graphite	Mining	Graphite	Yes	No	X Large (>2000)	No	No	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		3
Mercury	Mining	Mercury	Yes	No	X Large (>2000)	No	No	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		3
Talc	Mining	Talc	Yes	No	Medium (500-1000)	No	No	N/A	Yes	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		3
Ceramics / Fly-ash Products	Non-Metallic Mineral Product Manufacturing	Coal tailing - sand, clay Lithium	No	Yes	Small (0-500)	No	Yes	No	No	Yes		Yes	Cement & Construction Materials Precinct	3
Renewable Energy - Solar - Wind - Battery	Electricity, Gas, Water and Waste Services	Wind Solar	No	Yes	[TBC]	No	No	N/A	No	Yes		Yes	Renewable, Water & Hydrogen	3

Industry Options	ANZSIC Classification	Key Feedstock	Criteria 1: (PRIMARY) Heavy Industry?	Criteria 2: (PRIMARY) Local Feedstock / Resources available?	Criteria 3: Buffer Zone >500m required?	Criteria 4: Is the process Electricity Intensive?	Criteria NOT INCLUDED Is the process Emissions Intensive?	Criteria 5: Value from Direct Transport Links	Criteria 6: No Competitive Options for Location	Criteria 7: Propensity for Greenfield Investment	Rationale for Criteria 7:	Criteria 8: Benefit from co-location and by-product synergies	Precinct / Cluster type	Total Score
Space Station / Research Station	Professional, Scientific and Technical Services	N/A	No	N/A	X Large (>2000)	Yes	No	N/A	No	Yes		N/A		3
Strategic Military Land	Public Administration and Safety	N/A	No	N/A	X Large (>2000)	No	No	Yes	No	Yes		N/A		3
Air Separation	Basic Chemical and Chemical Product Manufacturing	Air	No	Yes	Small (0-500)	Yes	No	No	No	No	Needs to be located close to demand markets	N/A		2
Aquaculture	Agriculture, Forestry and Fishing		No	N/A	Small (0-500)	Yes	No	N/A	No	Yes		N/A		2
Data Centre	Professional, Scientific and Technical Services	N/A	No	N/A	N/A	Yes	No	N/A	No	Yes		N/A		2
Natural Gas Liquefaction	Mining	Natural gas	Yes	No	Large (1000-2000)	No	No	N/A	No	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		2
Sulphuric Acid Plant	Basic Chemical and Chemical Product Manufacturing	Sulphur Spent sulphuric acid	Yes	No	X Large (>2000)	No	[TBC]	N/A	No	No	No market appetite as there is no local feedstock/resource in the catchment area	N/A		2
Heavy Machinery - Fabrication / Testing	Machinery and Equipment Manufacturing	N/A	No	N/A	N/A	No	No	Yes	No	No		N/A		1
Rendering Plants / Piggery / Abattoir	Agriculture, Forestry and Fishing		No	N/A	X Large (>2000)	No	No	N/A	No	No		N/A		1

Key:
Green = "High" (score of 7 or greater) and primary criteria satisfied
Orange = "Medium"(score of 4-6) and primary criteria satisfied
Grey = Did not satisfy primary criteria

Scoring:
"No" (except Criteria 3) = 0 Point
"<500m" (Criteria 3) = 0 Point
"Yes" (except Criteria 3) = 1 Point
">500m" (Criteria 3) = 1 Point
"N/A" – not assessed as did not pass primary screening criteria
Emissions intensive is NOT included in the screening criteria

Appendix C Potential Land Development



EASEMENT REQUIREMENTS

WATER PIPELINES
- Shotts Transfer Station and Borefield (69m x 99m)
- Wellington Dam to Shotts (6m)
- Ewington to Shotts (6m)
- Woolnough to Shotts (6m)
- Shotts to MPS (6m)

Unrestricted access for services vehicles is to be provided alongside all pipelines being minimum 3m either side of the centerlines. Vehicles crossings for Development Areas are to be at approved designated locations and subject to Verve engineering approval.

CONVEYOR
Premier to CPS (10m) Vehicle crossings for Development Areas are to be at approved designated locations and subject to Premier Coal engineering approval. The conveyor is to be fenced to prevent uncontrolled access.

TRANSMISSION LINES
- Muja to Bluewater 330kV (60m)
- Western Collieries to Worsley 132kV (28m)

GRIFFTH HAUL ROAD
Approximately 75m

The easement for the Haul Road may require the installation of earth bund's for safety purposes. The final easement width will be determined during the detailed design and depends upon the local topographical conditions as the bund height may be reduced on the up slope side.

NOTES
MPS - Muja Power Station
CPS - Collie Power Station

Easement widths include access roads where required.

REV	DATE	ISSUE DESCRIPTION	DRAWN	DESIGN	CHECK
A	18.03.2019	ISSUED FOR COMMENT	*BTH	*RWE	*RWE

STATUS: **INFORMATION ONLY** NOT FOR CONSTRUCTION PURPOSES
SCALE: 0 50 100 150 200 250 SCALE 1:5000

CLIENT:
calibre
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PROJECT: SHOTTS INDUSTRIAL AREA
DRAWING TITLE: EASEMENT REQUIREMENTS
PROJECT No. 18-002615 | DRAWING No. C001 | REVISION A

Figure C-1: Potential Land Development

APPENDIX B ENGINEERING AND SERVICING REPORT

Engineering Servicing Report

Shotts Industrial Park
Collie

PREPARED FOR LANDCORP

18-002615 | 29 April 2019

Calibre Professional Services Pty Ltd
ABN 55 070 683 037

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
DRAFT	27 March 2019	Client Review	W Edgeloe	B Oversby	W Edgeloe
FINAL	29 April 2019	Report updated	W Edgeloe	B Oversby	W Edgeloe

Contents

1 Introduction

Shotts Industrial Park was developed by Landcorp to attract large scale industries which can value add to Collie's existing energy and coal production and also allow opportunities for diversification into the future for other industries.

The site has an area of approximately 210ha with development sites available from 12ha to 123ha.

The Shotts locality was identified in the late 1990's by the South West Development Commission as an area possibly suitable for the establishment of coal related industries. The Commission established a working group with representatives from the Shire of Collie, Wesfarmers Premier Coal Limited, Department of Environment and Conservation and LandCorp to support and guide the site investigation process.

Technical investigations and planning on the site began in 2003. The Shotts Industrial Park Structure Plan was approved by the Western Australian Planning Commission in 2010.

The site is located near the former Shotts townsite approximately 7.5km east of Collie and is located between Muja and Bluewaters power stations and associated coal mines to take advantage of existing infrastructure and supply connections including road, rail, water, power and coal. See Figure 1 Location Plan.

There is complex array of existing infrastructure within the site including transmission lines, coal conveyor, haul road, borefield and water pipelines. The main access to the site is from Premier Road which also provides access to the Premier Coal loading facility. Premier Coal has developed a rail siding "loop" to service this facility.

Shotts is situated in the Collie River catchment, which is located within the Public Drinking Water Source Area of the Wellington Dam. Stockton Lake is located approximately 1 km to the south west of the site.

Landcorp currently own 5 of the development sites, which are available for long-term lease to industries associated with coal mining and possibly a broader range of industrial uses. These sites are surrounded by a buffer area, designed to avoid land use conflicts.

As a number of factors have changed since the undertaking of technical reports some years ago, Landcorp have engaged Calibre to review, analyse and update the Engineering Servicing Report previously prepared by Wood and Grieve in 2008.

Investigations to the current availability, cost and likely routes for connection to a range of services have been undertaken. Opportunities and constraints to servicing options are explored with estimated costs given for the various servicing options.

Outcomes from this investigation are to then inform a Concept Plan, which will seek to create smaller sites to utilise existing infrastructure and minimise costs.

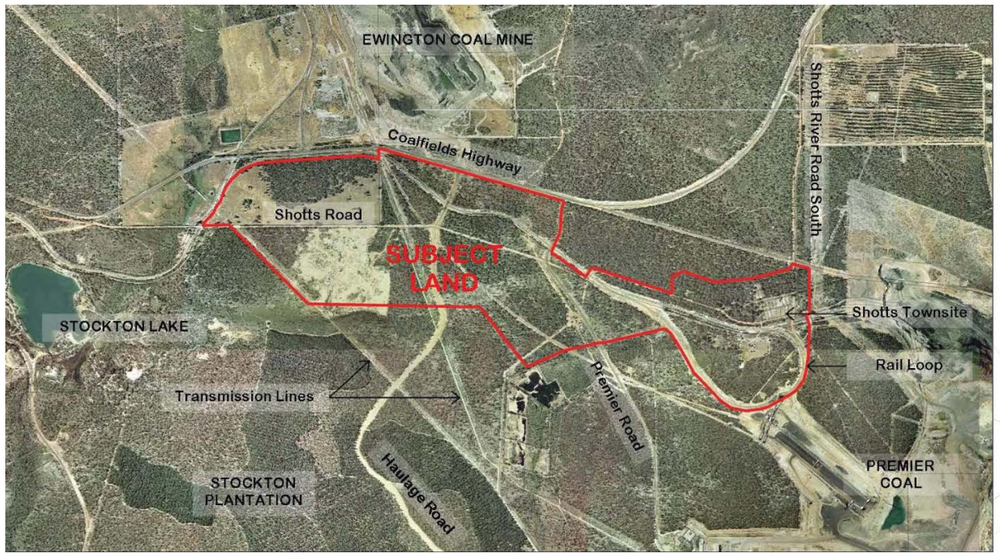

Figure 1 Location Plan

2 Previous investigations and reports

2.1 General

The key previous investigations and reports undertaken for the site include:

- **TME (2010)** Shotts Industrial Park Structure Plan
- **Wood & Grieve (2008)** Shotts Industrial Park- Collie Engineering Servicing Report, prepared for LandCorp 27 October 2008.
- **GHD (2010)** Local Water Management Strategy, Report for Shotts Industrial Park, February 2010

The Shotts Industrial Park (SIP) Structure plan set the framework for the land uses and development within the area.

2.2 Shotts Industrial Park Structure Plan

Key Issues identified within the Structure Plan are summarised as follows. The Key development issues for the site are shown in Figure 2.

2.2.1 Underground Subsidence

Historic underground mining in the area has resulted in Mine voids at depths of 12 to 15m below ground level are located in the eastern portion of the site in the vicinity of the rail loop and there is evidence of subsidence and collapses. These old workings were typically “bord and pillar” construction with bords 3m to 5m wide and up to 2m high.

These areas have been identified in the Structure plan and any structures proposed in these areas are likely to require substantial ground improvement works and/or piled foundations to avoid excessive settlement and distortion.

2.2.2 Water Management

The GHD (2010) Local Water Management Strategy has been developed for the SIP to demonstrate that water quality and drainage at the SIP can be adequately managed with each proponent of the SIP to be responsible for the preparation and implementation of an urban water management plan on their allotment, which will be subject to approval by the DWER.

It was identified that no scheme water was available within the SIP and the potential water supply sources for development are from surface water, groundwater, and mine dewatering. Groundwater is now however over allocated and is no longer a source option for the SIP.

Stormwater quantity and flood protection was identified as to be achieved through the use of local detention basins, and infiltration. It is the responsibility of proponents to provide the appropriate level of treatment for all surface and groundwater discharges from the site.

Groundwater depths were identified as varying across the site from 3m – 15m and that the impacts of shallow perched groundwater would need to be assessed on individual developments.

No wastewater infrastructure was also available on site and would need to be provided within the SIP and each proponent is required to manage their own wastewater collection, treatment, and disposal.

2.2.3 Wetlands

There are several wetlands identified adjacent to the border of the SIP and to reduce any potential impact from industrial uses on these wetlands and their associated vegetation minimum development setback/buffer were recommended.

2.2.4 Vegetation and Fauna

Approximately 51% of the SIP was identified as containing existing vegetation with a high degree of disturbance in many areas.

There is no Declared Rare Flora within the SIP, however two priority flora species have been found in several locations.

A number of fauna species were found in the SIP that have conservation significance including Carnaby’s Cockatoo, Baudin’s Black Cockatoo and the Forest Red-tailed Black Cockatoo, the Chuditch and Western Brush Wallaby.

As the development of the SIP will inherently require the removal of most of the vegetation specific controls were identified in the Structure Plan.

2.2.5 Heritage

An Aboriginal archaeological and ethnographic survey was undertaken and no sites of significance were recorded at the site.

2.2.6 Traffic and Access

It was identified that the SIP will have three entrances, with the main access being from Premier Road and secondary access from both Shotts Road and Shotts River Road South. Shotts Road to be realigned to provide an improved intersection with the Coalfields Highway.

The realignment of Shotts Road has now occurred in readiness for development in the SIP.

2.2.7 Soil Contamination

A preliminary site investigation was previously conducted and identified historical dumping of waste materials within the ‘rail loop’ at the eastern end of the site. Further site investigations and remediation will occur prior to development commencing.

2.2.8 Acid Sulphate Soils

ASS was identified as a likely issue near wetlands but given identified setbacks for those wetlands ASS issues on development sites was not expected.

2.2.9 Dieback

Phytophthora cinnamomi (dieback) has been identified as being present for a long time in the SIP due to the high level of disturbance and historic movements through the area. Further spread to be restricted at development phases.

2.2.10 Emergency Management

The Structure Plan identified that a Local Emergency Management Plan has been prepared for Collie and it details prevention, response and recovery arrangements in the unlikely event of a major incident occurs at the SIP.

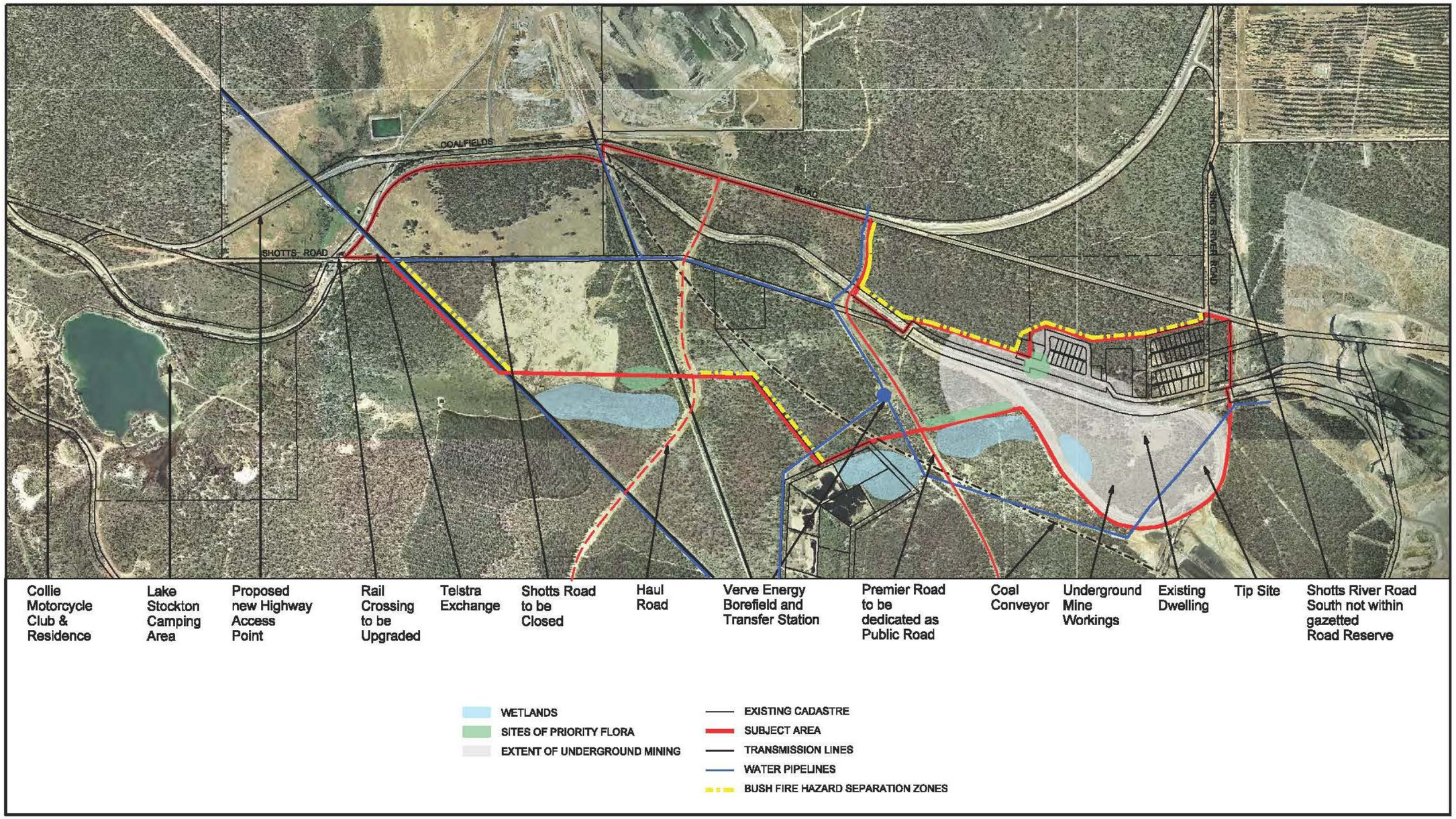

Figure 2 Site Constraints and Development Issues (Shotts Industrial Park Structure Plan, TME (2010))

2.3 Engineering Servicing Report

2.3.1 General

The previous **Wood & Grieve (2008)** Shotts Industrial Park- Collie Engineering Servicing Report assessed the servicing needs for potential industries and detailed the likely infrastructure needs and costs top service those possible industries.

