360 environmental

INF060-2 AD Albany and Kemerton 60 MW

5 June 2013

Paul Vogel
Chairman
Environmental Protection Authority
Locked Bag 10
East Perth WA 6892

Dear Paul

Section 38 for 60 megawatt (MW) Power Stations in Albany and Kemerton

On behalf of our Client, Tesla Holdings, we are pleased to provide the enclosed *Section 38* Form and supporting document for two proposed 60 MW power stations to be located Lot 5 Down Road, Albany and Lot 5107 Marriot Road, Wellesley.

The supporting document has been developed to provide more detailed information further to the attached Section 38 application form.

Should you have any questions or require further action please do not hesitate to contact Judith Ruppert or the undersigned on (08) 9388 8360. We look forward to your comments.

Yours sincerely,

Tamara Smith

Tamara Smith

Director

Enc.: Section 38 form and supporting documents

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GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

EPA REFERRAL FORM PROPONENT

Referral of a Proposal by the Proponent to the Environmental Protection Authority under Section 38(1) of the *Environmental Protection Act 1986*.

PURPOSE OF THIS FORM

Section 38(1) of the *Environmental Protection Act 1986* (EP Act) provides that where a development proposal is likely to have a significant effect on the environment, a proponent may refer the proposal to the Environmental Protection Authority (EPA) for a decision on whether or not it requires assessment under the EP Act. This form sets out the information requirements for the referral of a proposal by a proponent.

Proponents are encouraged to familiarise themselves with the EPA's *General Guide on Referral of Proposals* [see Environmental Impact Assessment/Referral of Proposals and Schemes] before completing this form.

A referral under section 38(1) of the EP Act by a proponent to the EPA must be made on this form. A request to the EPA for a declaration under section 39B (derived proposal) must be made on this form. This form will be treated as a referral provided all information required by Part A has been included and all information requested by Part B has been provided to the extent that it is pertinent to the proposal being referred. Referral documents are to be submitted in two formats – hard copy and electronic copy. The electronic copy of the referral will be provided for public comment for a period of 7 days, prior to the EPA making its decision on whether or not to assess the proposal.

CHECKLIST

Before you submit this form, please check that you have:

	Yes	No
Completed all the questions in Part A (essential).	X	
Completed all applicable questions in Part B.	X	
Included Attachment 1 – location maps.	X	
Included Attachment 2 – additional document(s) the proponent wishes to provide (if applicable).	X	
Included Attachment 3 – confidential information (if applicable).		X
Enclosed an electronic copy of all referral information, including spatial data and contextual mapping but excluding confidential information.	X	

Following a review of the information presented in this form, please consider the following question (a response is optional).

Do you consider the proposal requires formal environmental impact assessment? ☐ Yes ☒ No ☐ Not sure
If yes, what level of assessment? ☐ Assessment on Proponent Information ☐ Public Environmental Review

PROPONENT DECLARATION (to be completed by the proponent)

I, Ben Tan declare that I am authorised on behalf of Tesla Holdings Pty Ltd (being the person responsible for the proposal) to submit this form and further declare that the information contained in this form is true and not misleading.

Signature	Ben Tan
CEO	Tesla Holdings
Date	

PART A - PROPONENT AND PROPOSAL INFORMATION

(All fields of Part A must be completed for this document to be treated as a referral)

1 PROPONENT AND PROPOSAL INFORMATION

1.1 Proponent

Name	Tesla Holdings Pty Ltd
Joint Venture parties (if applicable)	N/A
Australian Company Number (if applicable)	63 141 729 857
Postal Address (where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State)	Level 3 Exchange House 68 St Georges Terrace Perth WA 6000
Key proponent contact for the proposal: • name • address • phone • email	Ben Tan Chief Executive Officer Level 3 Exchange House 68 St Georges Terrace Perth WA 6000 (08) 6143 1851 ben.tan@teslacorp.com.au
Consultant for the proposal (if applicable): • name • address • phone • email	Judith Ruppert 10 Bermondsey Street West Leederville, WA 6007 (08) 9388 8360 Judyruppert@360environmental.com.au

1.2 Proposal

Title	60 Megawatt Power Station - Lot 5107 Marriot Road, Wellesley
Description	It has been proposed that a power station be constructed on the site with an expected total energy output of 60 MW per year. The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. Other important components of the power station are as follows: • Two bunded transformers (11/132 kV 37.5 MVA); • 300,000 litre (L) capacity fuel tank(s) (safe fill, self-bunded); and • Control hut with separate rooms for control.

Extent (area) of proposed ground disturbance.	No native vegetation disturbance required.
Timeframe in which the activity or development is proposed to occur (including start and finish dates where applicable).	Construction will start once all necessary approvals and permits have been required and it is anticipated that commissioning would occur in mid-2016. There will be a commissioning period which includes the installation and testing of the full load of the proposed power station to ensure proposed management is appropriate and the power station is functionally operational. Operation will start post commissioning phase.
Details of any staging of the proposal.	N/A
Is the proposal a strategic proposal?	No
Is the proponent requesting a declaration that the proposal is a derived proposal? If so, provide the following information on the strategic assessment within which the referred proposal was identified: • title of the strategic assessment; and • Ministerial Statement number.	No
Please indicate whether, and in what way, the proposal is related to other proposals in the region.	N/A
Does the proponent own the land on which the proposal is to be established? If not, what other arrangements have been established to access the land?	The site is owned by LandCorp who have leased the land to Tesla.
What is the current land use on the property, and the extent (area in hectares) of the property?	The site is located on Lot 5107 Marriott Road, Wellesley. The site is zoned "Kemerton Park Industry" under the Shire of Harvey Town Planning Scheme No 1. The site is owned by LandCorp who have given their permission for the proposed usage of the land. The surrounding land is predominately utilised for industrial activities as the site is located within Kemerton Industrial Park.

1.3 Location

Name of the Shire in which the proposal is located.	Shire of Harvey.
For urban areas: • street address; • lot number; • suburb; and • nearest road intersection.	The site is located on Lot 5107 Marriott Road, Wellesley.
For remote localities: • nearest town; and • distance and direction from that town to the proposal site.	
Electronic copy of spatial data - GIS or CAD, geo-referenced and conforming to the following parameters: • GIS: polygons representing all activities and named; • CAD: simple closed polygons representing all activities and named; • datum: GDA94; • projection: Geographic (latitude/longitude) or Map Grid of Australia (MGA); • format: Arcview shapefile, Arcinfo coverages, Microstation or AutoCAD.	Enclosed?: Yes

1.4 Confidential Information

Does the proponent wish to request the EPA to allow any part of the referral information to be treated as confidential?	No
If yes, is confidential information attached as a separate document in hard copy?	

1.5 Government Approvals

Is rezoning of any land required before the proposal can be implemented? If yes, please provide details.		No	
Is approval required from any Commonwealth or State Government agency or Local Authority for any part of the proposal? If yes, please complete the table below.		Yes	
Agency/Authority	Approval required	Application lodged Yes / No	Agency/Local Authority contact(s) for proposal
Department of Environment and Conservation	Works Approval	No – a Works Approvals will be lodged following a	

		decision on this s38 referral.	
Shire of Harvey	Development Application	The Shire has been informed about the project; however, a formal Development Application will be lodged following a decision on this s38 referral.	

PART B - ENVIRONMENTAL IMPACTS AND PROPOSED MANAGEMENT

2. ENVIRONMENTAL IMPACTS

Describe the impacts of the proposal on the following elements of the environment, by answering the questions contained in Sections 2.1-2.11:

2.1 flora and vegetation;

2.2 fauna;

2.3 rivers, creeks, wetlands and estuaries;

2.4 significant areas and/ or land features;

2.5 coastal zone areas;

2.6 marine areas and biota;

2.7 water supply and drainage catchments;

2.8 pollution;

2.9 greenhouse gas emissions;

2.10 contamination; and

2.11 social surroundings.

These features should be shown on the site plan, where appropriate.

For all information, please indicate:

(a) the source of the information; and

(b) the currency of the information.

2.1 Flora and Vegetation

2.1.1 Do you propose to clear any native flora and vegetation as a part of this proposal?

[A proposal to clear native vegetation may require a clearing permit under Part V of the EP Act (Environmental Protection (Clearing of Native Vegetation) Regulations 2004)]. Please contact the Department of Environment and Conservation (DEC) for more information.

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section

It is not proposed to clear any native vegetation for the as part of this proposal.