The key findings of that report are summarised as follows.

2.3.2 Potential Industries

Potential industries identified at the time were a Fertilizer Plant and two coal char plants. The rest of the land was then available for heavy industry that would have appropriate buffer areas.

It was identified that some existing infrastructure on the sites may need to be relocated at a ballpark cost of $100m+ or developments established to work around that infrastructure and avoid those costs.

2.3.3 Site Constraints

Site constraints that were identified included:

- Vegetated areas
- Old sand pits not yet rehabilitated
- Haul roads associated with the coal mining operations in the area
- Underground and overhead power lines and associated easements
- Existing rail line and loop servicing the coal load out facility
- Private roads and servicing the mines sites, Premier Road
- Unconstructed road reserves
- Bore water mains and transfer stations
- Brine water pipelines
- Collapsed ground conditions from former underground mining operations
- Coal conveyor
- Optic Fibre lines

2.3.4 Water Supply

Process Water demand of 12 Gigalitres / year was assumed could be sourced from groundwater allocation (possible transfer) and Wellington Dam. Total cost $38m and assumed 800ND pipe @ 381 l/s.

Since the Wood & Grieve (2008) report was done the availability of groundwater is now extremely tight and is over allocated and so may no longer be an alternative.

New water schemes are now proposed for Collie Area so alternate water supply options may be possible. These include sourcing water possibly from Wellington Dam which is now part of the overall Collie Water scheme in development with various agencies and so may impact options available.

Alternate water providers are now in the market now as well such as Harvey Water that may provide alternatives not available before.

Potable Water demand of 25 Megalitres / year was assumed and was identified as potentially to be sourced from on-site rainwater harvesting or Collie townsite scheme. Also potential for further treatment of Process water source. Total Cost estimate was $1.5m- $4m.

However now the viability of on-site capture and treatment likely to be more viable due to small treatment systems being more readily available.

2.3.5 Electricity Supply

An electrical demand of 200 MW peak was assumed. Cost were highly variable from $0- $640m depending on energy options chosen. There is some existing infrastructure both above and below ground that could possibly be utilised. Most however is of a low voltage type and not sufficient for most heavy industry needs.

A 330kV line traverses the site and a 162kV line is adjacent but don't service it. These lines run from Muja Power station and sub-stations, distribution stations and distribution lines would be required if connection to these lines were to occur.

There have been additional power stations and transmission lines built since the Wood & Grieve (2008) report was done and coal industry far less profitable now so alternatives likely.

Since the Wood & Grieve (2008) report Synergy (the former energy retailer) was merged in 2014 with Verve Energy (the former state owned generation Business) and now Synergy controls the power generation and sale of energy form the Collie Power stations. This changes the dynamics in the energy industry and options available now.

Sustainable alternatives like solar power and hydrogen power also now can be considered that weren't options previously investigated.

2.3.6 Gas Supply

A gas demand of 30,000 Nm3/day was assumed. Costs estimates varied from $23m-$60m depending on demand for extensions from existing Dampier Bunbury Gas Pipelines.

The cost at the time depended on available capacity in the gas line to Worsley Alumina and the same issues remain.

2.3.7 Communications

The estimated costs to upgrade existing Servcies, divert existing services around the site and possible additional infrastructure was estimated at $5m – $10m.

Options for communication have significantly changed since 2008 and NBN now will impact telecommunications options.

2.3.8 Roads

It was assumed that approximately 1.6 km of new road train rated, sealed pavement would be provided by LandCorp with construction timing as required, plus purchase of 1.2km of existing Premier Road to convert to a Public Road. Total Cost approx. $2m

Since the Wood & Grieve (2008) report a new Shotts Road intersection with Coalfields Highway has been built to allow access to the western portion of the SIA.

The first kilometre of Premier Road is now in a formal Road Reserve and so should be available for access to the eastern portion of the SIA.

Additional internal public roads will also still be needed to service the estate.

2.3.9 Rail

Narrow Gauge railway track runs through the SIA site to the Premier Coal load out facility. Potential was identified to include two possible rail sidings to service the site. The Rail sidings were estimated as a cost $4m-$8m.

2.3.10 Wastewater Treatment and Disposal

For Domestic Waste Water treatment it was identified that the domestic waste generated by employees would be treated and used on site for landscape irrigation at a costs of approximately $4m to $5m.

For Process Waste Water treatment / disposal it was assumed this would be taken care of by proponent.

If an ocean outfall were required an approximate cost of $70m to $100m was given for an assumed 8 GL/yr outflow.

2.3.11 Storm Water Drainage

It was assumed that onsite stormwater solutions would be provided by each industry proponent to suit their site and comply with an overall drainage strategy which meets the environmental objectives of the Department of Water and the Department of Environment and Conservation (now combined as DWER), and State and Federal Environmental Protection Departments.

An estimated cost of $10m was provided for the cost of internal stormwater infrastructure that would be provided by the developers of each site.

It is noted now though that the guidelines and experience in stormwater management has significantly improved since 2008. This may also provide an opportunity for generation of some on site water which could be considered a resource.

2.3.12 Earthworks

Earthwork was considered as being undertaken by the developers of each site and so no assessment or costs were included.

Further geotechnical investigations were also recommended at development stage of each lot. Due consideration was also to be given to impacts of development over the old underground mined sections of the site some of which were reported previously as showing signs of subsidence on the site.

3 Existing and Required Infrastructure

3.1 Existing Site

The existing site is traversed by a number of services and transport corridors and also impacted by a number of other constraints as shown in Figure 2.

Development of the SIP will most likely require development of strategic sites within these areas to avoid the large costs of relocation that were previously estimated by Wood & Grieve (2008) at $100m +.

3.2 Assumed Required Demands

Given that the demands and resource requirements for individual industries is not yet identified the following assumed resource demands have been assumed as the basis of investigations. These match the same demands as the Previous Wood & Grieve (2008) study.

The assumed demands of future industry for the purpose of this investigation are:

- Non Potable Process Water = 12 Gigalitres / year.
- Potable Water = 25 Megalitres / year
- Electricity Supply = 200 MW peak (250 MVa)
- Gas = 30,000 Nm3/day.
- Earthworks = by site developers.
- Communications = by site developers depending on own requirements.
- Roads = no additional new roads, Shotts Road intersection already constructed. Usage of Premier Road to be negotiated.
- Domestic Waste Water treatment / disposal = 25 ML/yr or by site developers depending on own requirements.
- Process Waste Water treatment / disposal = by site developers depending on own requirements.
- Storm Water Drainage = provided by each site developer to suit their site and comply with an overall drainage strategy which meets the environmental objectives of the Department of Water and Department of Environment and Conservation (now combined as DWER), and State and Federal Environmental Protection Departments.
- Emergency Services = an emergency management committee is formed which answers to and includes representatives of DFES.

3.3 Potable Water

3.3.1 Existing Infrastructure

The Water Corporation currently has a Water Servcies Operating license area covering the Shotts area for provision of potable water but has no infrastructure nearby. The license doesn't however oblige Water Corporation to provide water services to the SIA.

The closest Water Corporation mains are located in the Collie townsite approximately 3.9km to the west where a 63 HDPE main has been extended to service a single farm house on Coalfields Highway or the Great Southern Towns Water Supply Scheme (GSTWSS) above ground 760 diameter steel main on the Collie Williams Road located approximately 7km to the north west as shown in Figure 3.

The GSTWSS has been in place for approximately 60 years and services 44 inland towns from Collie, east to Lake Grace and South to Tambellup at Harris River dam. Originally it was connected to Wellington Dam but changed later to the fresher source of Harris Dam as water salinity rose in Wellington Dam. This has resulted in the supply main from Wellington dam and portion of the pipe feeding to now become redundant as it is effectively replaced by the new feed to the GSTWSS by the Harris River Dam Main to the north. The pipeline has a nominal life of 100 years and so has significant asset value remaining.

There is also a private Muja Power Station 460 diameter above ground steel potable water main adjacent to the site that connects from the GSTWSS main on the Collie Williams Road to the north to the Muja Power station in the south also shown in Figure 3.

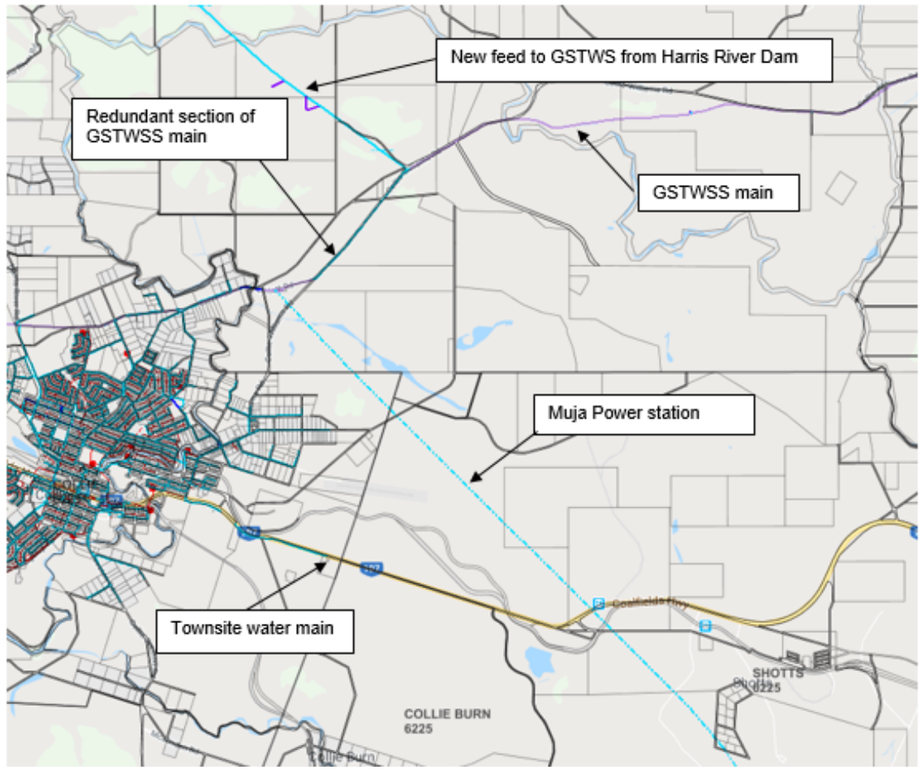

Figure 3 Existing Water Corporation water mains

This main was originally part of the water supply to Muja Power Station but now is no longer used and is now possibly used for backflow of excess water for short periods to other power stations along its route.

The previous proposed Perdaman Collie Urea Plant in Shotts had an agreement in principle with Water Corporation to enable Perdaman to access the existing redundant Wellington Dam take off and pipeline to supply water to the Urea plant. The Perdaman project had an estimated water demand of 12GL/yr.

This reused the existing pipe from Wellington Dam as well as constructing a new pipeline parallel to the Muja pipeline as previously referenced.

This projects did not proceed but the pipelines are shown in Figure 4.

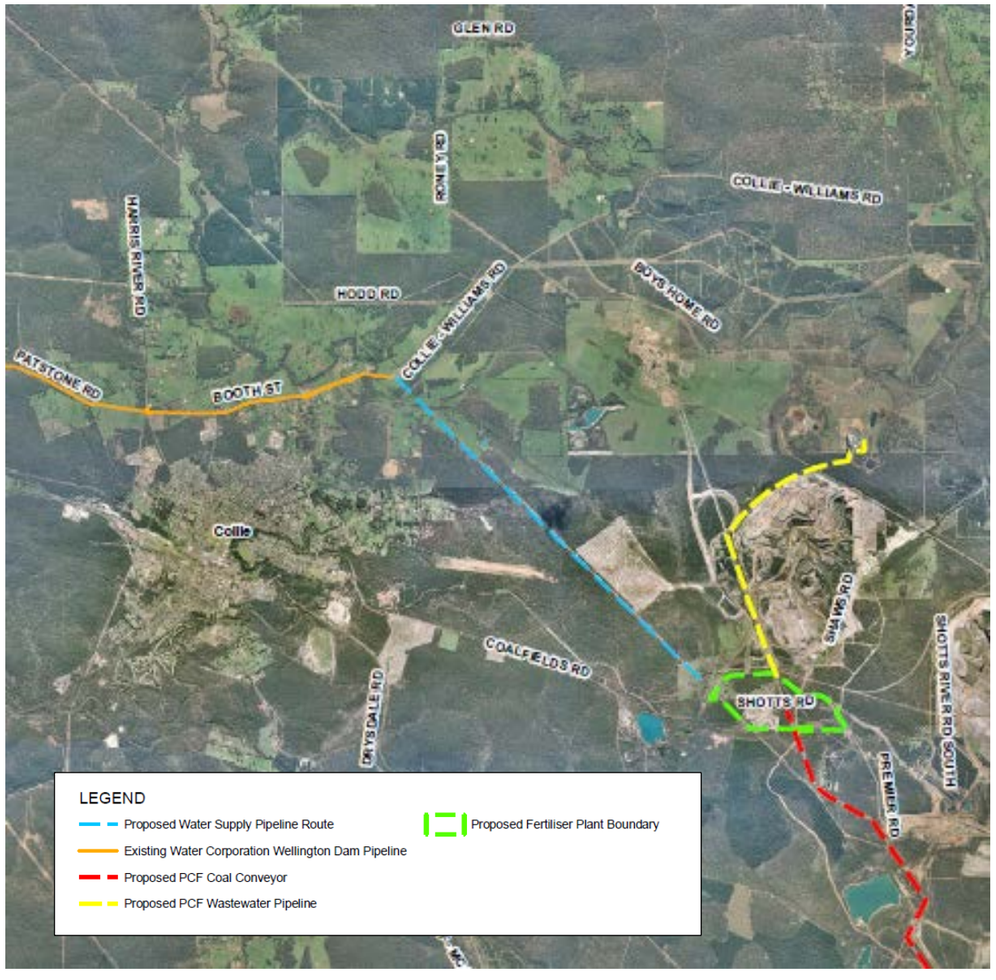

Figure 4 Perdaman pipeline routes- extract from PER GHD (2009)

3.3.2 Opportunities and Constraints

General

As well as extensions off the existing Water Corporation mains there are a number of developments currently under consideration in Collie regarding water supplies that could have an impact on availability of potable and non-potable water for Shotts.

These include the proposed Collie Water Project and also Harvey Water possibly entering the market in the Collie area. Both these will produce potable and non-potable water.

Extension from Water Corporation Mains

A small volume of potable water may be able to be delivered from the Collie townsite scheme by extension from existing mains. These mains are however of only small diameter and extension from larger mains closer to the townsite may be required if sufficient capacity and pressure is available

The supply from these mains is unlikely to be able to cater for the potable water demands of Shotts which are estimated at 25ML/ yr

Collie Water

The Collie Water project is one that plans to divert the early winter saline flows from the Collie River East branch into a coal mine void and then extract that stored water and treat to an acceptable quality in a new desalination plant near Collie that will deliver approximately 20GL/yr.

The diversion of approximately 14GL/yr of the saline water will then allow the water quality within Wellington Dam to improve increasing is suitability for uses direct from the dam. This project will be undertaken in conjunction with reforestation of existing Blue Gum harvest areas to further enhance water quality improvements in Wellington Dam.

This will then also improve the quality of water from Wellington Dam that is currently supplied to the Collie River Irrigation District by Harvey Water.

The treated water will then be piped to coastal areas where it will recharge the Myalup Aquifer and allow enhanced food production as part of the Myalup Irrigated Agriculture Precinct.

Portion of the treated water will also be available for Water Corporation to pump to Harris River Dam which can then be supplied either to the GSTWSS or into the Integrated Water Supply Scheme (IWSS) for use elsewhere in the Water Corporation network.

This then allows Harris Dam to be supplemented as in recent years it has been heavily impacted by Climate change reducing inflows to the dam.

The Burekup Weir is also raised as part of the project to allow piping of the irrigation area and further reduce water losses.

Collie Water is a WA-based water company established to manage the industry lead solution to resolve the salinity issue in Wellington Dam and also provide additional water for agricultural and domestic purposes. It was selected as preferred proponent for the scheme as a result of a government advertised expression of Interest Process.

At present the State and Federal Governments are working with Collie Water to secure the required funding for the estimated $394m project.

The Collie Water concept is shown in Figure 5.

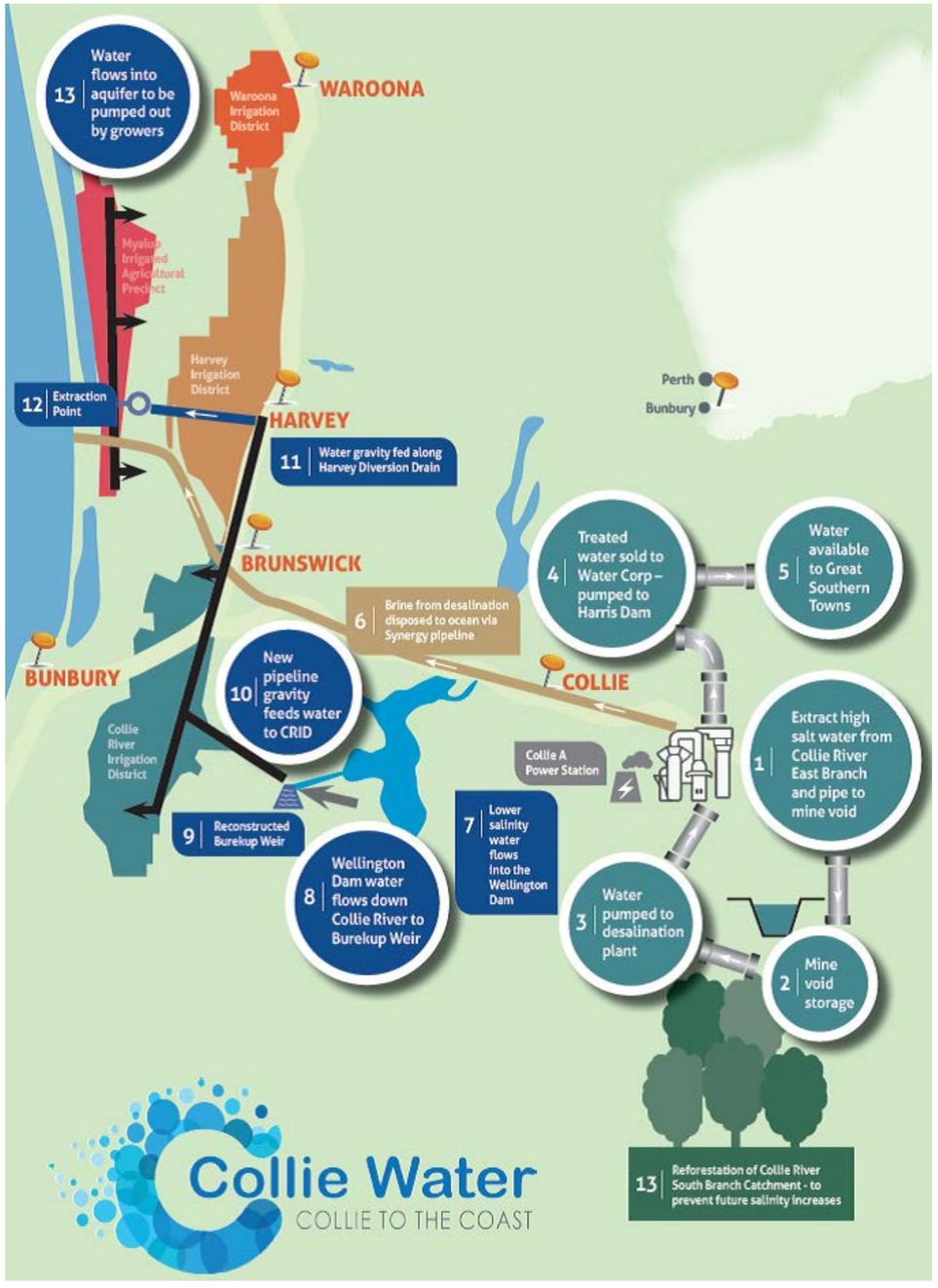

Figure 5 Collie Water Concept

The final pipeline routes have not been released publically yet but the indicative routes are shown in Figure 6 sourced from the Department of Water web site for the project.

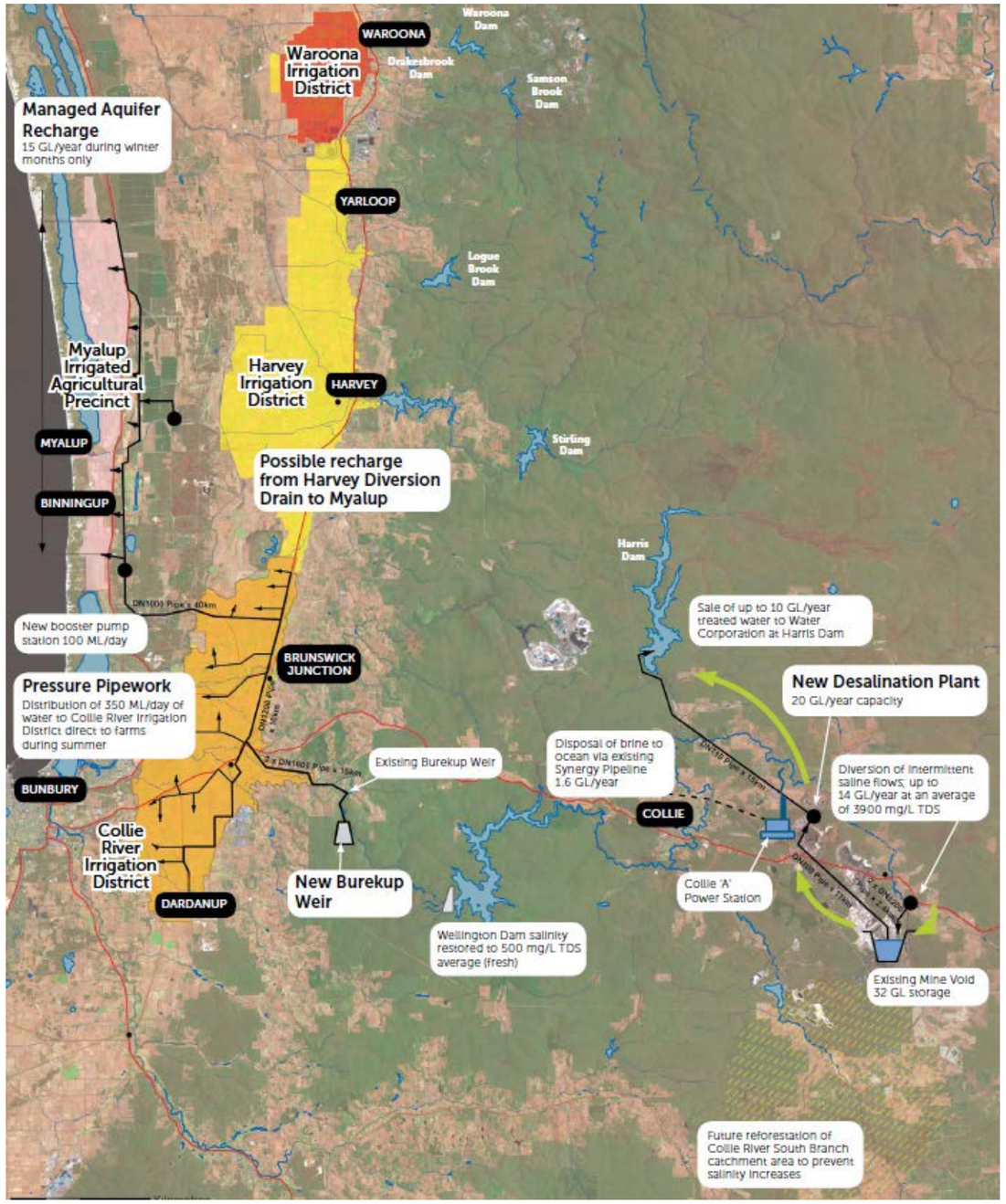

Figure 6 Conceptual Pipe Routes- Collie Water Project

If this project proceeds then up to 20GL/yr will be produced and at least 10GL/yr of which is allocated to the Harris Dam. If any other allocation becomes available then this could possibly be used by agreement for the SIA needs.

The key outcome of the Collie Water Project is however is that once implemented then the salinity level of Wellington Dam is predicted to drop from 1200 mg/l TDS towards 700 mg/l within 3 years of diverting 15GL of water.

This would then improve the quality of water from Wellington Dam for reuse elsewhere including the SIA where it would reach near potable quality for TDS.

Harvey Water

Harvey Water (South West Irrigation Management Co-operative) is a self-funded cooperative that delivers non potable water to its members and a broad customer base.

It takes water by agreement form local dams including Wellington Dam and delivers it to customers via a system of open and piped channels to the Harvey, Waroona and Collie River Districts.

Harvey Water has ERA issued Water Service Licenses for both the South West Irrigation Area as well as the Upper Collie Operating Area. As shown in Figure 7 the Upper Collie Operating Area covers the SIA and so gives them ready ability to service this area if a customer required it and they could identify a suitable source.

These licenses cover non potable water services and irrigation services but could be readily extended to potable water services if required.

Harvey Water is licensed to draw 137GL annually from Waroona, Drakesbrook, Logue Brook, Harvey and Wellington dams as well as the Wokalup Pipe-head. The allocation from Wellington Dam is 68GL and of this Harvey Water have identified that they have approximately 10GL of available allocation from Wellington Dam.

This is the amount available within their current overall 68GL allocation. The water would need to be pumped from the heritage listed pump station location directly below the Wellington Dam wall. There is no pumping from this pump station at the moment and there is likely to be significant works for this to provide water to the SIA.

This water is slightly brackish and this will need to be taken into account for any new pipe networks as well as end uses. On site treatment to produce water of a suitable quality can be undertaken by either Harvey Water or a third party to get the water to a potable quality.

Harvey Water are currently in discussions with another potential customer in the SIA vicinity and are also discussing with Water Corporation the possibility of using the existing redundant portion of the GSTWSS main from Wellington dam and then providing a new offtake in a similar location to the existing Muja Power Station offtake for the same main.

Harvey Water are only in early investigation phases of this scheme and no formal costings have been produced yet.

There could be an opportunity to share this supply in conjunction with the other customer and provide both potable and non-potable services to the SIA.

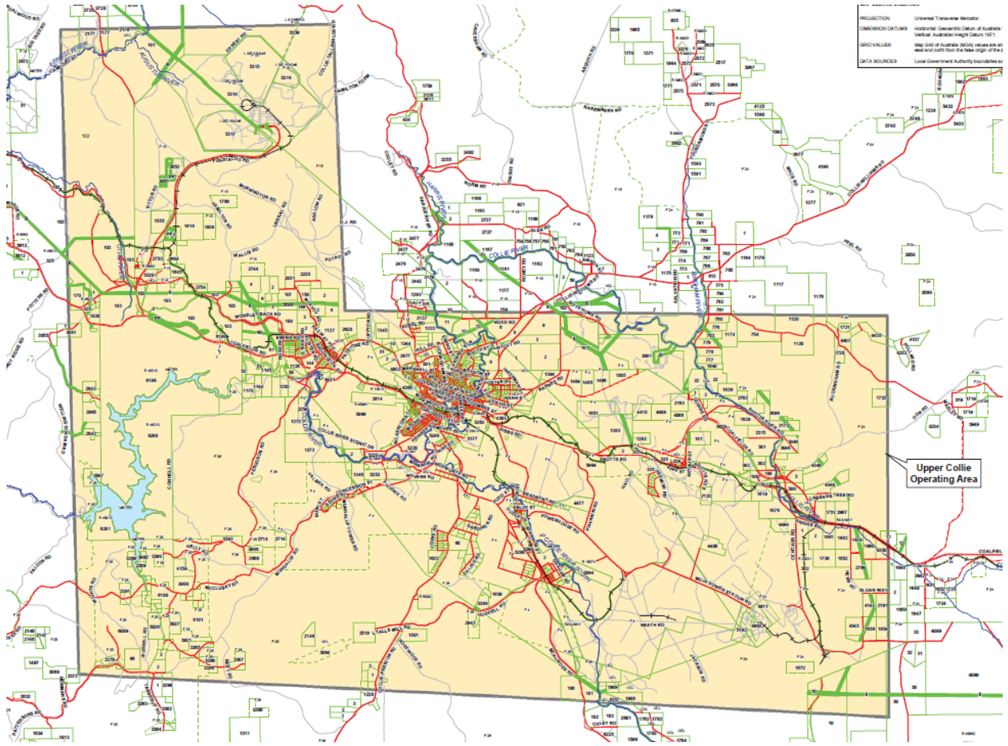

Figure 7 Harvey Water- Upper Collie Operating Area

If a portion of the non-potable water from such a scheme were treated to potable standards by a desalination plant then one issue to consider is the wastewater brine stream produced.

There may be opportunities for the use of this material as part of the industrial activities undertaken, especially if they require a salt source. Another use may be brine ponds for various aquaculture or for low grade heat generation.

Disposal of the wastewater off site would be a significant cost. Other disposal options, linked to the proposed Collie Water treatment plant may be viable once further investigations are undertaken.

Local Surface Water Capture and reuse

For potable needs there is the potential for a roof runoff capture and reuse system on each developed lot. This is probably best suited to individual lots having their own independent systems, which will negate the need for an overall potable water service provider who needs to coordinate and control the schemes between individual lots or developments.

The simplest systems are likely to consist of roof only catchments, with sealed tanks, suited to the roof size and annual demand. These would then be linked to an appropriate treatment system which may range from basic filtering and UV treatment through to full membrane and chlorination treatment systems.

Low flow trickle top up could also be possible from the Water Corporation townsite mains with small diameter low flow pipes.

Groundwater

Local groundwater bores and treatment is not an option for potable water supplies as the aquifer is currently over drawn and no additional groundwater extraction is permitted.

There is an existing network of bores and bore mains in the area that feed water to the Muja Power Station as shown in Figure 8 but these are for dedicated feeds to the Power Stations only.

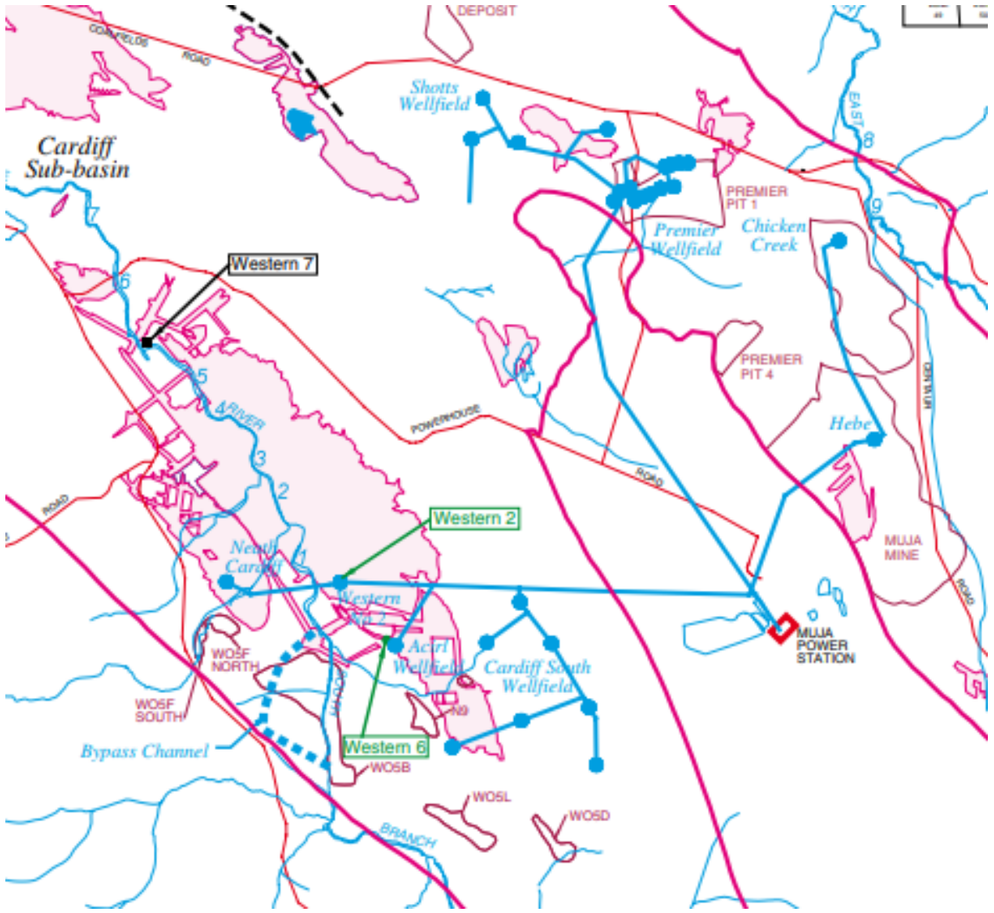

Figure 8 Groundwater Bores and mains

3.3.3 Estimate of Costs

External Source Water

To construct a potable water treatment plant within the subject land, using non-potable water from a local provided non-potable feed source and supplied via either Harvey Water or an alternate provider the cost would be approximately $1m for a 2ML/yr plant with a $300,000 annual operating cost. This cost assumes that the brine can be used and or stored and evaporated on site.