Searches of the DEC's Naturemap database (2013) and SEWPAC's (2013) Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) *Protected Matters Search Tool* were undertaken to identify the potential forl conservation significant species to exist within five kilometres of the site. The search results indicated there are no known occurrences of Declared Rare Flora (DRF) or Priority Flora on the site; however, two Vulnerable, six Endangered and two Critically Endangered plant species (or their habitat) were recorded as 'likely to occur' within five kilometres of the site.

Further detail can be found in Section 3.7 in the *Lot 5107 Marriot Road, Wellesley 60 Megawatt Power Station – Proponent Referral to the EPA* (360 Environmental 2013).

A search of the DEC's Threatened Ecological Community (TEC) database (2011) indicates there are no TECs or Priority Ecological Communities (PEC) known to exist within five kilometres of the site.

A search of SEWPAC's (2013) EPBC Act *Protected Matters Search Tool* was undertaken and identified there are no TEC listed under the EPBC Act within five kilometres of the site.

The Kemerton Industrial Park Strategy Plan (2009) identifies the vegetation on the site as a Pine (*Pinus radiata*) plantation. The site has recently been cleared by the Forest Product Commission; however, the stumps of the pines are still present. No native vegetation will be cleared to enable the development of this proposal.

For more detailed information please refer to *Lot 5107 Marriot Road, Wellesley 60 Megawatt Power Station – Proponent Referral to the EPA* (360 Environmental 2013).

2.1.2 How much vegetation are you proposing to clear (in hectares)?

2.1.3 Have you submitted an application to clear native vegetation to the DEC (unless you are exempt from such a requirement)?

☐ Yes ☐ No **If yes**, on what date and to which office was the application submitted of the DEC?

2.1.4 Are you aware of any recent flora surveys carried out over the area to be disturbed by this proposal?

☐ Yes ☐ No **If yes**, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

2.1.5 Has a search of DEC records for known occurrences of rare or priority flora or threatened ecological communities been conducted for the site?

☐ Yes ☐ No If you are proposing to clear native vegetation for any part of your proposal, a search of DEC records of known occurrences of rare or priority flora and threatened ecological communities will be required. Please contact DEC for more information.

2.1.6 Are there any known occurrences of rare or priority flora or threatened ecological communities on the site?

☐ Yes ☐ No **If yes**, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

2.1.7 If located within the Perth Metropolitan Region, is the proposed development within or adjacent to a listed Bush Forever Site? (You will need to contact the Bush Forever Office, at the Department for Planning and Infrastructure)

☐ Yes ☐ No **If yes**, please indicate which Bush Forever Site is affected (site number and name of site where appropriate).

2.1.8 What is the condition of the vegetation at the site?

2.2 Fauna

2.2.1 Do you expect that any fauna or fauna habitat will be impacted by the proposal?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

No native vegetation will be cleared to enable development of this proposal.

A search of the DEC's Naturemap database (2013) and SEWPAC's (2013) *Protected Matters Search Tool* was undertaken to identify the potential for conservation significant Fauna species to exist within five kilometres of the site. The search results indicated there are no known occurrences of Threatened Fauna on the site; however, 12 species are known to exist within five kilometres of the site. Further, three Vulnerable, one Marine and Migratory and one Endangered species listed under the EPBC Act were identified as potentially occurring on the site. No impact is expected to these species as a result of the development of this proposal.

For more detailed information please refer to *Lot 5107 Marriot Road, Wellesley 60 Megawatt Power Station – Proponent Referral to the EPA* (360 Environmental 2013).

2.2.2 Describe the nature and extent of the expected impact.

2.2.3 Are you aware of any recent fauna surveys carried out over the area to be disturbed by this proposal?

☐ Yes ☐ No **If yes**, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

2.2.4 Has a search of DEC records for known occurrences of Specially Protected (threatened) fauna been conducted for the site?

☐ Yes ☐ No (please tick)

2.2.5 Are there any known occurrences of Specially Protected (threatened) fauna on the site?

☐ Yes ☐ No **If yes**, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

2.3 Rivers, Creeks, Wetlands and Estuaries

2.3.1 Will the development occur within 200 metres of a river, creek, wetland or estuary?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

There are no water courses or drains present on the site or adjacent to the site. Also, there are no Ramsar wetlands on the site. The nearest Ramsar wetlands are the Peel-Yalgorup system which are within ten kilometres of the site. There are no Nationally Important Wetland, Conservation Category or Resource Enhancement wetlands listed on the site. There are several multiple use wetlands on and adjacent to the site, however these wetlands are greater than 100m away from the proposed power station footprint.

2.3.2 Will the development result in the clearing of vegetation within the 200 metre zone?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.3 Will the development result in the filling or excavation of a river, creek, wetland or estuary?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.4 Will the development result in the impoundment of a river, creek, wetland or estuary?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.5 Will the development result in draining to a river, creek, wetland or estuary?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.6 Are you aware if the proposal will impact on a river, creek, wetland or estuary (or its buffer) within one of the following categories? (please tick)

Conservation Category Wetland	☐ Yes	☐ No	☐ Unsure
Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998	☐ Yes	☐ No	☐ Unsure
Perth's Bush Forever site	☐ Yes	☐ No	☐ Unsure
Environmental Protection (Swan & Canning Rivers) Policy 1998	☐ Yes	☐ No	☐ Unsure
The management area as defined in s4(1) of the *Swan River Trust Act 1988*	☐ Yes	☐ No	☐ Unsure
Which is subject to an international agreement, because of the importance of the wetland for waterbirds and waterbird habitats (e.g. Ramsar, JAMBA, CAMBA)	☐ Yes	☐ No	☐ Unsure

2.4 Significant Areas and/ or Land Features

2.4.1 Is the proposed development located within or adjacent to an existing or proposed National Park or Nature Reserve?

☐ Yes ✔ No **If yes**, please provide details.

There are no Regional Parks or National Parks on or adjacent to the site.

2.4.2 Are you aware of any Environmentally Sensitive Areas (as declared by the Minister under section 51B of the EP Act) that will be impacted by the proposed development?

☐ Yes ✔ No **If yes**, please provide details.

There are no Environmentally Sensitive Areas (ESAs) on or adjacent to the site.

2.4.3 Are you aware of any significant natural land features (e.g. caves, ranges etc) that will be impacted by the proposed development?

☐ Yes ✔ No **If yes**, please provide details.

2.5 Coastal Zone Areas (Coastal Dunes and Beaches)

2.5.1 Will the development occur within 300 metres of a coastal area?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

2.5.2 What is the expected setback of the development from the high tide level and from the primary dune?

2.5.3 Will the development impact on coastal areas with significant landforms including beach ridge plain, cuspate headland, coastal dunes or karst?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.5.4 Is the development likely to impact on mangroves?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.6 Marine Areas and Biota

2.6.1 Is the development likely to impact on an area of sensitive benthic communities, such as seagrasses, coral reefs or mangroves?

☐ Yes ✔ No **If yes**, please describe the extent of the expected impact.

2.6.2 Is the development likely to impact on marine conservation reserves or areas recommended for reservation (as described in *A Representative Marine Reserve System for Western Australia*, CALM, 1994)?

☐ Yes ✔ No **If yes**, please describe the extent of the expected impact.

2.6.3 Is the development likely to impact on marine areas used extensively for recreation or for commercial fishing activities?

☐ Yes ✔ No **If yes**, please describe the extent of the expected impact, and provide any written advice from relevant agencies (e.g. Fisheries WA).

2.7 Water Supply and Drainage Catchments

2.7.1 Are you in a proclaimed or proposed groundwater or surface water protection area?

(You may need to contact the Department of Water (DoW) for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

☐ Yes ✔ No **If yes**, please describe what category of area.

2.7.2 Are you in an existing or proposed Underground Water Supply and Pollution Control area?

(You may need to contact the DoW for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

☐ Yes ✔ No **If yes**, please describe what category of area.

2.7.3 Are you in a Public Drinking Water Supply Area (PDWSA)?

(You may need to contact the DoW for more information or refer to the DoW website. A proposal to clear vegetation within a PDWSA requires approval from DoW.)

☐ Yes ✔ No **If yes**, please describe what category of area.

The site is not within any PDWSAs. The nearest is approximately ten kilometres to the east of the site and called Brunswick Catchment Area, which is a protected Public Drinking Water Source Area (PDWSA) under the *Country Areas Water Supply Act (CAWS) 1947*. Due the nature of the proposal, the limited site construction activities required for the installation of the infrastructure and the distance to the PDWSA, it is not anticipated that there will be any impact to the PDWSA through run-off, changes to existing hydrological regimes, or use of water from the local aquifer.