The cost for a 25ML plant is in the order of $5m, noting that this does not include extra pipe networks to safely dispose brine waste off site.

In addition would be the capital and operating costs of delivering a non-potable water source to the treatment plant which Harvey Water have estimated as of order $38m if a new pipeline and Pump Station works from Wellington Dam is required and lower if portions of the GSTWSS pipeline can be reused.

Alternatively if a connection can be made to the existing GSTWSS main on Collie Williams Road and supply provided by the Water Corporation then the pipeline costs based on 7km to the site with a 300mm at $300/m would be $2.1m.

This however depends largely on whether Water Corporation will continue to operate this main in the future or discontinue its use.

If the existing Muja pipeline also becomes fully redundant then this could save the cost of the new pipeline as it already runs adjacent the SIA site and would provide a suitable feed point for water in the estate.

Internal potable distribution mains would also be required within the SIA.

For the Collie Water Scheme to be implemented it will require the $394m for the project to be sourced before any offtake from the scheme could occur.

Local Surface Water Capture and reuse

The cost of independent roof runoff and treatment systems will vary depending on the treatment system chosen and the sizing. The cost per user is likely to be in the order of $500,000 - $1,000,000 for mid-range volumes up to 1ML.

For a 20ML supply across the SIA a ballpark price of $10m to $20m could be applied.

3.3.4 Recommendation on preferred approach

Work with potential water service providers to refine potable and non-potable water options, based on proposed needs. Harvey Water seem more advanced than other likely providers at this time.

3.4 Non-Potable Water

3.4.1 Existing Infrastructure

There is limited infrastructure in place for the provision of non-potable water to the subject land other than the Muja service water main that traverse the site. The current condition of this pipe is unknown and the current pipeline owner Synergy has verbally advised that the pipeline is not used for supply to the Muja Power Station anymore but that is kept operational and sometimes used to back feed the other nearby power stations.

There are other bores and mains nearby but these are all fully utilised for power station supplies and no additional capacity is available.

There are also no surface water catchment structures or dams.

3.4.2 Opportunities and Constraints

General

As with potable water supply options the options for a non-potable supply include the proposed Collie Water Project and also Harvey Water possibly entering the market in the Collie area. Both these will produce potable and non-potable water.

Harvey Water

As discussed in section 3.3.2 Harvey Water have identified that they have approximately 10GL of available allocation from Wellington Dam. This is the amount available within their overall 68GL allocation and would most of the estimated 12GL/yr demand for the SIA.

As the water is slightly brackish it may need additional treatment at the point of delivery although if the Collie Water project proceeds then the water quality is expected to improve in the future and no additional treatment may be needed depending on the water quality requirements of the industry using the water.

To supply water to the SIA would need a water main extension from the portion of the GSTWSS pipeline that Harvey Water intend to use on the Collie Williams Road.

Collie Water

Also as discussed in section 3.3.2 if the Collie Water Project proceeds then it will produce 20GL/yr of potable water all of which is expected to be allocated to the Harris River dam and local customers.

To utilise 12 GL/yr for the SIA would give a ready additional customer for the water as well, if a spare allocation of the water is available.

The final location of the treatment plant is not known but appears to be planned for construction adjacent the Blue Waters Power station which is only 5km for the SIA.

Groundwater

Based on advice from the Department of Water and Environmental Regulation there is unlikely to be any groundwater allocation available. The groundwater subarea is heavily over allocated, by approximately 10 times the optimal extraction limit. For this reason no new groundwater licences will be granted in the foreseeable future. Groundwater trades will also not be supported. It is likely that the aquifer will need a considerable period of time to recover, even if all current water use is ceased.

Local Surface Water Capture and reuse

There may be the opportunity for small scale surface water harvesting within future industrial lots for non-potable meeds. This may be from roof structures as well as hard stand areas. The actual volume of water would be dependent on the surface capture area as well as rainfall and storage capacity. This means that the actual harvest volume remains unknown.

To provide some guide to potential volumes, the following conservative formula can be applied to any proposed development hard surfaces (roof/paved surfaces).

Total Capture volume = Area x 70% Annual Rainfall x 60% effective runoff x 50% of potential storage.

Area is defined as the Developed hardstand Area excluding roads. Assuming 30% of the area is actually applicable hardstand area, the total area would be 63ha.

Annual rainfall is taken from the Bureau of Meteorology website is 850mm/annum averaged since 1971. The 70% calculation allows for a long-term reduction in rainfall predicted by climate change models.

The runoff coefficient is assumed to be 0.8 and to be conservative it is assumed that only 60% of the water will actually make it into the storage facility, due to overtopping in large events, losses during light rainfall and other general losses.

Storage and the associated 50% loss takes into account potential for loss through evaporation or the undersizing of the storage container/dam, meaning not all available water is held.

Total Capture volume = 63 ha of hardstand X 70% (850mm) X 60% (0.8) x 50%

=630,000m2 x 595mm x 0.48 x .5

= 90000KL (approximately)

= 90 ML

This is well below the 12GL/yr requirement and so will only be able to cater for a small portion of non-potable needs if any.

3.4.3 Estimate of Costs

Harvey Water initial estimates to lay a new pipe from Wellington Dam to the SIA, capable of providing 10GL/yr, would be in the order of $28m. Some sections of the existing pipe may be still viable or require only minor upgrades, which should reduce the overall cost.

The cost to repair the existing pump station is unknown. An allowance of $10m can be used as an interim quantum until further investigations are undertaken over the next 6 months by Harvey Water.

3.4.4 Recommendation on preferred approach

Work with potential water service providers to refine potable and non-potable water options, based on proposed needs. Harvey Water seem more advanced than other likely providers at this time.

3.5 Wastewater

3.5.1 Existing Infrastructure

The Water Corporation currently operate a Sewer Treatment Plant under their ERA Operating license for provision of sewer services to the Collie Townsite. This plant and the disposal site is shown in Figure 9.

The Collie Wastewater Treatment Plant is located 4km south of Collie along Mungalup Road and is licensed for 2,200 m3/day and currently receives an average of 1,400 m3/day. The Collie WWTW is over 10km from the SIA.

The Collie sewer scheme currently collects and treats approximately 600ML/yr of effluent for the current connected properties and this is expected to grow to approximately 900ML/yr by 2060.

Water Corporation have considered a long term option to take the effluent from the Collie Wastewater Treatment Plant and treat it through an advanced water recycling plant and then treat it to drinking water standard for recharge into groundwater supplies for later reuse.

This would be the same as the current groundwater reuse scheme operating in Craigie in Perth's northern suburbs.

Water Corporation estimated this scheme could yield 860 ML/yr by 2060 but will unlikely be constructed or needed until that time.

Figure 9 Collie WWTW

If the effluent requirements from the developments matched the likely potable demand of 25ML/yr then this could be within the future plant capacity but not likely viable.

3.5.2 Opportunities and Constraints

Individual on site treatment systems are likely to be the most viable option for the subject land.

Alternative a centralised wastewater treatment plant and sewer network could be set up within the SIA which may be operated by Water Corporation or another Service Provider.

There may be the potential to dispose of the treated water from this WWTW in the buffer areas to irrigate tree crops or other biomass as feed stock for biomass industries.

Alternatively, the treated water may be a viable resource for other industries e.g. composting.

If the quantities of waste water were much higher then this would not be a viable alternative.

There is the potential to pump wastewater to the Collie townsite plant which is located approximately 10km to the east but the long length of pressure main and likely low flows is likely to be problematic.

3.5.3 Estimate of Costs

The estimated cost to establish a 25 ML/yr (approx. 70KL/day) centralised WWTW and associated disposal area nearby would be approximately $4m.

Additional to this would be the costs for each industry to pump their effluent to the central WWTW site.

This could costs $100K+ for each site depending on the distance from the centralised WWTW.

The effluent could be disposed to a tree lot or could be treated to a higher standard and used for landscape purposes within the SIA.

3.5.4 Recommendation on preferred approach

On site treatment is likely to be the most flexible treatment option for wastewater, with the exact type depending on the industry scale and potential reuse or disposal options.

Without knowing the future industries to be developed on the site it would not be possible to adequately size a WWTW to cater for the unknown future flows and hence on lot solutions would be more reasonable and logical solution.

3.6 Gas

3.6.1 Existing Infrastructure

There is currently no gas available within the SIA.

The nearest gas supply is that operated by DBP (a part of the Australian Gas Infrastructure Group) the owner and operator of the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

This pipeline has been in operation since 1984 and extends from Dampier down to Clifton Road, Australind near Bunbury and also a lateral lines including one to Worsley Alumina Refinery approximately 22km east of Collie.

The lateral to Worsley Alumina is under a specific agreement with them and any additional flows off this lateral would need agreement of South 32 as well, the current refinery owner. At present Worsley have supply through two laterals in the same corridor and the capacity of these lines is fully contracted to Worsley.

The locations of the existing DBP mains relative to SIA are shown in Figure 10.

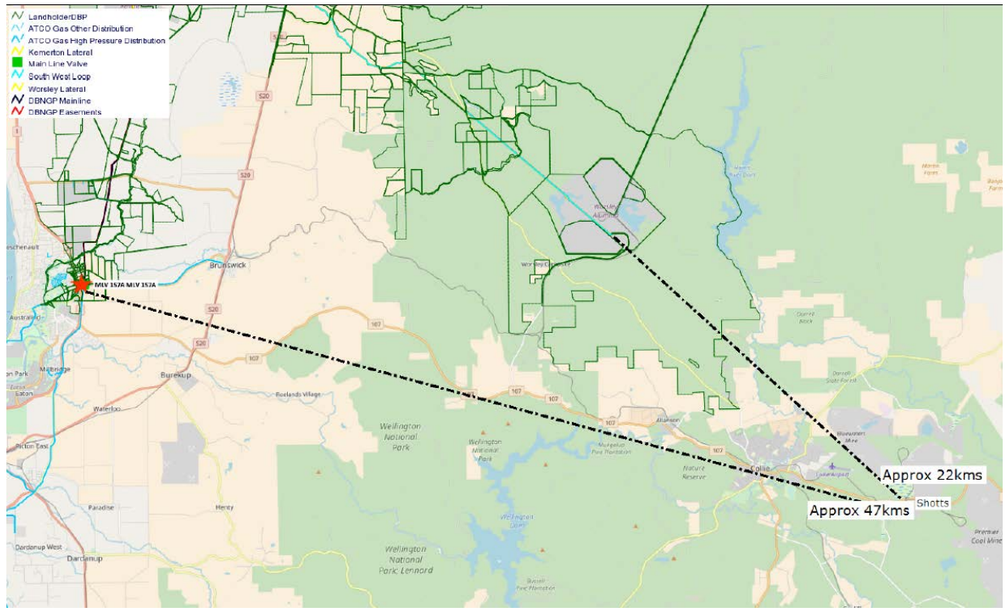

Figure 10 DBP locations

ATCO Gas normally provide gas supplies to townsite areas but Collie is not serviced with gas. Bunbury and surrounds are supplied by ATCO by laterals off the DBP line to Bunbury.

At one time is was planned to extend the gas line from Worsley to SIA to facilitate the Perdaman Urea Project but this did not eventuate.

This was to provide an alternate source material after the Urea project was unable to secure a coal supply for the proposed plant. This was estimated at $20m in 2017. At the same time there was a push to have a gas line extended to Collie at an estimated costs of $50m.

3.6.2 Opportunities and Constraints

There is an opportunity to extend gas lines from either the Worsley lateral or by a new extension from the end of the DBP line in Kemerton.

The Worsley laterals have their capacity fully contracted to Worsley under agreement with DBP and so any spare capacity could only be released by Worsley via owners South 32. The gas supply to Worsley is used to power a Gas Turbine based cogeneration facility and also for calcination of high purity alumina with approximately 85% of gas delivered to Worsley being used for the calcination process. Any future expansions of Worsley are heavily dependent on a gas supply and so it is unlikely this additional capacity currently held would be released to third parties.

Worsley is currently undergoing an expansion from 4.7 Mtpa to 5.1 Mtpa and has a mine life of approximately 50 years remaining and so any spare gas capacity is unlikely.

The more likely alternative is for a new lateral to be constructed from the end of the DBP line in Kemerton and extended to the SIA. DBP have advised they have capacity in the line at this point but that the route would need close attention to deal with the associated environmental and community issues.

DBP would construct these works as Public Works and this could facilitate the construction process.

The route would also desirable have an extension of the DBNGP corridor to afford some statutory protection. Where the road reserves were used this would also need agreement with MRWA and Shires.

There has long been discussion of a Bunbury to Albany Gas line as well and this route could form the first part of that future link if it were to eventuate.

3.6.3 Estimate of Costs

Based on the two possible options the estimated costs provided by DBP are:

Route 1 - Worsley to Shotts - approximately 22km

Cost @ $1M/kilometre = $22m

Meter Station and Offtake = $6m

Total approximate costs = $28m

This assumes spare capacity to Worsley can be released.

Route 2 - Clifton Road Kemerton (End of DBNGP) to Shotts - approximately 47km in a straight line or 55km using road reserves

Cost @ $1M/kilometre = $47m to $55m

Meter Station and Offtake = $6m

Total approximate costs = $53m to $61m

3.6.4 Recommendation on preferred approach

Further liaison with DBP to determine if spare capacity from Worsley is available under the agreement and if not then refine route and costs for extension from Kemerton.

3.7 Power

3.7.1 Existing Infrastructure

The SIA is central to 3 major power stations and a network of transmission lines that feed into the South West Interconnected Network.(SWIN)

The 3 major local power stations as shown in Figure 11 include:

- Muja Power Station
- Collie Power Station
- Bluewaters Power Station

Figure 11 Power Station locations

The following outlines background of the power generators and their capacity. If spare capacity is available, it will be both attractive to the new industries and power generator.

Collie Power Station

Collie Power Station was commissioned in 1999 and is a coal powered with one steam turbine that generates a total capacity of 300MW of electricity and is located 5km north of the SIA. The coal is mined locally from the Collie Sub-basin and is transported to the power plant by overland conveyor.

The Collie Power Station accounts for approximately 12.5% of Synergy's generation capacity with a current forecast retirement date of 2040.

Muja Power Station

Muja Power Station was commissioned in 1966 as a coal fired power station 9km south east of the SIA. It has eight steam turbines served by coal-fired boilers that together generate a total capacity of 854MW of electricity. The coal is mined locally in the nearby Collie Sub-basin.

The station was first commissioned on 21 April 1966. Currently four of the eight turbines are running (units 5 through to 8). Muja has four 60MW units (stages A and B), two 200MW units (stage C) and two 227MW units (stage D). The four smallest and least efficient units, stages A and B, were closed in April 2007. In June 2008 it was announced that these older generator units would be recommissioned, due to a state-wide natural gas shortage.

There has been recent debate on the staged closure of Units C and D but no timings or closures have been agreed at this time.

The Muja CD units account for approximately 32% of Synergy's generation capacity with a current forecast retirement date of 2030 for units 5 & 6 and 2035 for units 7 & 8.

Bluewaters Power Station

Bluewaters Power Station was the first privately owned, coal-fired power station in Western Australia and was built by Griffin Energy in 2009. The site is located 5km north of the SIA.

The plant consists of two 233MW coal powered units giving a total capacity of 466MW. An expansion of the power station was approved in 2010 to increase the capacity of the station to 830MW but those expansion works have not been undertaken to date.

The Bluewaters Power station delivers approximately 15% of Western Australia's electricity supply.

Perdaman Urea Plant

With the previous proposed Perdaman Urea Plant the power requirements for this development were to be provided by a 220MW Combined Cycle Gas turbine with 130MW from the gas turbine and 90MW from a heat recovery steam turbine. This development did not proceed.

On site generation of power remains an option for new industry with high power demands and sourcing gas from DBP.

Transmission Network

Multiple Transmission lines feed out from the three local Collie Power stations as shown in Figure 12.

The original transmissions lines in the area were 66kV lines and later 132kV transmission lines were built from Muja Power Station to Bunbury.

Later the more efficient 330kV network was constructed and links the power stations to the SWIS transmission network.

A single 220kV line also heads east and supplies Narrogin South Terminal and then continues to the Eastern Goldfields.