2.7.4 Is there sufficient water available for the proposal?

(Please consult with the DoW as to whether approvals are required to source water as you propose. Where necessary, please provide a letter of intent from the DoW)

✔ Yes ☐ No (please tick)

Water is not required for operation of the plant.

2.7.5 Will the proposal require drainage of the land?

☐ Yes ✔ No **If yes**, how is the site to be drained and will the drainage be connected to an existing Local Authority or Water Corporation drainage system? Please provide details.

2.7.6 Is there a water requirement for the construction and/ or operation of this proposal?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

2.7.7 What is the water requirement for the construction and operation of this proposal, in kilolitres per year?

2.7.8 What is the proposed source of water for the proposal? (e.g. dam, bore, surface water etc.)

2.8 Pollution

2.8.1 Is there likely to be any discharge of pollutants from this development, such as noise, vibration, gaseous emissions, dust, liquid effluent, solid waste or other pollutants?

(please tick) ✔ Yes **If yes**, complete the rest of this section.

☐ No **If no**, go to the next section.

2.8.2 Is the proposal a prescribed premise, under the *Environmental Protection Regulations 1987*?

(Refer to the EPA's *General Guide for Referral of Proposals to the EPA under section 38(1) of the EP Act 1986* for more information)

✔ Yes ☐ No **If yes**, please describe what category of prescribed premise.

Category 52: Electric power generation: premises (other than premises within category 53 or an emergency or standby power generating plant) on which electrical power is generated using a fuel.

2.8.3 Will the proposal result in gaseous emissions to air?

✔ Yes ☐ No **If yes**, please briefly describe.

Key air pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), hydrocarbon, sulfuret (SO_2) and particulate matter such as PM_{10} and $PM_{2.5}$ will be released (Table 1, 360 Environmental 2013).

POLLUTANT	OUTPUT
Carbon Monoxide (CO)	21.01 kg/ hour of operation
Nitrogen Dioxide (NO_2)	246.03 kg/ hour of operation
Particulate $Matter_{10}$	1.38 kg/ hour
Particulate $Matter_{2.5}$	1.34/ hour
Sulphur Dioxide (SO_2)	0.089 kg/ year

2.8.4 Have you done any modelling or analysis to demonstrate that air quality standards will be met, including consideration of cumulative impacts from other emission sources?

✔ Yes ☐ No **If yes**, please briefly describe.

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.

2.8.5 Will the proposal result in liquid effluent discharge?

☐ Yes ✔ No **If yes**, please briefly describe the nature, concentrations and receiving environment.

2.8.6 If there is likely to be discharges to a watercourse or marine environment, has any analysis been done to demonstrate that the State Water Quality Management Strategy or other appropriate standards will be able to be met?

☐ Yes ✔ No **If yes**, please describe.

2.8.7 Will the proposal produce or result in solid wastes?

☐ Yes ✔ No **If yes**, please briefly describe the nature, concentrations and disposal location/ method.

Solid waste is expected to be minor and will be dealt with appropriately – e.g. any oily waste from inspections or maintenance will be disposed of via a controlled waste contractor.

2.8.8 Will the proposal result in significant off-site noise emissions?

✔ Yes ☐ No **If yes**, please briefly describe.

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla on the subject site in Kemerton (Synergetics 2013b). The total capacity of the proposed power station is 60 MW consisting of 40 x 1.6 MW Caterpillar diesel engines housed in four engine houses each containing ten engines. The engines are expected to run at no more than 500 hours per year. The power station noise was considered in two parts:

- Mechanical noise sourced from the surface of the engines and associated accessories; and
- Exhaust noise.

It was determined that both the engine noise and the exhaust noise will need to be attenuated to assure compliance with noise regulations.

It was calculated that at Kemerton, an engine house enclosure with a transmission loss of 26 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise. Tesla will build the plant to meet the *Environmental Protection (Noise) Regulations 1997*.

2.8.9 Will the development be subject to the *Environmental Protection (Noise) Regulations 1997*?

☑ Yes ☐ No **If yes**, has any analysis been carried out to demonstrate that the proposal will comply with the Regulations?

Please attach the analysis.

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla on the subject site in Kemerton (Synergetics 2013b). For more detailed information please refer to *Lot 5107 Marriot Road, Wellesley 60 Megawatt Power Station – Proponent Referral to the EPA* (360 Environmental 2013). Tesla will build the plant to meet the *Environmental Protection (Noise) Regulations 1997*.

2.8.10 Does the proposal have the potential to generate off-site, air quality impacts, dust, odour or another pollutant that may affect the amenity of residents and other "sensitive premises" such as schools and hospitals (proposals in this category may include intensive agriculture, aquaculture, marinas, mines and quarries etc.)?

☐ Yes ☑ No **If yes**, please describe and provide the distance to residences and other "sensitive premises".

2.8.11 If the proposal has a residential component or involves "sensitive premises", is it located near a land use that may discharge a pollutant?

☐ Yes ☐ No ☑ Not Applicable

If yes, please describe and provide the distance to the potential pollution source

2.9 Greenhouse Gas Emissions

2.9.1 Is this proposal likely to result in substantial greenhouse gas emissions (greater than 100 000 tonnes per annum of carbon dioxide equivalent emissions)?

☐ Yes ☑ No **If yes**, please provide an estimate of the annual gross emissions in absolute and in carbon dioxide equivalent figures.

2.9.2 Further, if yes, please describe proposed measures to minimise emissions, and any sink enhancement actions proposed to offset emissions.

2.10 Contamination

2.10.1 Has the property on which the proposal is to be located been used in the past for activities which may have caused soil or groundwater contamination?

☐ Yes ☑ No ☐ Unsure **If yes**, please describe.

2.10.2 Has any assessment been done for soil or groundwater contamination on the site?

☑ Yes ☐ No **If yes**, please describe.

The soil testing undertaken on site by MBS Environmental demonstrated that there was no Actual Acid Sulfate Soils (AASS) or Potential Acid Sulfate Soils (PASS) present on the site down to a depth of 2 metres below ground level (mbgl).

2.10.3 Has the site been registered as a contaminated site under the *Contaminated Sites Act 2003*? (on finalisation of the CS Regulations and proclamation of the CS Act)

☐ Yes ✔ No **If yes**, please describe.

A search of the DEC's Contaminated Sites Database has been undertaken which showed that the site has not been registered as contaminated site under the *Contaminated Sites Act 2003*.

2.11 Social Surroundings

2.11.1 Is the proposal on a property which contains or is near a site of Aboriginal ethnographic or archaeological significance that may be disturbed?

☐ Yes ✔ No ☐ Unsure **If yes**, please describe.

A search of the Aboriginal Heritage Inquiry System indicates there are no registered sites of Aboriginal heritage significance on or near the site. (Department of Indigenous Affairs (DIA) 2011). There have been several surveys completed over the site.

A search of the Heritage Council of Western Australia database of culturally significant sites in Western Australia was undertaken for the site. There are no reported culturally significant heritage sites on the site (Heritage Council of Western Australia 2011).

No World, Federal or National heritage places are listed as occurring on the site (SEWPAC 2013).

2.11.2 Is the proposal on a property which contains or is near a site of high public interest (e.g. a major recreation area or natural scenic feature)?

☐ Yes ✔ No **If yes**, please describe.

2.11.3 Will the proposal result in or require substantial transport of goods, which may affect the amenity of the local area?

☐ Yes ✔ No **If yes**, please describe.

Transport of bulk goods will only occur during construction. During operation of the site, no substantial transportation of goods will be required.

3. PROPOSED MANAGEMENT

3.1 Principles of Environmental Protection

3.1.1 Have you considered how your project gives attention to the following Principles, as set out in section 4A of the EP Act? (For information on the Principles of Environmental Protection, please see EPA Position Statement No. 7, available on the EPA website)

1. The precautionary principle.	✔ Yes	☐ No
2. The principle of intergenerational equity.	✔ Yes	☐ No
3. The principle of the conservation of biological diversity and ecological integrity.	✔ Yes	☐ No
4. Principles relating to improved valuation, pricing and incentive mechanisms.	✔ Yes	☐ No
5. The principle of waste minimisation.	✔ Yes	☐ No

3.1.2 Is the proposal consistent with the EPA's Environmental Protection Bulletins/Position Statements and Environmental Assessment Guidelines/Guidance Statements (available on the EPA website)?

✔ Yes ☐ No

3.2 Consultation

3.2.1 Has public consultation taken place (such as with other government agencies, community groups or neighbours), or is it intended that consultation shall take place?

✔ Yes ☐ No **If yes**, please list those consulted and attach comments or summarise response on a separate sheet.