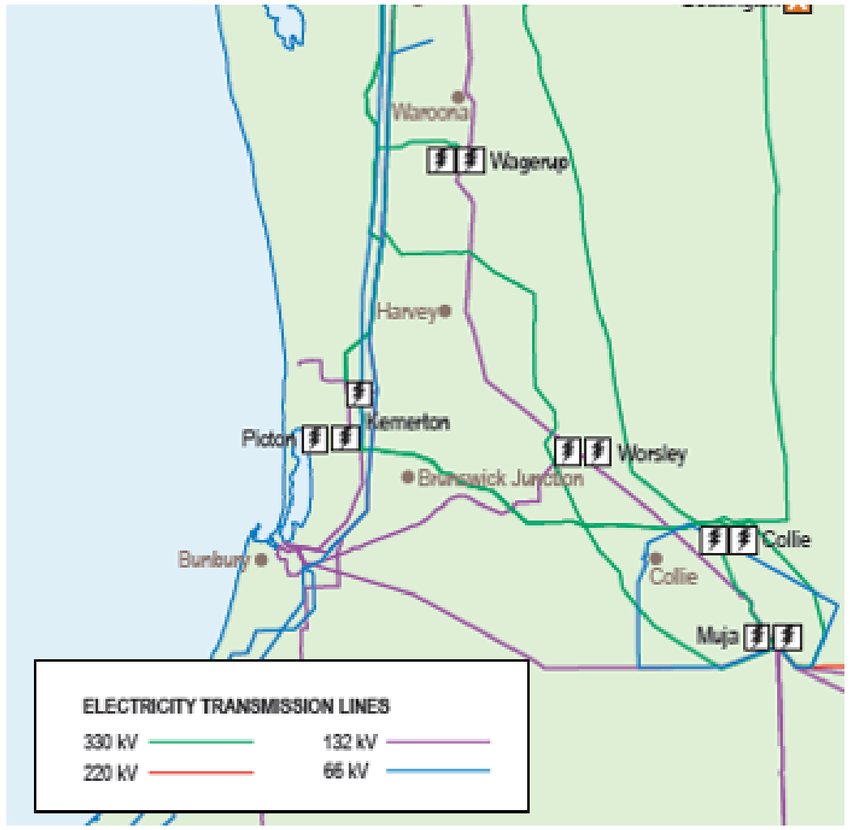

Figure 12 Western Power Transmission Network

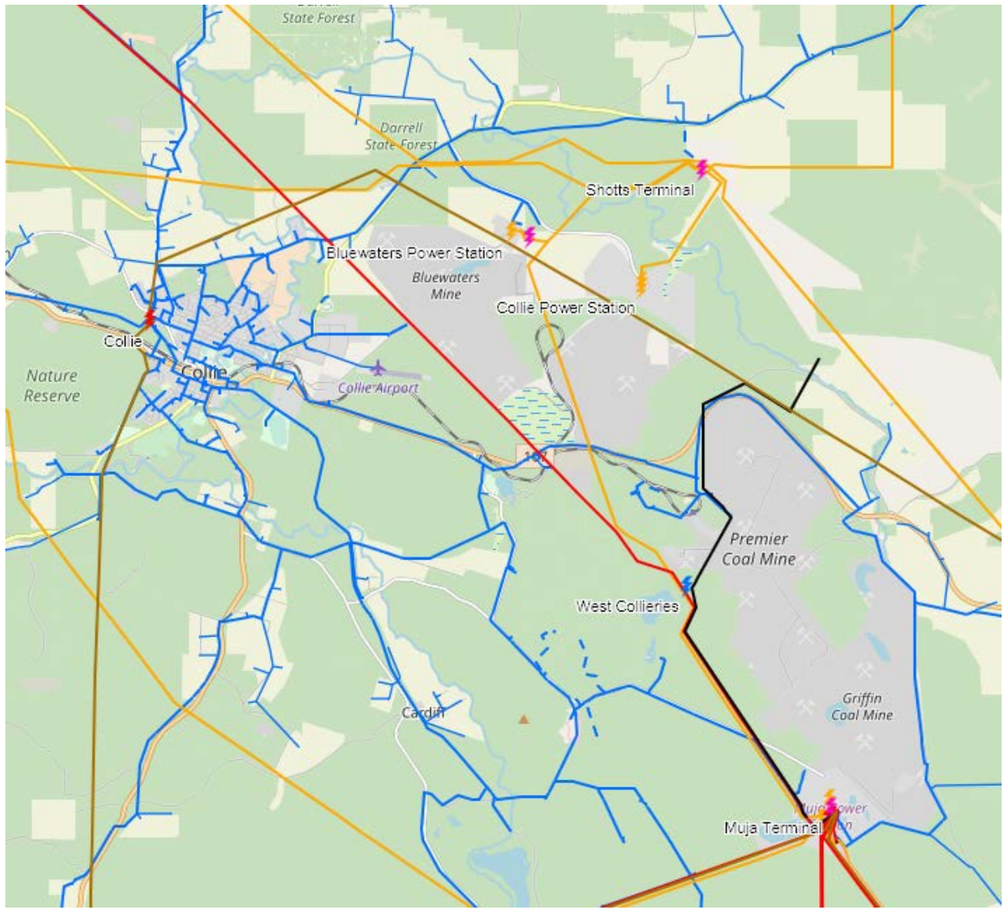

Figure 13 Terminals, Substations, Transmission and Distribution lines.

Terminals and Substations.

The Muja Terminal station located adjacent Muja Power Station takes the power from the 330kV lines and drops it down to 132kV for further drop to distribution voltages or transmission across the 132kV network.

The Muja Terminal is one of the largest on Western Powers network and is characterised by significant generation connection and strongly meshed 330kV and 132kV networks with neighbouring areas.

There are other Terminals located at Shotts (7km north of the SIA) and also at Western Collieries, Collie Power Station and Bluewaters Power Station. These Terminal Substations converts voltages from 330kV to 132kV (or 66kV in some cases).

Zone Substations then convert the voltage from 132kV (or 66kV) to 22KV (or other distribution voltages).

The Collie Zone Substation has 3 transformers and largely feeds the Collie Townsite and surrounds.

The Terminals and Collie Zone Substation are shown in Figure 13 together with local Transmission and 22kV Distribution lines.

Figure 14 shows the Transmission and Distribution lines at the SIA.

The 330 kV Transmission lines runs north south through the western central portion of the site and the 132kV Transmission line follows the western boundary of the SIA.

The 22kV overhead distribution lines are generally 3 phase but with some single phase branch lines.

These have low capacity and would not be able to serve industry needs in the SIA and so feeds would be required from the transmissions lines and Terminals or Substations.

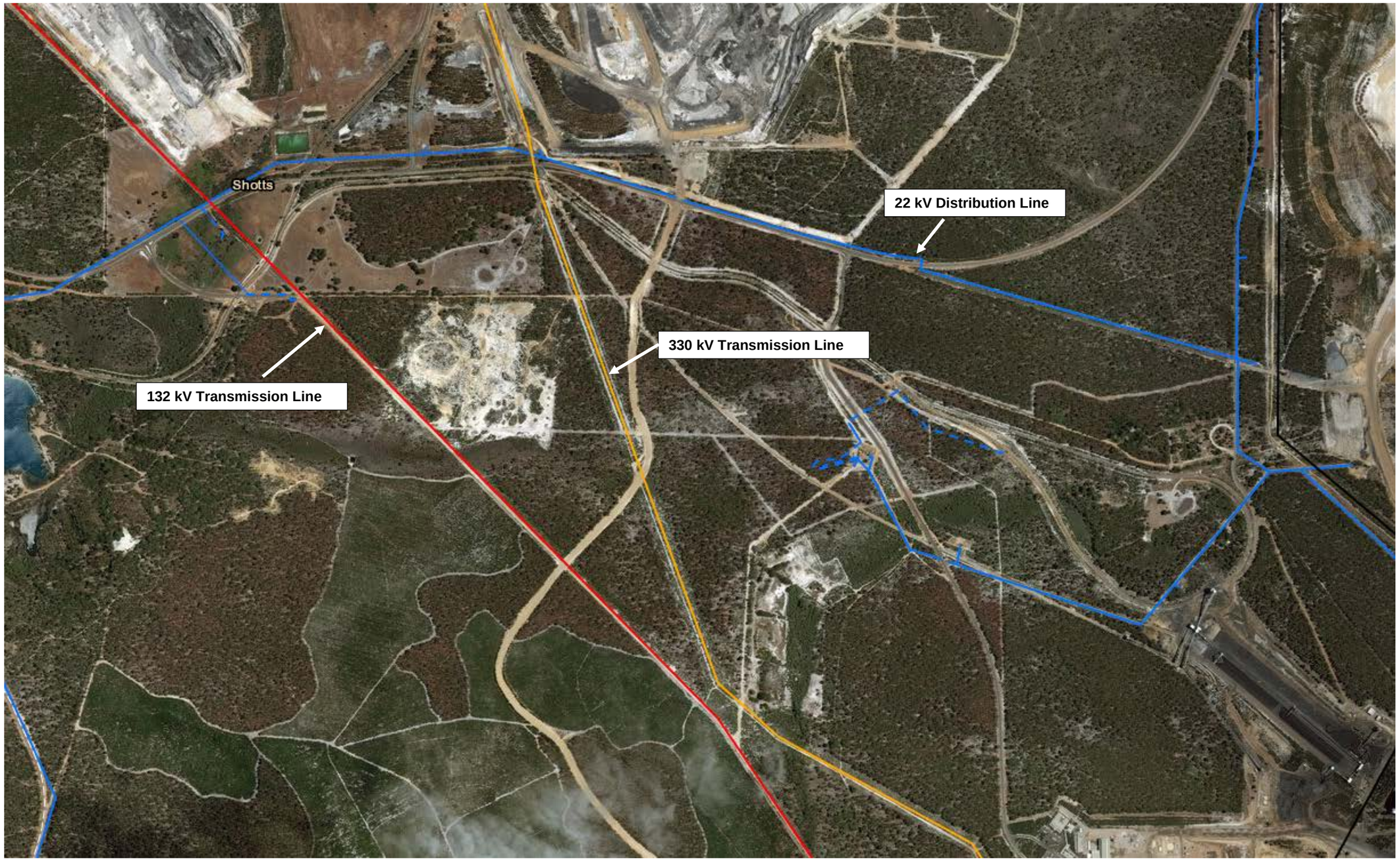

Figure 14 Transmission and Distribution Lines

3.7.2 Load Requirements

Possible Scenarios

Depending on the final power demands of the industries that develop in the SIA there are varying levels of potential power demands that will impact on the infrastructure to be provided or required.

The following outlines the different power options available for the developer for supply to the development. The different requirements and their respective HV concept plans are shown in Figures 15, 16 and 17.

CAG Requirements

For each of the different scenarios, a Competing Applications Group (CAG) will be triggered. In this process if there are multiple applicants then Western Power groups the applicants behind the common network constraint allowing a single network solution to be developed to meet some or all of the applicants requirements. A CAG is triggered if the lot requires more than 1.5MVA supply per lot.

In the SIA this will be the case for all current lots because the minimum load requirement set by Western Power for newly developed lot is based on 200kVA/ha. All the lots being created in SIA are greater than the 7.5ha, which is equivalent of 1.5MVA supply.

Because the minimum load requirement set by Western Power for newly developed lot is based on 200KVA/ha, the minimum load required for the SIA based on its site area is 42MVA.

Exemptions can be made if the industry requests certain amount of load but for this to occur, the industry needs to have bought or leased the land and has approval to build, thus knows exactly what the power requirements are.

Less than 15MVA Load Requirement

Western Power's network mapping tool shows there is between 10MVA and 15MVA capacity remaining in the SIA area at present. Thus if a lower power using development occurs on one or more of the sites with a total demand of less than 15MVA then no reinforcement or upgrades to the network is required.

As per Western Power's Standards, having 10MVA load to any development will require its own HV feeder. The existing 22kV HV overhead distribution lines running along the Collie Darkan Road are connected to the Collie Zone Substation on the western side of the Collie Township.

This is the closest Zone Substation and so Western Power will require at least two (2) HV feeders to run 10 km along Collie Darkan Road all the way back to the Collie Zone Substation.

15MVA to 60VMA Load Requirement

Any loads above 15MVA will require reinforcement to the network and this typically means a new Zone Substation.

As the Collie substation will only likely be able to supply up to a maximum of 15MVA a Zone Substation is likely to be required for a 132kV transmission line in the area to drop the voltages to the required 22kV for distribution through the SIA.

By constructing a new Zone Substation, the minimum requirement of 42MVA load (due to the Western Power's 200kVA/ha requirement) will be readily met.

Construction of a Zone Substation can easily be accomplished because 132kV transmission line runs through the SIA and would provide a source of power for the Zone Substation.

Western Power standards have a maximum of three transformers inside a Zone Substation. Each transformer can supply a maximum of 30MVA. Thus the maximum capacity of a new Zone Substation is 90MVA or if security/reliability is required, 60MVA with one spare as backup. Using the new Zone Substation, HV metering arrangements can also be used to supply the rest of the lots.

Above 60VMA Load Requirement

Any lots that require more than 60MVA will require its own zone substation. The 132kV transmission line can only convert so much power before the 330kV Terminal Zone Substation will be required.

Western Power would need to complete a detailed study to determine the constraints on the 132kV transmission line and the maximum power available until a Terminal Station would be required on the 330kV Transmission line.

If a Terminal Zone Substation needs to be constructed, then all the new Zone Substations will connect to the new Terminal Zone Substation by installing new 132kV transmission lines.

Reliability and security of the network would also need to be determined and whether it is required for the specific industry. If security is a concern, extra transformers inside the Zone Substation as back-up will also be required.

3.7.3 Opportunities and Constraints

Existing Power Stations

The advantage of having a development close the existing power generators is that they could potentially get cheaper electricity if the industry comes to a direct arrangement with the retailer and generator. Unfortunately, the power generators arrangement with existing retailers are private and it is not known if there is an appetite for this arrangement.

It should be noted, that Western Power will need to also approve of the arrangement because a dedicated transmission line could be built for the industry. Western Power will need to complete a dynamic study of the power flow on their network to determine constraints and issues by having this type of arrangement.

The other advantage of having a direct arrangement is that the new power network (transmission and distribution) could be owned and operated by the industry itself (as they do in the mines).

New or upgraded Power Station

An alternative for a large power load is for a new independent power station, or expansion of an existing power station such as Bluewaters to be developed using coal or gas as a supply. The estimated peak load of 200 MW peak (250 MVa) is a viable size for a power station or additional unit at an existing power station.

Coal is unlikely to be allowed as a feed source for a new power station although Bluewaters do still have a current approval for power generation units to be added.

Gas is a more likely possibility if the DBP were extended to the SIA to provide gas.

Saline discharges from the power station would need to interconnect to other power station saline pipelines and supply of water to the power station would remain an issue to be resolved given limitations on water availability in the area.

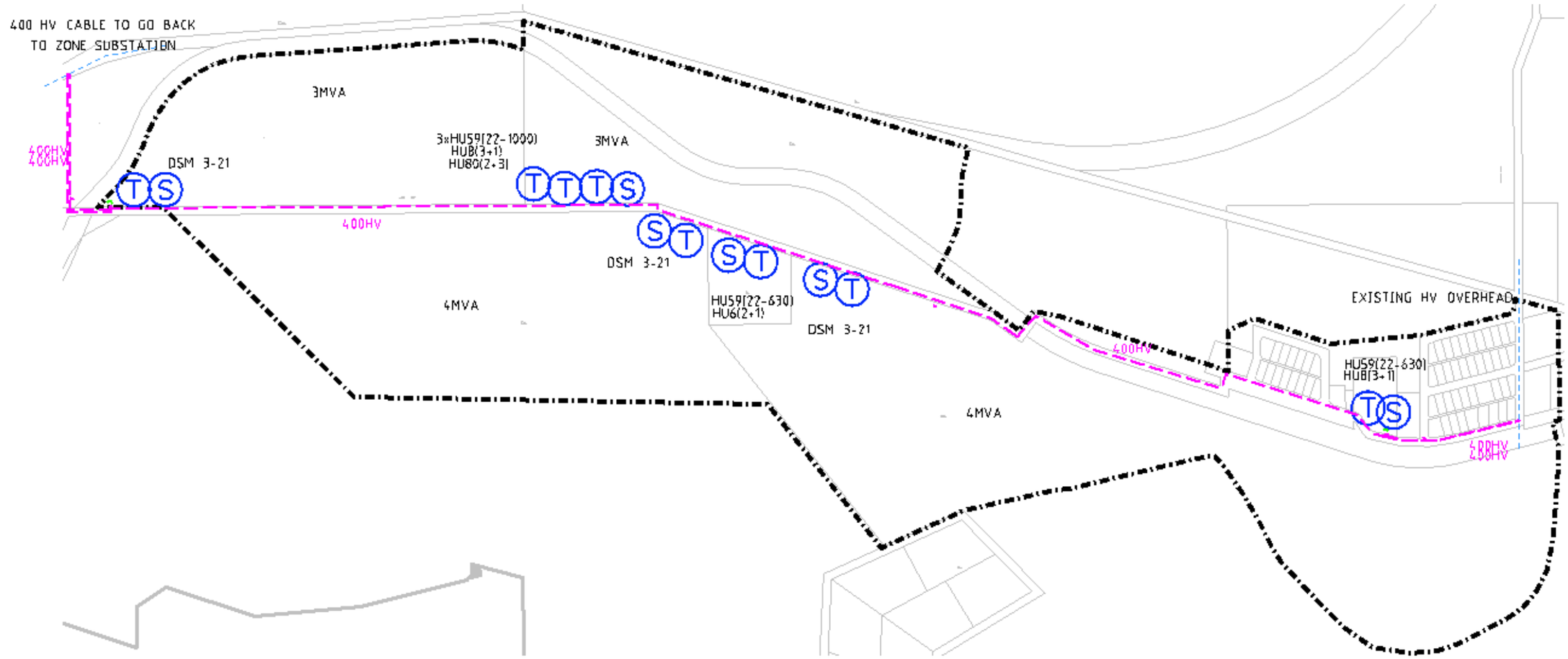

Figure 15 HV Concept Plan for 15MVA and less load requirement

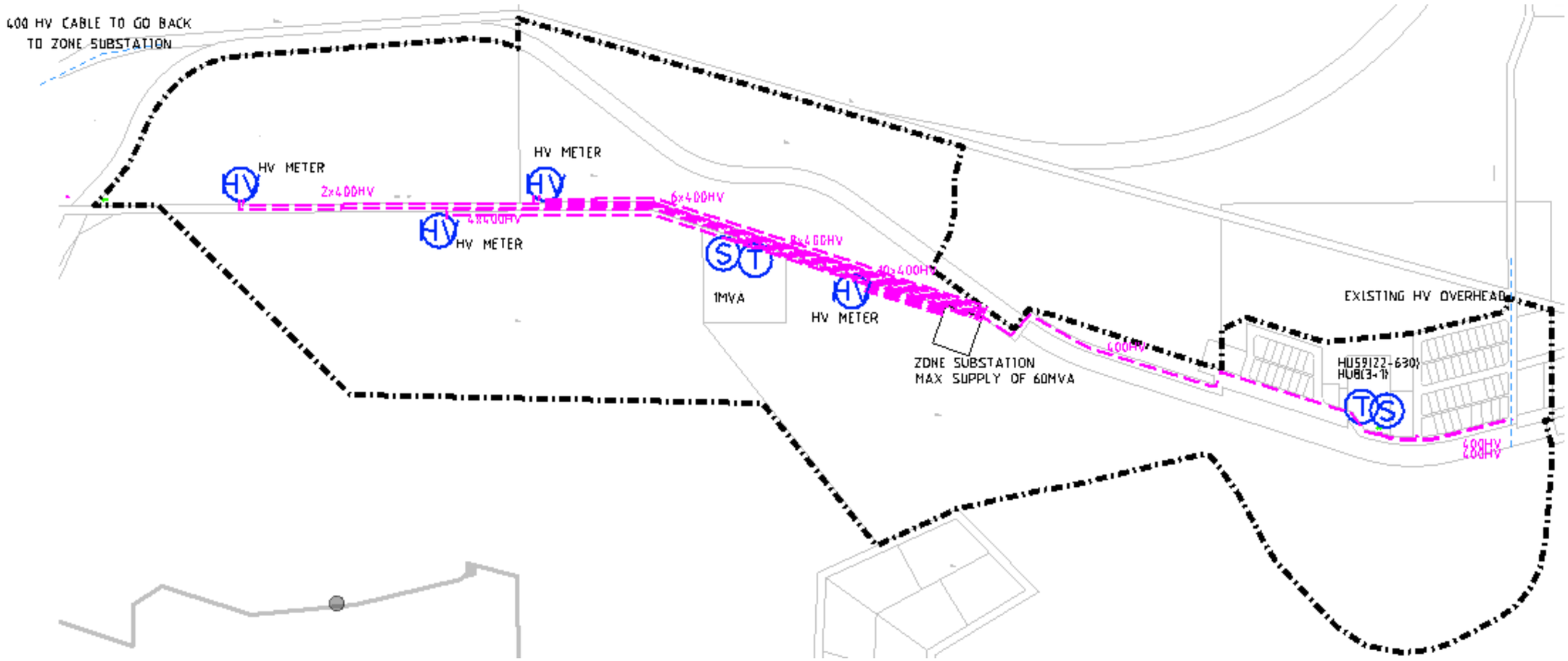

Figure 16 HV Concept Plan for 15MVA to 60MVA load requirement

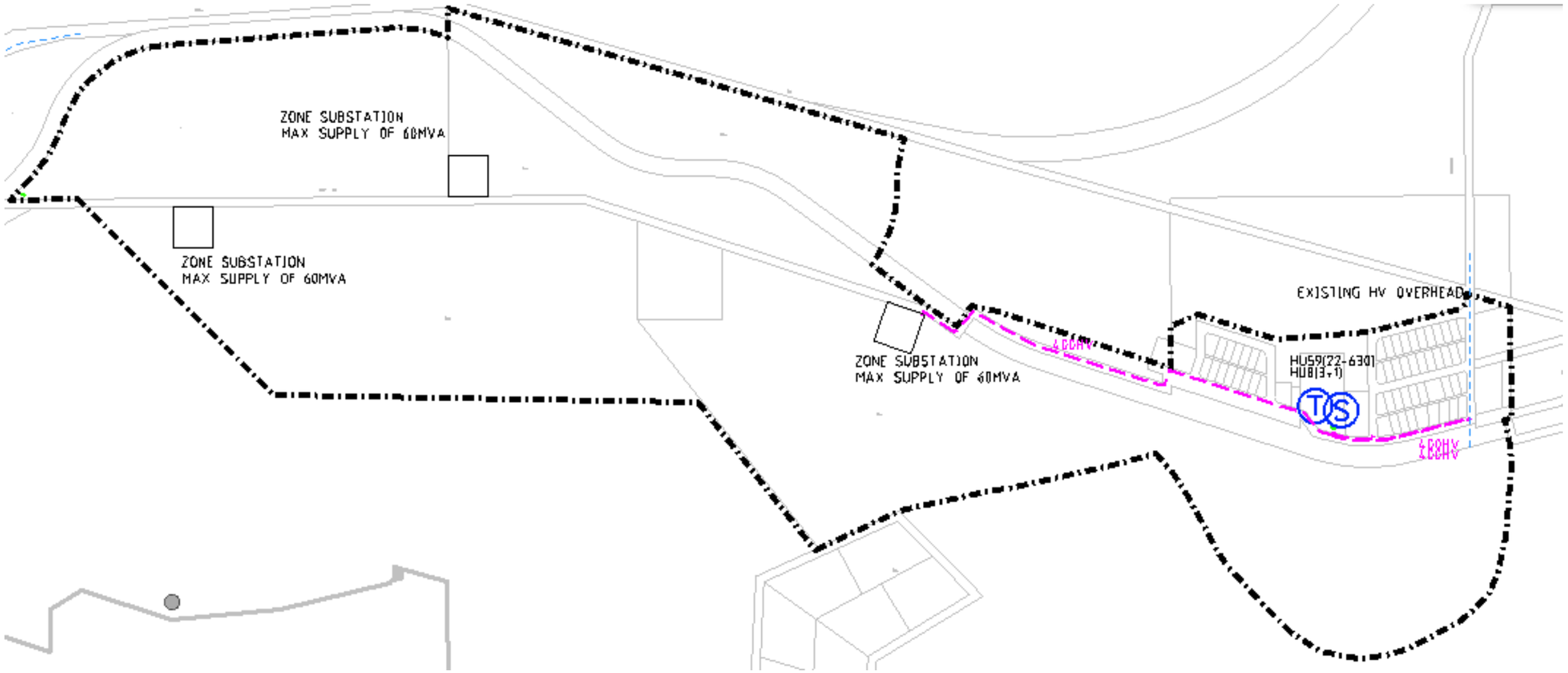

Figure 17 Multiple Zone Substations for above 60MVA load requirement.

Solar Power Plant

Constructing a solar power plant in the area has been discussed by other proponents previously.

In early 2018 a 20MW Solar Farm was approved to power a crypto-currency mining operation in Collie. The Solar Farm was proposed to be located on Patstone Road on the west side of Collie near the existing Collie Townsite Zone Substation. The solar component was to take up 18 hectares of the total 57 hectare lot. The facility was proposed to connect to the nearby Western Power 22kV distribution lines.

This solar farm proposes to use a fixed tilt panel system where the panels are set in a position that takes optimal alignment of the sun. The panels aren't set to track the movement of the sun and thus remove the need for motors to be fixed to the panels to rotate them during the day.

An example of the two basic types of solar panel systems are shown in Figure 18.

Figure 18 Solar Panel system types

The fixed tilt panel system allows the panels then to be located closer together and have a smaller footprint and land requirement than the single – axis tracking system.

The tracking system is more expensive but allows better solar efficiency form the panels.

Large scale solar farms tend to be constructed with the tracking system to get best solar efficiency for the panel areas.

Typically, the costs of constructing a 200MW solar farm will require at least $320m with 600ha of land required. This cost also includes the cost of a Zone Substation.

However, for the SIA if an agreement between the energy user and solar farm is reached such that they will buy all the power, a Zone Substation may potentially not be required. All the energy produced could go straight to the industry by its own private distribution network (similar to the mines).

However unless battery storage is also provided then the industry itself will still need to connect to the Western Power's as the solar farm will not be able to produce energy for the industry 24/7 due to cloudy days and in nights.

As with all alternate supplies an access agreement would be required from the solar farm with Western Power to access the Western Power network.

3.7.4 Estimate of Costs

Based on the level of demand required there are a number of cost options for providing power to the SIA.

Less than 15MVA supply

Supply from Collie Zone Substation with two HV feeders to the site. This is the closest Zone Substation and so Western Power will require at least two (2) HV feeders to run all the way back to the Collie Zone Substation.

If these works are undertaken by Western Power the cost is approximately $350/m per cable and if Western Power permit it to be installed by a contractor it would be $110/m per cable. Given it would need extension through the Collie townsite additional restoration along the route would also be required.

Western Power Extension

External 400mm HV cable @ $350/m * 10km * 2 = $7m

Internal 400mm HV cable @ $110/m * 4km = $440k

Restoration along route = $1m

6 Switchgear @ $60k = $360k

8 Transformers @ $60K = $480k

Total = $9.28m

Private HV extension

External 400mm HV cable @ $110/m * 10km * 2 = $2.2m

Internal 400mm HV cable @ $110/m * 4km = $440k

Restoration along route = $1m

6 Switchgear @ $60k = $360k

8 Transformers @ $60K = $480k

Total = $4.48m

15MVA to 60MVA supply

For this power demand a new Zone Substation will be required on the 132kV line (subject to available capacity). The maximum capacity of a zone substation is 60 MVA.

Zone Substation = $30m

Internal 400mm HV cable @ $110/m * 15km = $1.65m

HV Meter @ $200k * 4 = $800k (includes building allowance)

2 Switchgear @ $60k = $120k

2 Transformers @ $60K = $120k

Total = $32.69m

Greater than 60MVA Supply

For greater than 60MVA supply a Terminal Substation will be required plus 3 Zone Substations and connecting 132kV overhead power lines.

Terminal Zone Substation = $110m

Zone Substation = $30m * 3= $90m

132kV Transmission lines @$1m/km * 2km = $2m

Terminal poles on 132kV lines @$1m each * 4 = $4m

Internal 400mm HV cable @ $110/m * 1.4km = $154k

HV Meter @ $200k * 4 = $800k (includes building allowance)

1 Switchgear @ $60k = $60k

1 Transformers @ $60K = $60k

Total = $207.1m

200MW gas fired power station

200,000 kW @ $1,000 to $2000 per KW = $200m to $400m (excluding gas supply line)

Ancillary works allow $100m

Total = $300m to $500m.

Plus transmission lines and internal distribution at development sites.

Solar Farm

Solar farm prices are general $1.60 to $1.80 per watt but recently some proponents are claiming costs as low as $1.00 per watt.

200MW requires 600 hectare footprint @ $1.60/watt = $320m

Plus transmission lines and internal distribution at development sites.

3.7.5 Recommendation on preferred approach

Once a preferred industry is identified and the level of power demand of the potential industries is known then direct engagement could occur with Western Power/ Synergy on potential power supply options.

The future capacity in Collie depends on the future of the power stations and this is still uncertain at this time as other renewable sources come on line and reduce the need for base load coal fired power stations.

There is an opportunity for industries to buy directly from the Generators as they are so close to the power source. Multiple generators could supply the new industries, which could save power infrastructure in the area. However, for this to occur, Western Power will need to complete a dynamic study to determine if this won't cause power flow issues on their network and if the generator has spare capacity for this type of arrangement.

The budget price for a Western Power Dynamic study is $0.5m.

3.8 Communications

3.8.1 Existing Infrastructure

The NBN does not exist within the proposed subdivision as per below Figure 19 although a private connection to Premier Mine site is possibly indicated from the intersection of Premier Road and the Collie Darkan Road.

NBN standards state that due to the remoteness of the area, this development will likely become a fixed wireless communication area.

Extension of the NBN cable network to the area may be possible from Collie as this would give better security to industries than a wireless based network.

The NBN network in Collie is approximately 5km to the west an NBN have advised that if the demand for the SIA were large enough to justify connection then a subsidised backhaul would be provided.

If the demand is not sufficient then satellite connections would be provided to each lot but these would not give the same data speeds or capability s fibre connections.

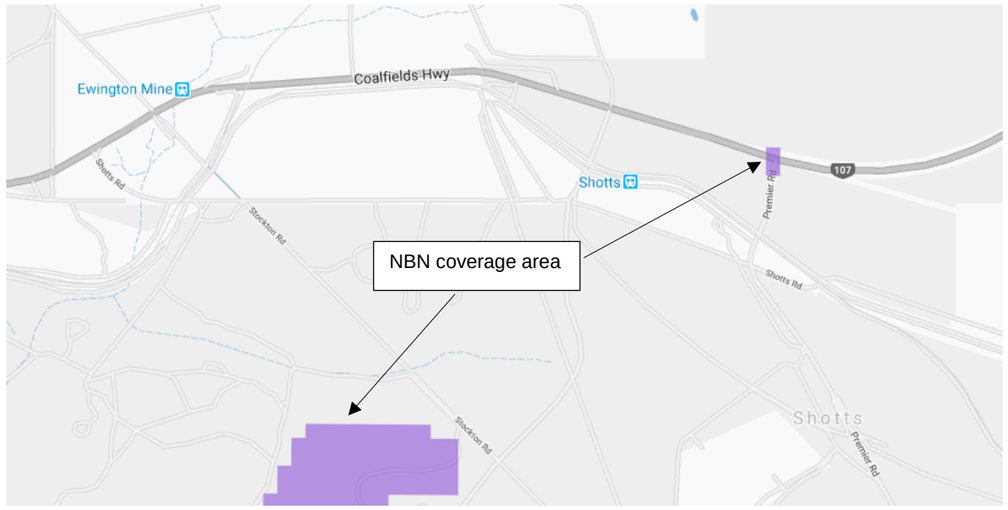

Figure 19 NBN rollout Map

There is also existing Telstra network located throughout the SIA as shown in Figure 20 and an exchange located at the west end of the SIA on Shotts Road together with a mobile phone tower.

The Telstra network is not suitable for further extension and so all services would need to come from the NBN network.

There is also an old Nakina Rail Line fibre optic cable located along the old closed Shotts Road although details on this cable are not available.

3.8.2 Opportunities and Constraints

The only opportunity for telecommunications to the SIA is via the NBN network unless wireless based solutions are adopted.

Direct connection to the NBN network would be the recommended option.

3.8.3 Estimate of Costs

Backhaul from existing Collie NBN network

5km fibre @ $30k/km = $150k (if deemed viable with equivalent 200+ premises, subsidised)

Alternate $1000/ premises for satellite connection per lot fibre

3.8.4 Recommendation on preferred approach

Once NBN requirements are known for development lots a formal application would be made to NBN for a feasibility and costing of the backhaul charges to the SIA.

Figure 20 Existing Telstra network

3.9 Roads

3.9.1 Existing Infrastructure

Since the previous Wood & Grieve (2008) Servicing report was undertaken a new access road into the SIA has been constructed by LandCorp as shown in Figure 21.

Figure 21 Shotts access road

This created an access point off the Collie Darkan Road suitable for Industrial traffic into the SIA.