On 23 August 2011, letters were sent to nearby residents outlining the proposal and any comments sought. Comments were captured in a register and responded to by either Tesla directly or by 360 Environmental on behalf of Tesla.

Further to this, an initial scoping meeting was held with the Office of the Environment Protection Authority (OEPA) in 2011 and then an update meeting in April 2013. In both meetings, Tesla in conjunction with 360 Environmental introduced the project, its key environmental impacts and proposed management strategies. In the April 2013 meeting, the OEPA indicated that the project may receive a 'Not Assessed' as it can be managed under Part V of the EP Act. However, the OEPA suggested contacting the regional DEC office in Kemerton to introduce the project prior to lodging any Part V approvals.

After the OEPA meeting, 360 Environmental contacted the regional DEC office in Kemerton and sent a power point presentation with project overview, background, key environmental factors and proposed management strategies.

Both parties agreed on reconvening once the Part IV referral have been lodged.

For more detailed information please refer to *Lot 5107 Marriot Road, Wellesley 60 Megawatt Power Station – Proponent Referral to the EPA* (360 Environmental 2013).

4. REFERENCES

360 Environmental 2013. *Lot 5107 Marriot Road, Wellesley 60 Megawatt Power Station – Proponent Referral to the EPA.*

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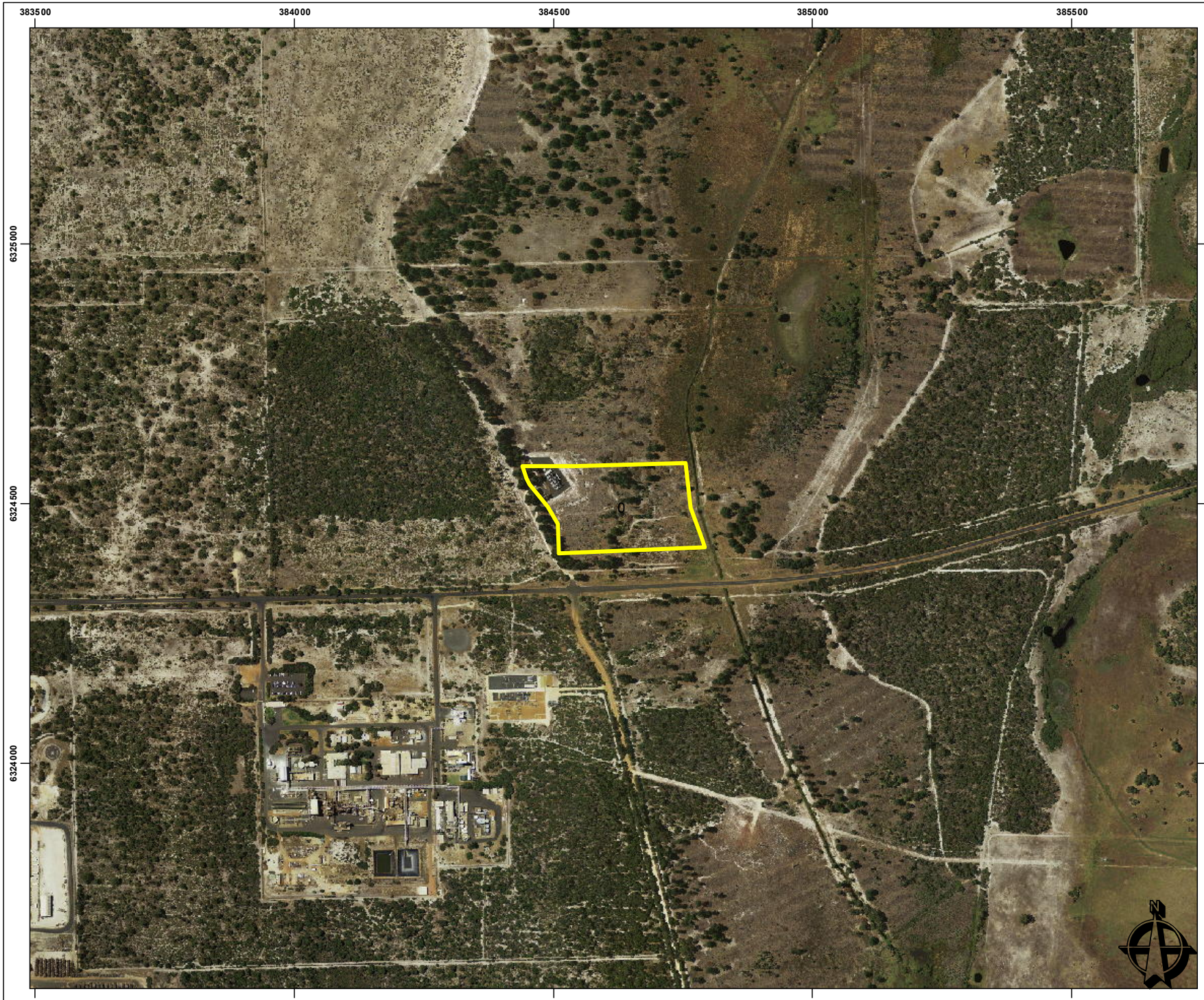

Legend

Site Location

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED FROM LANDGATE 2006
- STREET DIRECTORY MAP SOURCED FROM STREETSMART 2008
- AERIAL PHOTOGRAPHY SOURCED FROM LANDGATE 2012
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Metres

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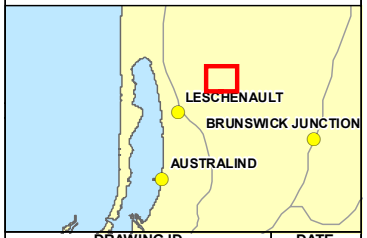
LOCALITY MAP



DRAWING ID	DATE
INF160-2	15/04/2013

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Kemerton Pty Ltd
Lot 5107 Marriott Rd
Wellesley, WA 6233

60MW Power Station

Figure 1 - Site Location

360 environmental

Lot 5107 Marriot Road,
Wellesley

60 Megawatt Power Station – Proponent's Referral to the Environmental Protection Authority

Prepared for:
Tesla Kemerton Pty Ltd

June 2013

people planet professional

Document Reference	Revision	Prepared by	Reviewed by	Submitted to Client	
				Copies	Date
INF060-2AB	A CLIENT DRAFT	JR	FD	1 electronic	21/05/13
INF060-2AB	B CLIENT FINAL	JR	BT	1 electronic	22/05/13
INF060-2AB	C FINAL TO THE OEPA	JR	FD	1 electronic copy (CD) 1 hard copy	04/06/13

Executive Summary

Tesla Kemerton Pty Ltd proposes to construct a 60 megawatt peak load power station (the power station) at Lot 5107 Marriott Road, Wellesley. The site is located within the Kemerton Industrial Park, approximately 20 kilometres (km) northeast of Bunbury.

The power station is proposed to provide peak loading capacity into the Western Power South West Interconnected System as required by the network operator. The power station will connect to the Marriot Road zone substation via the Marriot Road branch of the Marriott Road (MRR) 516 Marriot Road East.

The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. The power station will utilise approximately 15,750 litres (L) of diesel per hour and is to be operated for a maximum of 500 hours per year.

The key environmental factors relevant to the proposal have been identified as the following:

- Air emissions (including dust);
- Hydrocarbon transport, handling and storage; and
- Noise.

Hydrocarbons will be transported to site via main roads; however, as the power station is only to be operated during peak load times, transport will not be required on a regular basis. It is proposed to store 300,000 L of fuel on site which will be stored in safe fill self-bunded tanks in accordance with relevant Australian Standards and licenced as necessary with the Department of Mines and Petroleum. Spill response kits will be available to manage any potential spills and contingency measures will be in place to ensure potential environmental impacts are mitigated.

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.

Calculations on the noise resulting from the proposed operations in Kemerton determined that both the engine noise and the exhaust noise will need to be attenuated to ensure compliance with noise regulations. It was calculated that at Kemerton, an engine house enclosure with a transmission loss of 26 A-weighted decibels (dBA) or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise.

Through implementation of appropriate management measures and operational controls it is not anticipated that the implementation of this proposal will cause significant environmental impacts.

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Appendix I

1 Introduction

1.1 Background

Tesla Kemerton Pty Ltd (Tesla Kemerton) proposes to construct a 60 megawatt (MW) peak load power station (the power station) on 5107 Marriot Road, Wellesley (the site) (Figure 1). The site is located in the Kemerton Industrial Park approximately 20 kilometres (km) northeast of Bunbury. The power station will be located in the northern corner of the site (Figure 1).