This road included a new boom gate controlled rail crossing point and also a short section of gravel access road was created for the Perdaman Urea Plant access.

Central to the SIA is Premier Road. The Wood & Grieve (2008) Servicing report mentions that Premier Road would need to be purchased from premier Mine site as it was a private road.

Landgate searches however show that Premier Road is now a Public Road and so use for access to the SIA is permitted.

It is shown as Lots 562 and 563 in Figure 22 and both lots are owned now by the State Government.

It already has a significant intersection with the Collie Darkan Road and so little upgrade works would be required to bring it to the required industrial standard.

The rail crossing however on Premier Road is only flashing light controlled and so boom gate control would be expected if it were to become a major access for the SIA.

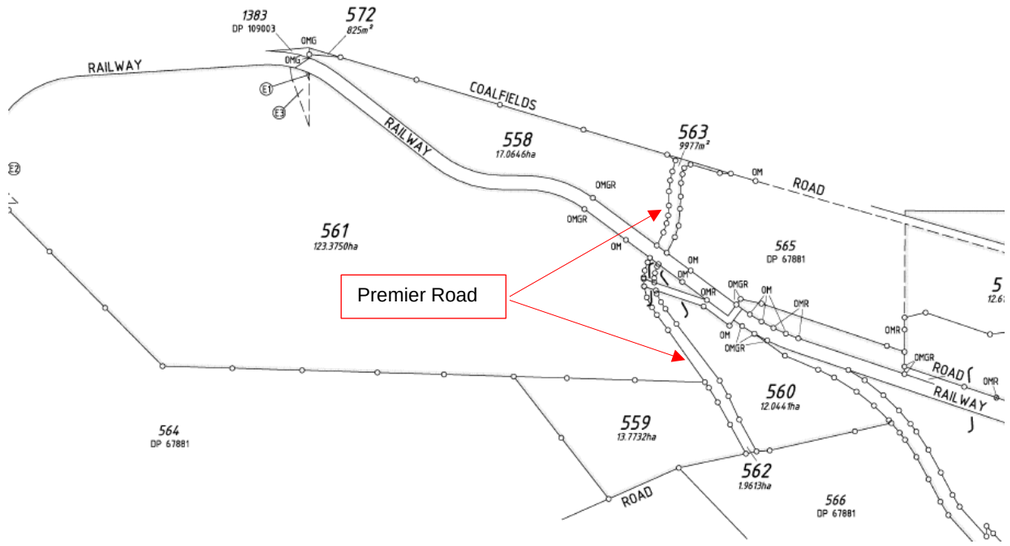

Figure 22 Premier Road reservations

To the east of the SIA is Shotts River Road South but this is not planned for a future access to the SIA and will remain as an access to the coal loading facility and the mine site.

It could be upgraded if required to suit the purpose as an access road to the SIA.

3.9.2 Opportunities and Constraints

The SIA now has two access points already established via Shotts Road and Premier Road and so only internal road networks will need to be constructed to service future industries.

These roads will be located to avoid relocation of existing infrastructure and also to service specific industry requirements.

These roads would not be constructed until specific developments were identified.

3.9.3 Estimate of Costs

No additional roadworks are required at this time other than possible conversion of rail crossing on Premier Road from flashing light control to boom gate control.

Boom gate conversion on Premier Road rail crossing

Conversion from flashing lights to boom gates = $600K

3.9.4 Recommendation on preferred approach

Conversion from flashing lights to boom gate crossing to be investigated with Arc Infrastructure to formalise costs of conversion if traffic figures justify boom gate control.

3.10 Rail

3.10.1 Existing Infrastructure

The SIA is currently adjacent the rail line servicing the coal loading facility of Premier Coal.

The rail network is operated by ARC Infrastructure and is part of the overall freight rail network in Western Australia.

The Collie rail network connects to the Bunbury Port and other rail links as shown in Figure 24.

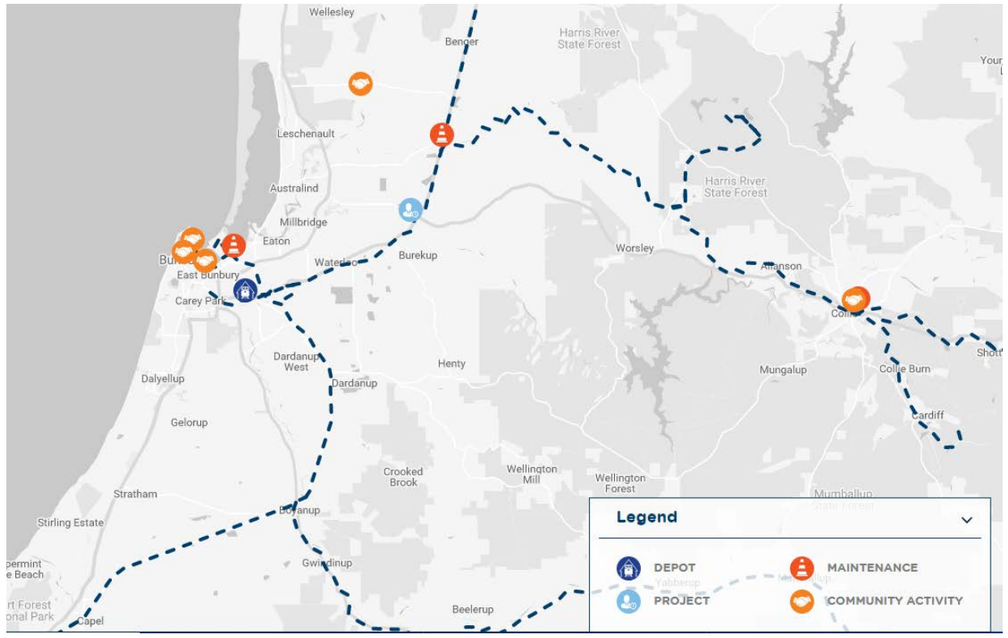

Figure 23 ARC Infrastructure rail network

The rail link to Collie consists of a narrow gauge (1067mm) 41 kg/m rail line on a 1 in 2 Steel Timber configuration sleepers with metal ballast and with a 19.0 Tonne axle load capacity.

The previous Perdaman development was also planning to use rail transport but it noted that the Brunswick to Bunbury Rail line was heavily utilised and that Perdaman would be taking the last remaining train paths on that section of rail line.

The capacity of this line thus would need confirmation with ARC Infrastructure when numbers of train movements were identified.

3.10.2 Opportunities and Constraints

The existing rail loop through the SIA provides an opportunity for additional rail sidings to be constructed to serve future development on the lots.

The recommended minimum length for rail sidings is approximately 1000m and presently two sidings were proposed previously by Wood & Grieve (2008) as shown in Figures 25 and 26.

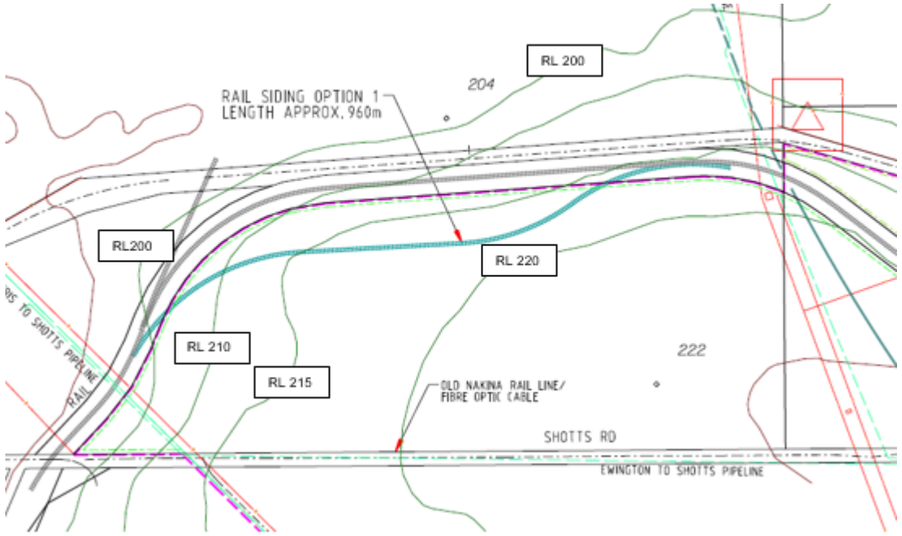

Figure 24 Rail Siding Option 1 Wood & Grieve (2008)

The rail siding Option 1 is an acceptable length but the alignment would need to be brought closer to the existing rail line to reduce earthworks and also top allow easier access from the adjacent site.

In its current proposed location it would require up to 10m of cut to keep an acceptable rail grade.

It does not clash with any infrastructure but would need significant earthworks to enable an acceptable grade to be maintained on the siding.

Interface would also be required with the ARC signals and controls system.

When the adjacent lot is developed an access track will also be required to the rail siding that allows easy movement of materials onto the track although the elevation change on the land could be used to advantage if a top load system is adopted for the rail cars.

The western siding is 960m and the other is 1230m, both of an acceptable length.

The Eastern siding in Option 2 as shown in Figure 26 is also an acceptable length and the route has far less earthworks required to establish it being relatively level along its route.

This route however crosses the Premier Road and this would require an additional boom gate signalised crossing.

This route also would have reduced length available for loading as only has approximately 700m of rail spur available between the rail crossing and the offtake point.

If loading were to occur without sitting across the rail crossing then additional spur length is required or an alternate location determined.

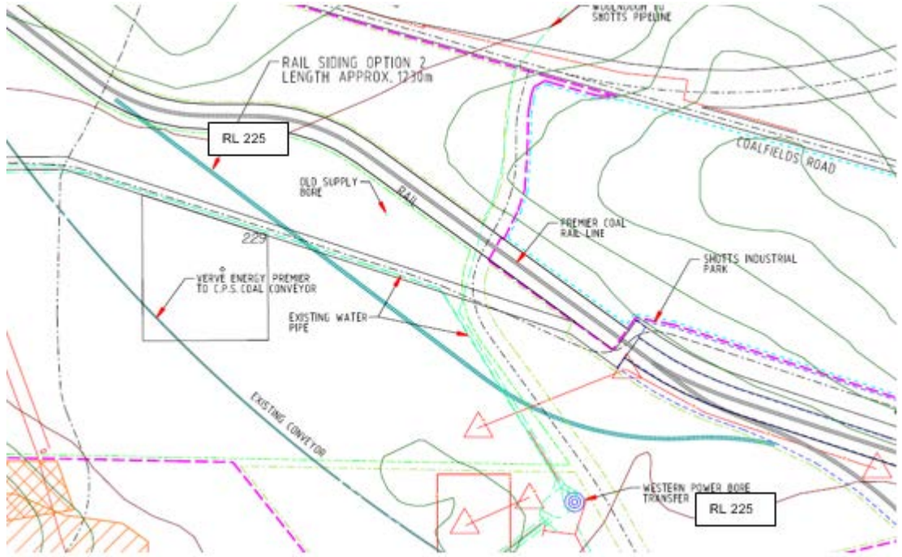

Figure 25 Rail Siding Option 2 Wood & Grieve (2008)

An alternate rail siding has been developed as shown in Figure 27 that allows a full 1000m of track between the spur take off and the signalised rail crossing.

This would allow full load out operations to be undertaken without impacting the signalised crossing point unless exceptionally long trains are permitted and are used.

The total spur length would be 1.5km approximately but allow more functional operation of the spur line.

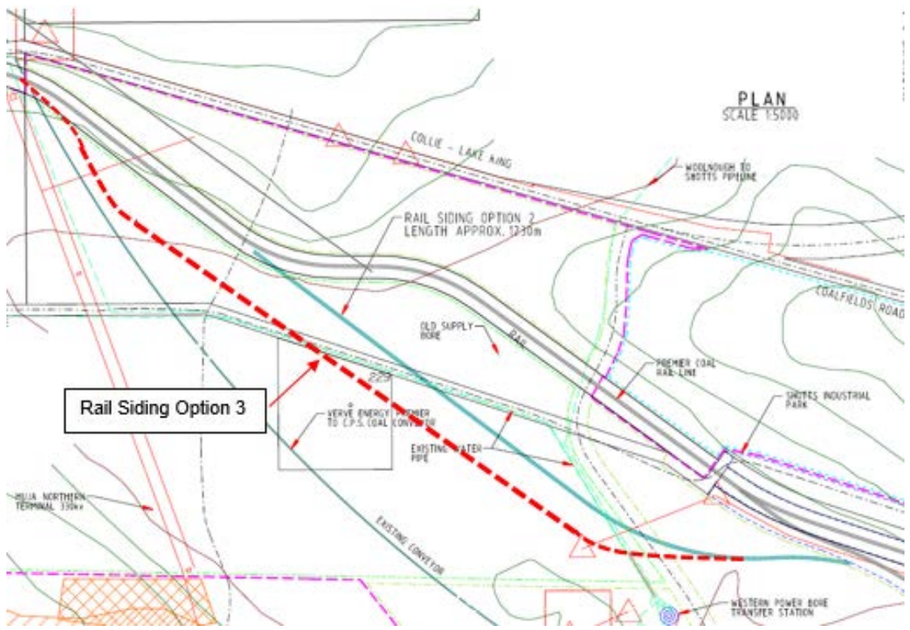

Figure 26 Alternate Rail siding Option 3

3.10.3 Estimate of Costs

The cost of the rail spurs is highly varaiable and depends on interface costs with the ARC Infrastructure re signalling systems and any upgardes of the system that may be required.

The following costs exclude any upgrades that may be required externally by ARC Infrastructure.

Rail Spur Option 1

Rail spur 960m @ $5m/km to $10m/km = $4.8m to $9.6m

Earthworks along route = $1m to $2m

Total = $5.8m to $11.6m

Rail Spur Option 2

Rail spur 1230m @ $5m/km to $10m/km = $6.2m to $12.3m

Earthworks along route = $0.5m to $1m

Boom gate crossing = $1m

Total = $7.7m to $14.3m

Rail Spur Option 3

Rail spur 1500m @ $5m/km to $10m/km = $7.5m to $15.0m

Earthworks along route = $0.5m to $1m

Boom gate crossing = $1m

Total = $9.0m to $17.0m

3.10.4 Recommendation on preferred approach

Upon identification of industries to be developed on the sites the rail needs would need to be refined and access arrangements made with ARC Infrastructure.

Siding locations and lengths could then be refined and final route selected.

The capacity of this line should be confirmed with ARC Infrastructure when numbers of train movements were identified.

4 Easements

For each of the services in the SIA easements either already exist or will be required when adjacent land is developed.

Each easement will require detailed confirmation with the relevant servicing agency but as a guide the following easement requirements have been adopted as shown in Figure 28.

Water Pipelines

- Shotts Transfer Station and Borefield (69m x 99m)
- Wellington Dam to Shotts (6m)
- Ewington to Shotts (6m)
- Woolnough to Shotts (6m)
- Shotts to MPS (6m)
- Unrestricted access for services vehicles is to be provided alongside all pipelines being minimum 3m either side of the centrelines.

CONVEYOR

- Premier to CPS (10m)
- Vehicle crossings for Development Areas are to be at approved designated locations and subject to Premier Coal engineering approval.
- The conveyor is to be fenced to prevent uncontrolled access.

TRANSMISSION LINES

- Muja to Bluewater 330kV (60m)
- Western Collieries to Worsley 132kV (28m)

GRIFFIN HAUL ROAD

- Approximately 75m
- Possible earth bunding for safety.