The power station is required to provide peak loading capacity into the Western Power South West Interconnected System (SWIS) as required by the network operator. The power station will connect to the Marriot Road zone substation via the Marriot Road branch of the MRR 516 Marriot Road East.

1.2 Purpose of this Document

The purpose of this document is to identify and assess the key potential environmental impacts associated with the proposal, for both construction and operation phases, and outline Tesla Kemerton's proposed management measures to avoid or mitigate them.

1.3 Proponent Information

The proponent is Tesla Kemerton Pty Ltd. The appropriate contact details are provided as follows:

Ben Tan

Chief Executive Officer

Level 3 Exchange House

68 St Georges Terrace

Perth WA 6000

Ph: +61 8 6143 1851

1.4 Report Structure

The remainder of the report comprises the following sections:

- Section 2 – Proposal Description;
- Section 3 – Location and Existing Environment;
- Section 4 – Environmental Impact Assessment and Management Strategy;
- Section 5 – Stakeholder Consultation;

- Section 6 – Summary;
- Section 7 – Limitations; and
- Section 8 – References.

2 Proposal Description

It has been proposed that a power station be constructed on the site with an expected total energy output of 60 MW per year (Table 1). The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. The proposed site layout is shown in Figure 2. Other important components of the power station are as follows:

- Two bunded transformers (11/132 kV 37.5 MVA);
- 300,000 litre (L) capacity fuel tank(s) (safe fill, self-bunded); and
- Control hut with separate rooms for control.

Table 1. Key Project Characteristics

ELEMENT	DESCRIPTION
Project Location	Lot 5107 Marriott Road, Wellesley.
Life of Project	30 years.
Power Station Footprint	Approximately 6,630 m^2.
Nominal Configuration	40 x self-bunded diesel fuelled Caterpillar type 3516B generator sets.
Hydrocarbon storage	300,000 L in safe fill, self-bunded diesel fuel tank(s).
Operating Hours	Maximum 500 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 L per hour.
Approximate expected distillate demand	800,000 L per annum.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.
OUTPUTS (500 HOURS PER YEAR)	
Nominal Power Output	60 MW
Carbon Monoxide (CO)	21.01 kg/ hour of operation
Nitrogen Dioxide (NO_2)	246.03 kg/ hour of operation
Particulate $Matter_{10}$	1.38 kg/ hour
Particulate $Matter_{2.5}$	1.34
Sulphur Dioxide (SO_2)	0.089 kg/ year
Noise at site boundary (Sound Pressure Level)	94.24 dBA
Noise at nearest sensitive premise (Sound Pressure Level)	60.93 dBA

The full functional design specification of the power plant is outlined in Appendix A.

2.1 Site Selection

As a result of the site selection process, this site was chosen due to its low environmental values. The site is located within a heavy industrial park, has already been cleared, and there is a sufficient distance between the site and any nearby sensitive receptors.

2.2 Water Supply/Resources

There is no water supply required for the operation of this site.

2.3 Schedule

Construction will start once all necessary approvals and permits have been required and it is anticipated that commissioning would occur in mid-2016. There will be a commissioning period which includes the installation and testing of the full load of the proposed power station to ensure proposed management is appropriate and the power station is functionally operational. Operation will start post commissioning phase.

3 Location and Existing Environment

3.1 Location and Surrounding Land Use

The site is located on Lot 5107 Marriott Road, Wellesley. The site is zoned 'Kemerton Park Industry' under the Shire of Harvey Town Planning Scheme No 1 (WAPC 2011). The site is owned by LandCorp who have given their permission for the proposed usage of the land (Appendix B). The surrounding land is predominately utilised for industrial activities as the site is located within Kemerton Industrial Park. The nearest sensitive receptors are located approximately 1.8 km to the south east and 3.6 km to the west (Figure 3).

3.2 Climate

The closest official Bureau of Meteorology (BoM) weather station, which is still currently operating and has been operating for a sufficient period to indicate local weather conditions, is at Wokalup, where climate data is available from between 1951 and May 2011 (BoM 2011). Recorded climatic data is summarised in Table 2.

Table 2. Average Weather Data from Wokalup Weather Station

PARAMETER	RESULTS
Mean daily maximum temperature December	28.1 °C
Mean daily maximum temperature July	16.7 °C
Mean daily minimum temperature December	11.5 °C
Mean daily minimum temperature July	8.0 °C
Annual average rainfall	943.0 mm
Mean annual rain days	93.6 days

3.3 Landform and Soils

3.3.1 Topography

The site is relatively flat at 15 metres (m) Australian Height Datum (AHD) (Figure 4).

3.3.2 Geology and Soils

The site lies on Bassendean soils which have been described by the Department of Agriculture and Food (DAF) as an imperfectly drained sandplain and broad extremely low rises with deep or very deep grey siliceous sands (Department of Agriculture and Food 2011) (Figure 4).

A soil assessment was undertaken across the site by MBS Environmental, in October 2010, which identifies the soils as predominately grey sand down to a depth of two metres (Appendix C). The samples taken during the assessment were analysed to determine the concentration of potential contaminants they may contain, including metals, total recoverable hydrocarbons, polychlorinated biphenyls (PCBs), organochlorine pesticides (OC) and monocyclic aromatic hydrocarbons. Results from all samples showed that concentrations were well below the respective Ecological Investigation Levels.

3.3.3 Acid Sulfate Soil Risk

The site is shown on the Western Australian Planning Commission (WAPC) *Planning Bulletin No. 64* (WAPC 2011) and the DEC (2011) *On-line Risk Mapping* databases of Acid Sulfate Soils (ASS) risk mapping as having 'moderate to low risk' of acid sulfate soils occurring at depths less than three metres (Figure 5).

The soil testing undertaken on site by MBS Environmental demonstrated that there was no Actual Acid Sulfate Soils (AASS) or Potential Acid Sulfate Soils (PASS) present on the site down to a depth of two metres below ground level (mbgl) (Appendix C).

3.4 Groundwater

A search of the Department of Water (DoW) *Water Information System (WIN) database* for groundwater bores within a two kilometres radius of the site has been undertaken (Appendix D). The search indicates that there are 19 groundwater bores located within this radius of which two groundwater bores are located within 500 m of the site (Figure 6). No groundwater chemistry information was available from these two bores and neither bore is currently operating. Groundwater at the site is approximately 12 mbgl (Kemerton Industrial Park Strategy Plan 2009).

The site is not within a Public Drinking Water Source Area (PDWSA). The nearest is approximately 10 km to the east of the site and called Brunswick Catchment Area, which is protected under the *Country Areas Water Supply Act (CAWS) 1947*. Due the nature of the proposal, the limited site construction activities required for the installation of the infrastructure and the distance to the PDWSA, it is not anticipated that there will be any impact to the PDWSA through run-off, changes to existing hydrological regimes, or use of water from the local aquifer.

3.5 Surface Water

There are no water courses or drains present on or adjacent to the site (Figure 7).

3.6 Wetlands and Conservation Areas

There are no Ramsar wetlands on the site (Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) 2013). The nearest Ramsar wetland is

the Peel-Yalgorup system which is within ten kilometres of the site. There are no Nationally Important Wetland, Conservation Category or Resource Enhancement wetlands listed on the site. There are several Multiple Use wetlands on and adjacent to the site, however these wetlands are greater than 100 m from the proposed power station footprint (Figure 7).

There are no Environmentally Sensitive Areas (ESA), Regional Parks or National Parks on or adjacent to the site (Figure 8). There are unlikely to be any specific wetland or conservation area related management measures required due to the separation distance between the proposed footprint and these assets.

3.7 Flora and Vegetation

3.7.1 Flora

Searches of the DEC's Naturemap database (2013) and SEWPAC's (2013) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Protected Matters Search Tool* were undertaken to identify the potential conservation significant species to exist within five kilometres of the site (Appendix E). The search results indicated there are no known occurrences of Declared Rare Flora (DRF) or Priority Flora on the site; however, the species listed below are known to exist within five kilometres of the site. Two Vulnerable, six Endangered and two Critically Endangered plant species (or their habitat) were recorded as 'likely to occur within the area' and are listed in Table 3.

Table 3. Flora Species Potentially Occurring within Five Kilometres of the Site.

Species	Common Name	Federal	State	
		EPBC Act	WC Act	DEC Priority
Acacia semitrullata				Priority 4
Andersonia gracilis	Slender Andersonia	Endangered	DRF	
Caladenia huegelii	King Spider-orchid	Endangered	DRF	
Caladenia speciosa	Sandplain White Spider Orchid			Priority 4
Centrolepis caespitosa		Endangered		Priority 4
Darwinia sp. Muchea B.J.Keighery 2458	Muchea Bell	Critically Endangered	DRF	
Dillwynia dillwynioides				Priority 3
Diuris micrantha	Dwarf Bee-orchid	Vulnerable	DRF	
Diuris purdiei	Purdie's Donkey-orchid	Endangered	DRF	
Drakaea elastica	Glossy-leafed Hammer-orchid	Endangered	DRF	
Drakaea micrantha	Dwarf Hammer-orchid	Vulnerable	DRF	
Lasiopetalum membranaceum				Priority 3
Pterostylis frenchii	Tuart Rufous Greenhood			Priority 2
Pultenaea skinneri	Skinner's Pea			Priority 4
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Selena's Synaphea	Critically Endangered	DRF	
Synaphea stenoloba	Dwellingup Synaphea	Endangered	DRF	
Verticordia attenuata				Priority 3

It is unlikely that any protected species occur within the site as the area is clear of native vegetation.

3.7.2 Vegetation

A search of the DEC's Threatened Ecological Community (TEC) database (2011) indicates there are no TECs or Priority Ecological Communities (PEC) known to exist within five kilometres of the site.

A search of SEWPAC's (2013) EPBC Act *Protected Matters Search Tool* was undertaken and identified there are no TEC listed under the EPBC Act within five kilometres of the site (Appendix E).

The Kemerton Industrial Park Strategy Plan (2009) identifies the vegetation on the site as a Pine (*Pinus radiata*) plantation. The site has recently been cleared by the Forest Product Commission; however, the stumps of the pines are still present.

There are unlikely to be any significant impacts to flora or vegetation as a result of the proposed power station as no native vegetation clearing is required as a result of this development.

3.8 Fauna

A search of the DEC's *Naturemap* database (2013) and SEWPAC's (2013) *Protected Matters Search Tool* was undertaken to identify the potential for conservation significant Fauna species to exist within five kilometres of the site (Appendix E). The search results indicated there are no known occurrences of Threatened Fauna on the site; however, the species listed in Table 4 are known to exist within five kilometres of the site. Further, three Vulnerable, one Marine and Migratory and one Endangered species listed under the EPBC Act were identified as potentially occurring on the site (Appendix E).

Table 4. Fauna Species Potentially Occurring Within Five Kilometres of the Site.

Species	Common Name	Federal	State	
		EPBC Act	WC Act	DEC Priority
Botaurus poiciloptilus	Australasian Bittern		Schedule 1	
Calyptorhynchus banksii subsp. naso	Forest Red-tailed Black-Cockatoo			
Calyptorhynchus baudinii	Baudin's Cockatoo		Schedule 1	
Calyptorhynchus latirostris	Carnaby's Black Cockatoo	Endangered	Schedule 1	
Dasyurus geoffroii	Western Quoll	Vulnerable	Schedule 1	
Falco peregrinus subsp. macropus			Schedule 4	
Isoodon obesulus subsp. fusciventer	Southern Brown Bandicoot			Priority 5
Merops ornatus	Rainbow-Bee-eater	Marine and Migratory	Schedule 4	
Numenius madagascariensis	Eastern Curlew		Schedule 1	
Phascogale tapoatafa subsp. ssp. (WAM M434)	Brush-tailed Phascogale		Schedule 1	
Pseudocheirus occidentalis	Western Ringtail Possum	Vulnerable	Schedule 1	
Setonix brachyurus	Quokka	Vulnerable	Schedule 1	

It is unlikely that any protected species occur within the site as the area has been cleared in the past for forestry.

3.9 Heritage

3.9.1 Aboriginal

In Western Australia, the *Aboriginal Heritage Act 1972* protects places and objects customarily used by, or traditional to, the original inhabitants of Australia. A register of such places and objects is maintained under the Act, however, all sites are protected under the Act whether they have been registered or not.

A search of the Aboriginal Heritage Inquiry System indicates there are no registered sites of Aboriginal heritage significance on or near the site (Figure 9) (Department of

Indigenous Affairs (DIA) 2011) (Appendix F). There have been several surveys completed over the site (DIA 2011).

Although no Aboriginal heritage sites of significance are recorded as occurring on the site, if any heritage sites are found, approval under Section 18 of the *Aboriginal Heritage Act 1972* will be required to disturb the sites if they cannot be avoided.

3.9.2 European

A search of the Heritage Council of Western Australia database of culturally significant sites in Western Australia was undertaken for the site. There are no reported culturally significant heritage sites on the site (Heritage Council of Western Australia 2011).

No World, Federal or National heritage places are listed as occurring on the site (SEWPAC 2013).

4 Environmental Impact Assessment and Management Strategy

4.1 Overview

The following environmental factors are considered to be the key factors associated with the proposal:

- Hydrocarbon transport, handling and storage;
- Air emissions (including dust); and
- Noise.

These environmental factors are discussed in more detail below, together with proposed management actions.

4.2 Principles of Environmental Protection

Tesla Kemerton will adopt the principles of environmental protection outlined in section 4A of the *Environmental Protection Act 1986* and expanded upon on in the Environmental Protection Authority Guidance Statement No 33 *Environmental Guidance for Planning and Development* (2008). These principles are as follows:

- Precautionary Principle - where serious or irreversible (environmental) damage is likely to occur, actions to take measures to prevent the environmental degradation should not be postponed due to lack of scientific uncertainty. If there is an uncertainty, the action should be conservative in favour of preventing realisation of the risk;
- Principle of Intergenerational Equity - the project should not compromise the health, diversity and productivity of the environment for future generations;
- Principle of the Conservation of Biological Diversity and Ecological Integrity - decision makers should not knowingly reduce biodiversity and integrity unless it is completely unavoidable. Conservation where possible through offsetting the impacts is expected; and
- Principle of Waste Minimisation - the project should minimise waste generation and its discharge to the environment by exploring the waste hierarchy (prevent, minimise, reuse, recycle) for waste generation and disposal.

Table 5 shows how consideration has been given to the principles of environmental protection within the project.

Table 5. Principles of Environmental Protection as Related to the Project

PRINCIPLES OF ENVIRONMENTAL PROTECTION	RELEVANT (YES/NO)	IF YES, CONSIDERATION AFFORDED
The Precautionary Principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by: (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and (b) an assessment of the risk – weighted consequences of various options.	Yes	Site selection was undertaken to avoid, as far as practicable, harm to environmental values. This was achieved by selecting an already cleared site in an industrial area. Mitigation measures have been proposed as well as opportunities for environmental offsets, as a last resort.
Principle of Intergenerational Equity The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations	Yes	Due to the already degraded nature and location of the site, impacts are expected to be minimal. The site is located in a state defined heavy industrial estate and has significant buffer zones surrounding the region. Therefore it is highly unlikely that future generations will be disadvantaged.
Principle of the Conservation of Biological Diversity and Ecological Integrity. Conservation of biological diversity and ecological integrity should be a fundamental consideration	Yes	Site selection was undertaken to avoid, as far as practicable, harm to environmental values. This was achieved by selecting an already cleared site in an industrial area. The biodiversity and ecological integrity of the potentially impacted region will be maintained.
Principle of Waste Minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	Yes	The project is expected to generate minimal wastes. Wastes will be managed with consideration of the waste hierarchy.

4.3 Air Quality (Including Dust)

4.3.1 Background

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment (Appendix G).

The modelled ground level concentrations (GLCs) at the various receptors were presented and compared against the relevant assessment criteria. A 'compliance factor' (CF) was also reported as the ratio of the guideline value and the calculated GLC. A value of CF < 1 indicates the calculated GLC is higher than the guideline value whereas a value ≥ 1 indicates the calculated GLC is equal to or below the guideline value. The CF allows an immediate assessment of the potential for the facility to exceed guideline GLC values.

All modelled GLCs at the discrete modelling receptors are presented in Appendix G. Also included are the GLCs at the nearest residential receptor. All GLCs for each of the proposed power stations were below relevant assessment criteria.

4.3.2 Management Objective

The management objectives for air quality for this project are as follows:

- Best practice is applied to maximise energy efficiency and minimise emissions;
- To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards;
- There is an ongoing program to monitor and report emissions and periodically access opportunities to further reduce greenhouse gas emissions over time; and
- Surrounding land users are protected such that dust will not adversely impact upon welfare and amenity during construction.

4.3.3 Potential Impacts

Potential impacts associated with the installation and operation of the power station includes reduction of local air quality due to:

- Increased atmospheric carbon dioxide concentration; and
- Release of key air pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), hydrocarbon, sulfuret (SO_2) and particulate matter such as PM_{10} and $PM_{2.5}$.