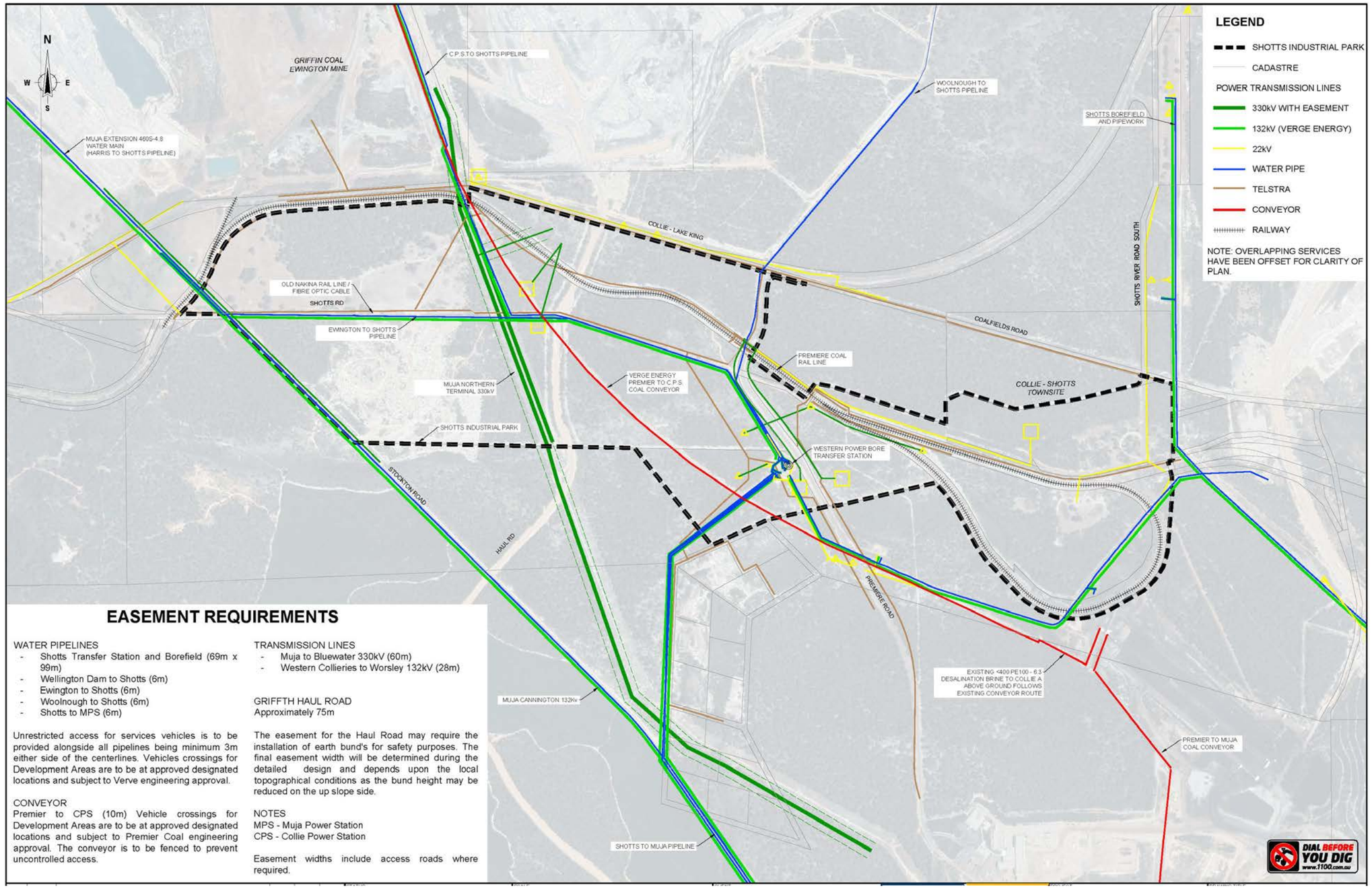

Figure 27 Easement Requirements

5 High Level Estimates

5.1 Service Demands

A range of servicing options are available for development within the SIA and servicing options selected will depend on final demands for each of the required services.

Based on the following servicing demands high level estimates have been developed for each service.

- Non Potable Process Water = 12 Gigalitres / year.
- Potable Water = 25 Megalitres / year
- Electricity Supply = 200 MW peak (250 MVa)
- Gas = 30,000 Nm3/day.
- Earthworks = by site developers.
- Communications = by site developers depending on own requirements.
- Roads no additional new roads, Shotts Road intersection already constructed. Usage of Premier Road to be negotiated.
- Domestic Waste Water treatment / disposal = 25 ML/yr or by site developers depending on own requirements.
- Process Waste Water treatment / disposal = by site developers depending on own requirements.
- Storm Water Drainage = provided by each site developer to suit their site and comply with an overall drainage strategy which meets the environmental objectives of the DWER and State and Federal Environmental Protection Departments.
- Emergency Services = an emergency management committee is formed which answers to and includes representatives of DFES.

The High Level costings for each of the services is summarised as follows

5.2 Potable Process water

5.2.1 External Source Water

25ML potable water treatment plant = $5m plus brine disposal costs.

Non Potable Source from Wellington Dam to treatment plant = $2.1m to $38m depending on pipe requirements.

Collie Water Scheme implementation = $394m

5.2.2 Local Surface Water Capture and reuse

20ML supply = $10m to $20m.

5.3 Non Potable Water

New pipe from Wellington Dam to the SIA, capable of providing 10GL/yr = $28m.

Cost to repair the existing pump station at Wellington Dam allow = $10m

5.4 Wastewater

25 ML/yr (approx. 70KL/day) centralised WWTW and associated disposal area nearby = $4m.

Costs for each industry to pump their effluent to the central WWTW site= $100K+ for each site

5.5 Gas

Based on the two possible options the estimated costs provided by DBP are:

Route 1 - Worsley to Shotts - approximately 22km = $28m

Route 2 - Clifton Road Kemerton (End of DBNGP) to Shotts = $53m to $61m

5.6 Power

5.6.1 Less than 15MVA supply

Western Power Extension from Collie Zone Substation = $9.28m

Private HV extension from Collie Zone Substation = $4.48m

5.6.2 15MVA to 60MVA supply

New Zone Substation on 132kV line plus associated works = $32.69m

5.6.3 Greater than 60MVA Supply

Terminal Substation, 3 Zone Substations and associated works = $207.1m

5.6.4 200MW gas fired power station

200,000 kW gas fired power station = $300m to $500m.

Plus gas line extension, transmission lines and internal distribution at development sites.

5.6.5 Solar Farm

200MW Solar Farm = $320m

Plus transmission lines and internal distribution at development sites.

5.7 Communications

Backhaul from existing Collie NBN network = $150k (if deemed viable with equivalent 200+ premises, subsidised)

Alternate $1000/ premises for satellite connection per lot fibre

5.8 Roads

Conversion of rail crossing on Premier Road from flashing light control to boom gate control= $600K.

5.9 Rail

The following costs exclude any upgrades that may be required externally by ARC Infrastructure.

Rail Spur Option 1 = $5.8m to $11.6m

Rail Spur Option 2 = $7.7m to $14.3m

Rail Spur Option 3 = $9.0m to $17.0m

6 Recommendations

A summary of the recommendations is provided as follows

6.1 Potable Water and Non Potable Water

Work with potential water service providers to refine potable and non-potable water options, based on proposed needs. Harvey Water seem more advanced than other likely providers at this time.

6.2 Wastewater

On site treatment is likely to be the most flexible treatment option for wastewater, with the exact type depending on the industry scale and potential reuse or disposal options.

6.3 Gas

Further liaison with DBP to determine if spare capacity from Worsley is available under the agreement and if not then refine route and costs for extension from Kemerton.

6.4 Power

Once a preferred industry is identified and the level of power demand of the potential industries is known then direct engagement could occur with Western Power/ Synergy on potential power supply options.

The future capacity in Collie depends on the future of the power stations and this is still uncertain at this time as other renewable sources come on line and reduce the need for base load coal fired power stations.

There is an opportunity for industries to buy directly from the Generators as they are so close to the power source. Multiple generators could supply the new industries, which could save power infrastructure in the area. However, for this to occur, Western Power will need to complete a dynamic study to determine if this won't cause power flow issues on their network and if the generator has spare capacity for this type of arrangement.

6.5 Communications

Once NBN requirements are known for development lots a formal application would be made to NBN for a feasibility and costing of the backhaul charges to the SIA.

6.6 Roads

Conversion from flashing lights to boom gate crossing to be investigated with Arc Infrastructure to formalise costs of conversion.

6.7 Rail

Upon identification of industries to be developed on the sites the rail needs would need to be refined and access arrangements made with ARC Infrastructure.

Siding locations and lengths could then be refined and final route selected.

The capacity of this line should be confirmed with ARC Infrastructure when numbers of train movements were identified.

7 References

GHD (2010) Local Water Management Strategy, Report for Shotts Industrial Park, February 2010

TME (2010) Shotts Industrial Park Structure Plan

Wood & Grieve (2008) Shotts Industrial Park- Collie Engineering Servicing Report, prepared for LandCorp 27 October 2008.

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All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

URBIS

Planning and Development Act 2005

RESOLUTION TO AMEND LOCAL PLANNING SCHEME

Shire of Collie Local Planning Scheme No. 5
Amendment Number 7

Resolved that the Local Government pursuant to section 75 of the *Planning and Development Act* 2005, amend the above Local Planning Scheme by:

1. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following land uses permissiblities:

   - ***Industry – P***
   - Industry Extractive – D
   - Industry Light - D
   - ***Mining Operations – A***
   - ***Office – I***
   - ***Renewable Energy Facility – A***
   - ***Resource Recovery – D***
   - ***Telecommunications Infrastructure – P***
   - ***Waste Disposal Facility – A***
   - ***Waste Storage Facility – A***

2. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to delete the following land uses permissiblities:

   - ~~Industry – rural ('D' use)~~
   - ~~Industry – general ('D' use)~~
   - ~~Industry – noxious ('A' use)~~

3. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following objectives

   c) To allow for the development of industries of State or regional significance and supporting/ancillary activities, reflective of its role as a Strategic Industrial Area.

   d) To provide for industrial development that:

   (i) is sufficiently flexible to accommodate the diversification of primary industries within Collie;

   (ii) encourages activities consistent with the principles of industrial ecology; and

   (iii) provides sufficient flexibility to accommodate varying needs and future forms of development.

4. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to delete the following objectives

   - ~~allow for the development of industry associated with the coat resource and other support or related industries.~~

5. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to replace the following conditions:

~~**2. Structure Plan**~~

~~(a) land use and development within the Special Use Zone No. 11 shall comply with a Structure Plan adopted by the local government and approved by the Commission in accordance with the Scheme or any subsequent Structure Plan adopted by the local government and approved by the Commission.~~

~~**3. EPA Approval**~~

~~All applications for planning approval within the Special Use Zone No. 11 shall be referred to the EPA for assessment unless –~~

~~(a) The EPA has agreed that a specific class of industry will not have any additional environmental impacts in the area; or~~

~~(b) The application is for a minor or ancillary development with no significant environmental impacts.~~

2. A Structure Plan is to contain such details as, in the opinion of the local government and Western Australian Planning Commission, is required to satisfy the planning requirements for the proposed development, and shall include, but not be limited to, the following details:

- ***ix. Identification and proposed management of any likely environmental impacts or emissions generated from the envisaged industrial development, including cumulative impacts, to ensure that these impacts are appropriately managed and contained within the Shotts Strategic Buffer (SCA);***
- ***x. The identification and management of environmentally sensitive locations, including possible contaminated sites, underground mine workings, wetlands, and significant flora, vegetation, fauna habitat and habitat corridors;***
- ***xi. Establishment of appropriate separation between strategic and general industrial land uses, if applicable.***
- ***xii. The apportionment of land suitable for general and strategic land uses, and typical lot sizes;***
- ***xiii. The indicative lot pattern and staging;***
- ***xiv. The provision of major infrastructure, including main drainage, power, sewerage, water supply and other key infrastructure services.***
- ***xv. The proposed major road network and other transport and movement systems.***
- ***xvi. Bushfire management, including consideration of hazard separation, water supply, and emergency access.***

3. All applications for development approval shall be referred to the Department of Water and Environmental Regulation for comment unless:

- ***iii. The Department of Water and Environmental Regulation has agreed that a specific class of industry will not have any additional environmental impacts in the area; or***
- ***iv. The application is for minor or ancillary development with no significant environmental impacts.***

4. Where a structure plan has been advertised and approved in conjunction with an Amendment to the Scheme it shall be deemed to have complied with the requirements of Clause 6.3.5 of the Scheme.

6. Amend Schedule 4 – Special Use Zones No. 11 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to include the following Condition:

   5. Development Standards

   c) Setbacks and carparking shall be designed and demonstrated to meet operational needs.
   d) All development shall have general regard to the development standards for the general industry zone in Schedule 11.

7. Amend Schedule 14 – Structure Plan Areas No. 1 - Lots 557-563 (inclusive) DP 67882 Premier Road; Shotts as follows to delete the following:

~~Land Use Expectation~~

- ~~Industrial uses;~~
- ~~Char Plant;~~
- ~~Urea Plant;~~
- ~~Power Generation; and~~
- ~~Support / Industries.~~

8. Amend Schedule 1 – Dictionary of defined terms and expressions to include:

- Industry - means premises used for the manufacture, dismantling, processing, assembly, treating, testing, servicing, maintenance or repairing of goods, products, articles, materials or substances and includes premises on the same land used for:

  (a) the storage of goods;

  (b) the work of administration or accounting;

  (c) the selling of goods by wholesale or retail; or

  (d) the provision of amenities for employees, incidental to any of those industrial operations;

  (e) incidental purposes

- ***Mining Operations - mining operations means premises where mining operations, as that term is defined in the Mining Act 1978 section 8(1) is carried out;***

- ***Renewable Energy Facility - means premises, buildings or structures used to generate energy from a renewable energy source. It does not include solar panels or a wind turbine principally used to supply energy for an individual lot's private domestic or rural supply.***

- ***Resource Recovery - resource recovery centre means premises other than a waste disposal facility used for the recovery of resources from waste;***

- Telecommunications infrastructure means land used to accommodate ~~any part of~~ the ***used by or in connection with*** ~~of~~ a telecommunications network and includes any line, equipment, apparatus, tower, antenna, tunnel, duct, hole, pit or other structure

~~used, or for use in or in connection with, a telecommunications~~ ***related to the*** network;

- ***Waste Disposal Facility - means premises used —***

(a) for the disposal of waste by landfill; or

(b) the incineration of hazardous, clinical or biomedical waste;

- ***Waste Storage Facility - means premises used to collect, consolidate, temporarily store or sort waste before transfer to a waste disposal facility or a resource recovery facility on a commercial scale;***

10. Amend Table 1:Zoning Table to include the following uses and include I – Incidental in the legend:

Use Class	Rural 1	Rural 2	General Industry	Light and service Industry	Mixed Use	Residential	Residential Development	Rural Residential	Town Centre
Industry	X	X	P	A	X	X	X	X	X
Mining operations	A	A	D	X	X	X	X	X	X
Renewable energy facility	A	A	P	A	X	X	X	X	X
Resource recovery centre	A	A	P	D	X	X	X	X	X
Waste disposal facility	A	A	A	X	X	X	X	X	X
Waste storage facility	X	X	A	A	X	X	X	X	X

Legend

X ***Not Permitted***

D ***LG Discretion***

P ***Permitted***

I ***Incidental***

A ***Advertising***

11. Amend Table 1 Zoning Table to update the permissibility for the following uses:

Use Class	Rural 1	Rural 2	General Industry	Light and service Industry	Mixed Use	Residential	Residential Development	Rural Residential	Town Centre
Office	I	I	I	I	D	X	X	X	P
Telecommunications Infrastructure	D	D	P	P	A	A	A	A	A

10. Amend Clause 4.3.2 to include the "I" definition:

4.3.2 The symbols used in the cross reference in the Zoning Table have the following meanings:

"P" means that the use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme;

"D" means that the use is not permitted unless the local government has exercised its discretion by granting planning approval;

"I" means that the use is permitted if it is consequent on, or naturally attaching, appertaining or relating to the predominant use of the land and it complies with any relevant development standards and requirements of this Scheme

"A" means that the use is not permitted unless the local government has exercised its discretion by granting planning approval after giving special notice in accordance with clause 9.4;

"X" means a use that is not permitted by the Scheme.

The amendment is standard under the provisions of the *Planning and Development (Local Planning Schemes) Regulations* 2015 for the following reason(s):

- The proposal is a text only amendment to add and/or delete provisions to the existing Special Use Zone and Structure Plan Areas Schedules.

- The proposal is consistent with the Local Planning Strategy 2020 which notes that expansion of land uses outside of coal should be investigated within the Shotts Strategic Industrial Area.

Dated this _____ day of _____ 20___

_____

(Chief Executive Officer)

FORM 6A

COUNCIL ADOPTION

This Standard Amendment was adopted by resolution of the Council of the Shire of Collie at the [NAME] Meeting of the Council held on the [day] day of [month], 20[year].

.....

MAYOR/SHIRE PRESIDENT

.....

CHIEF EXECUTIVE OFFICER

COUNCIL RESOLUTION TO ADVERTISE

by resolution of the Council of the Shire of Collie at the [NAME] Meeting of the Council held on the [day] day of [month], 20[year], proceed to advertise this Amendment.

.....

MAYOR/SHIRE PRESIDENT

.....

CHIEF EXECUTIVE OFFICER

COUNCIL RECOMMENDATION

This Amendment is recommended [for support/ not to be supported] by resolution of the Shire of Collie at the [NAME] Meeting of the Council held on the [number] day of [month], 20[year] and the Common Seal of the [LOCAL GOVERNMENT] was hereunto affixed by the authority of a resolution of the Council in the presence of:

.....

MAYOR/SHIRE PRESIDENT

.....

CHIEF EXECUTIVE OFFICER

WAPC ENDORSEMENT (r.63)

.....

DELEGATED UNDER S.16 OF THE P&D ACT 2005

DATE.....

FORM 6A - CONTINUED

APPROVAL GRANTED

.....

MINISTER FOR PLANNING

DATE.....