The major concern with air pollution is the release of greenhouse gases. Air emissions can also have impacts on air quality and human health if not properly monitored.

Dust generated by construction, if deposited on adjacent native vegetation, has the potential to disrupt the photosynthetic, respiratory and/or water balance processes of plants, thereby causing mortality or decreased health and increased susceptibility to disease. Dust can also have impacts on air quality and human health if not properly monitored.

4.3.4 Proposed Management Strategies

Management measures to reduce any potential air emissions include the following:

- Generators will be maintained and serviced regularly to ensure all machinery is running at its most efficient and optimal to minimise emissions;
- Regular checks on vehicles and machinery/equipment;
- Replacement and report on machinery/equipment will occur if not meeting air quality controls; and
- Ensuring machinery on site are properly maintained and serviced in accordance with manufacturer's specifications to minimise potential unacceptable air quality emissions.

Periodic monitoring will be implemented to confirm success of the management measures.

The management strategies to reduce dust during construction and the need for dust suppression include:

- Vehicle access will be restricted and vehicles must remain on designated access tracks and parking areas, at controlled vehicle speeds;
- Compacted or cleared areas will be stabilised. The extent of exposed surfaces such as stockpiles and cleared areas (e.g. during construction), and the duration of which these areas are exposed, will be minimised;
- Maintaining general housekeeping practices to ensure there is no accumulation of waste or loose materials that may generate dust;
- Using water trucks/water cannons during construction activities to dampen areas identified as being potentially dust generating. Frequency will be determined by the Contractor based on weather conditions;
- The site will be covered in blue metal to reduce any potential for dust generation;
- Cease works until remedial actions can be implemented if dust emissions are considered significant;

- Ensuring machinery on site is properly maintained in accordance with manufacturer's specifications (especially any dust suppression systems) to minimise potential for dust generation; and
- All staff to be inducted on dust control measures of the power station.

Where dust reduction is not possible dust suppression will be undertaken by water spray.

If any complaints are made with regards to dust, the management measures will be reviewed to see if any improvements can be made.

Regular monitoring is not considered necessary for dust during operations as no dust is expected to be produced once construction and commissioning are complete.

4.3.5 Predicted Outcome

Given these management strategies, the short duration of construction and operation at below air quality standards, it is predicted that there will be no significant impact to the local air quality.

4.4 Hazardous Materials Management

4.4.1 Background

The most significant hazardous material to be stored and utilised at the site is hydrocarbon (diesel fuel). The on-site storage of hydrocarbons is proposed to be a maximum of 300,000 L in safe fill, self-bunded tanks. At full load the power station will use approximately 15,750 L of diesel per hour. No other significant amounts of chemicals will be stored on site.

Transport of the hazardous materials will occur on an as needs basis via main roads. The transport is not expected to cause significant traffic impacts, or reduction in amenity to nearby land users, as the power station is only to be operational during peak loading times and as such will not demand constant delivery of these materials.

4.4.2 Management Objectives

The management objective for the management of hazardous materials is to ensure there is no contamination on the site as a result of construction and operation.

4.4.3 Potential Impacts

If inappropriately managed, the transport, handling, storage and use of hazardous materials (including potential leaks and spills) and the disposal of associated waste streams have the potential to:

- Degrade the environment through the contamination of soil, groundwater and surface waters;

- Create risk to human safety or health, potentially resulting in injury or spread of disease; and
- Reduce the amenity of an area due to visual and odorous impacts.

4.4.4 Proposed Management Strategies

To manage hazardous materials at the site the following measures will be in place:

- All hydrocarbons will be contained in standard storage fuel tanks located in a bunded area, in double skinned, self-bunded fuel tanks or in portable bunds. All storage will be in accordance with the Australian Standards AS1940 and AS1692 and an appropriate licence from the Department of Mines and Petroleum;
- Any significant leakage or spill into a bunded area will be collected by an appropriate waste removal company;
- Spill response kits, and instructions for their use, will be located adjacent to bunded areas;
- Generator bunds are to be covered so as not to collect rainfall; and
- Bunds will be maintained as part of the site maintenance schedule.

In the unlikely event of an accidental spill of hazardous materials, the excess materials will be collected using a spill response kit. Any contaminated soils will be immediately excavated, removed from site and disposed at an appropriately licenced facility. All spills will be reported through an incident reporting procedure and reporting to the DEC will occur as necessary.

4.4.5 Predicted Outcome

With these management strategies in place the risk of environmental impacts is considered to be a low.

4.5 Noise

4.5.1 Background

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla on the subject site in Kemerton (Synergetics 2013b). The total capacity of the proposed power station is 60 MW consisting of 40 x 1.6 MW Caterpillar diesel engines housed in four engine houses each containing ten engines. The engines are expected to run at no more than 500 hours per year.

The power station noise was considered in two parts:

- Mechanical noise sourced from the surface of the engines and associated accessories; and

- Exhaust noise.

Calculations on the noise resulting from the proposed operations in Kemerton quantified the level of muffler insertion loss and engine enclosure transmission loss required to meet the assessment criteria.

It was determined that both the engine noise and the exhaust noise will need to be attenuated to assure compliance with noise regulations.

It was calculated that at Kemerton, an engine house enclosure with a transmission loss of 26 dBA or more will provide sufficient attenuate ion for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise (Appendix H).

4.5.2 Management Objectives

The management objectives in regards to noise are as follows:

- Compliance with any statutory requirements and acceptable standards in relation to noise to protect the amenity of the community; and
- To avoid unacceptable adverse impacts on the natural environment, including native fauna.

4.5.3 Potential Impacts

If noise levels are not managed efficiently they may impact on the surrounding land users. Following implementation of the engine and exhaust noise controls, it was calculated that the power station will comply with the boundary noise requirements of the *Environmental Protection (Noise) Regulations (EPR) 1997* (WAEPA 1997a) (Synergetics 2013b).

4.5.4 Proposed Management Strategies

To manage noise levels the following strategies will be in place:

- All machinery and equipment shall be fitted with the appropriate noise control equipment where necessary;
- Regular checks on vehicles and machinery/equipment;
- Replacement and repair on machinery/equipment will occur if not meeting noise control requirements;
- Adherence with the *Environmental Protection (Noise) Regulations 1997*;
- During construction known noisy activities will not occur outside the hours of 7am until 6pm weekdays;
- All staff to be inducted on noise control measures of the power station;

- Generator sets will be housed in noise attenuating enclosures;
- The acoustic equipment including engine exhaust muffler, acoustic louvers and ventilation fan are designed and manufactured to meet the acoustic requirements of the installation equipment; and
- Property boundary noise level will not exceed legislated levels measured at the fence line.

If complaints are made with regards to noise the management measures will be reviewed to see if any improvements can be made.

4.5.5 Predicted Outcome

Due to the location of the power plant within an industrial area, the short duration of construction, limited operation time (as a peak loading facility) and as compliance with the regulatory standards will be achieved the environmental risk is believed to be small.

4.6 Summary of Environmental Factors and Management

Table 6 provides a summary of the environmental factors and management for the project.

Table 6. Summary of Environmental Factors and Management

Management Objective(s)	Background	Potential Impact	Proposed Environmental Management	Predicted Outcome(s)
Air Quality (including Dust)				
Best practice is applied to maximise energy efficiency and minimise emissions. To ensure that air emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards. There is an ongoing program to monitor and report emissions and periodically access opportunities to further reduce greenhouse gas emissions over time. Surrounding land users are protected such that dust will not adversely impact upon welfare and amenity during construction.	According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.	Increased atmospheric carbon dioxide concentration. Release of key air pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), hydrocarbon, sulfuret (SO_2) and particulate matter. If dust is deposited on adjacent native vegetation has the potential to disrupt the photosynthetic, respiratory and/or water balance processes of plants, thereby causing mortality or decreased health and increased susceptibility to disease. Dust can also have impacts on air quality and human health if not properly monitored.	Generators will be maintained and serviced regularly to ensure all machinery is running at its most efficient and optimal to minimise emissions. Regular checks on vehicles and machinery/equipment. Replacement and report on machinery/equipment will occur if not meeting air quality controls. Ensuring machinery on site are properly maintained and serviced in accordance with manufacturer's specifications to minimise potential unacceptable air quality emissions. Periodic monitoring will be implemented to confirm success of the management measures. Vehicle access will be restricted and vehicles must remain on designated access tracks and parking areas, at controlled vehicle speeds. Compacted or cleared areas will be stabilised. Extent of exposed surfaces such as stockpiles and cleared areas, and the duration of which these areas are exposed, will be minimised. Maintaining general housekeeping practices to ensure there is no accumulation of waste or loose materials that may generate dust. Using water trucks/water cannons during construction activities to dampen areas identified as being potentially dust generating. Frequency will be determined by the Contractor based on weather conditions. The site will be covered in blue metal to reduce any potential for dust generation. Cease works until remedial actions can be implemented if dust emissions are considered significant. Ensuring machinery on site is properly maintained in accordance with manufacturer's specifications (especially any dust suppression systems) to minimise potential for dust generation.	With these management strategies, the short duration of operation and as the power station will be operating at below air quality standards it is predicted that there will be no significant impact to local air quality.

Management Objective(s)	Background	Potential Impact	Proposed Environmental Management	Predicted Outcome(s)
			All staff to be inducted on dust control measures of the power station. Where dust reduction is not possible dust suppression will be undertaken by water spray. If any complaints are made with regards to dust the management measures will be reviewed to see if any improvements can be made.	
Hazardous Materials (e.g. Hydrocarbons)				
The management objective for the management of hazardous materials is to ensure there is no contamination on the site as a result of construction and operation.	The most significant hazardous material to be stored and utilised at the site is hydrocarbons (diesel fuel). The on-site storage of hydrocarbons is proposed to be a maximum of 300,000L in safe fill, self-bunded tanks.	Degrade the environment through the contamination of soil, groundwater and surface waters. Create risk to human safety or health, potentially resulting in injury or spread of disease. Reduce the amenity of an area due to visual and odorous impacts.	All hydrocarbons will be contained in standard storage fuel tanks located in a bunded area, in double skinned, self-bunded fuel tanks or in portable bunds. All storage will be in accordance with the Australia Standards AS1940 and AS1692 and an appropriate licence from the Department of Mines and Petroleum. Any significant leakage or spill into a bunded area will be collected by an appropriate waste removal company. Spill response kits, and instructions for their use, will be located adjacent to bunded areas. Generator bunds are to be covered so as not to collect rainfall. Bunds will be maintained as part of the site maintenance schedule. In the unlikely event of an accidental spill of hazardous materials, the excess materials will be collected using a spill response kit. Any contaminated soils will be immediately excavated, removed from site and disposed at an appropriately licenced facility. All spills will be reported through an incident reporting procedure and reporting to the DEC will occur as necessary.	
Noise				
Compliance with any statutory requirements and acceptable standards in relation to noise to protect the amenity of the community To avoid unacceptable adverse impacts on the natural environment, including native fauna.	The power station noise was considered in two parts: • Mechanical noise sourced from the surface of the engines and associated accessories; and • Exhaust noise. Calculations on the noise resulting from the proposed operations in	If noise levels are not managed efficiently they may impact on the surrounding land users.	All machinery and equipment shall be fitted with the appropriate noise control equipment where necessary. Regular checks on vehicles and machinery/equipment. Replacement and repair on machinery/equipment will occur if not meeting noise control requirements. Adherence with the *Environmental Protection (Noise) Regulations 1997*.	Due to the location of the power plant within an industrial area, the short operating duration and as compliance with the regulatory standards will be achieved the environmental risk is believe to be small.

Management Objective(s)	Background	Potential Impact	Proposed Environmental Management	Predicted Outcome(s)
	Kemerton quantified the level of muffler insertion loss and engine enclosure transmission loss required to meet the assessment criteria. It was determined that both the engine noise and the exhaust noise will need to be attenuated to assure compliance with noise regulations. It was calculated that at Kemerton, an engine house enclosure with a transmission loss of 26 dBA or more will provide sufficient attenuate ion for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise.		During construction known noisy activities will not occur outside the hours of 7am until 6pm weekdays. All staff to be inducted on noise control measures of the power station. Generator sets will be housed in noise attenuating enclosures. The acoustic equipment including engine exhaust muffler, acoustic louves and ventilation fan are designed and manufactured to meet the acoustic requirements of the installation equipment. Property boundary noise level will not exceed legislative requirements measured at the fence line. If any complaints are made with regards to noise, the management measures will be reviewed to see if any improvements can be made.	

5 Stakeholder Consultation

5.1 Objectives

The purpose of undertaking stakeholder consultation was to achieve the following objectives:

- To provide information about the project and to tap stakeholder information on key environmental and social baseline information in the project area;
- To provide opportunities to stakeholders to discuss their opinions and concerns;
- To manage expectations and misconceptions regarding the project;
- To discuss potential impacts and verify significant or major environmental, social and health impacts identified; and
- To inform the process of developing appropriate mitigation and management measures for effective implementation.

5.2 Strategy

On 23 August 2011, letters were sent to nearby residents outlining the proposal and any comments sought (Appendix I). Comments were captured in a register and responded to by either Tesla directly or by 360 Environmental on behalf of Tesla.

Tesla Kemerton will keep nearby affected residents and industries informed about the timing and duration of construction activities on site.

Further to this, an initial scoping meeting was held with the Office of the Environment Protection Authority (OEPA) in 2011 and then an update meeting in April 2013. In both meetings, Tesla in conjunction with 360 Environmental introduced the project, its key environmental impacts and proposed management strategies. In the April 2013 meeting, the OEPA was confident that the project would receive a 'Not Assessed' as it can be managed under Part V of the EP Act. However, the OEPA suggested contacting the regional DEC office in Kemerton to introduce the project prior to lodging any Part V approvals.

After the OEPA meeting, 360 Environmental contacted the regional DEC office in Kemerton and sent a power point presentation with project overview, background, key environmental factors and proposed management strategies.

Both parties agreed on reconvening once the Part IV referral have been lodged.

An overview of all key stakeholders is presented in Table 7.

Table 7. Key Stakeholders

STAKEHOLDER	DATE OF CONSULTATION
Office of Environment Protection Authority	Mid-2011 16 April 2013
Department of Environment and Conservation	18 April 2013
Members of the Community	24 August 2011 and ongoing

5.3 Outcomes

There was one response from the community in response to the letters. A summary of the comment is provided in Table 8 below.

Table 8. Stakeholder Comments

LANDOWNER	COMMENTS	HOW RECEIVED	ACTION
Graham and Emma Kirk	We are concerned about the impact on our rural lifestyle due to noise and odours and more importantly, the impact on our agricultural business as we have Quality Assurance requirements that we must meet. There is a lack of vegetation between the proposed power station and our property as a noise reduction measure due to the pine plantation on the corner of Marriot and Devlin Roads having just been logged. What action will be taken to guarantee us that we will not have any noise impact on our farm? We would like to see a large vegetative buffer between the power station and our property. Your letter states that the power station will be used for peak load, less than 200 hours per year and generally within standard business hours on business days during summer. Western Power tells us to 'power down' in the peak hours	Via email – 04/09/2011	Email response sent and saved in project email folder: • Air and Noise Assessments are being undertaken; • Management Measures in place; • Plant designed to meet relevant noise requirements at all periods of time.

LANDOWNER	COMMENTS	HOW RECEIVED	ACTION
	between 4 and 9pm which is not standard business hours. If the proposed facility is for peak load then one would assume that this is when the facility will be in use, not standard business hours on business days only. Will this facility be used outside the hours that are stated in your letter and if so, what will the hours be? There is already one diesel generated power station in Kemerton that is running in excess of its original plan. What guarantee can you provide us that this venture will not exceed its proposed limits in hours of use as it appears that a huge amount of effort and money will be spent for very little use (200 hours per year) of the facility? This does not seem cost effective. What is the likelihood of an extension in the capacity and hours of use being granted to you? We don't object to the proposed power plant if it is run within the guidelines that are stated in your letter but we are worried that the facility will be used more than 200 hours and outside standard business hours, which will impact on our lifestyle, agricultural business and the valuation of our property. We request an Environmental Noise Assessment Report and an Environmental Air Quality Report as soon as they are available.		

6 Summary

Tesla Kemerton Pty Ltd proposes to construct a 60 megawatt peak load power station (the power station) at Lot 5107 Marriott Road, Wellesley. The site is located within the Kemerton Industrial Park, approximately 20 km northeast of Bunbury.

The power station is proposed to provide peak loading capacity into the Western Power South West Interconnected System as required by the network operator. The power station will connect to the Marriot Road zone substation via the Marriot Road branch of the Marriott Road (MRR) 516 Marriot Road East.

The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. The power station will utilise approximately 15,750 L of diesel per hour and is to be operated for a maximum of 500 hours per year.

The key environmental factors relevant to the proposal have been identified as the following:

- Air emissions (including dust);
- Hydrocarbon transport, handling and storage; and
- Noise.

Hydrocarbons will be transported to site via main roads; however, as the power station is only to be operated during peak load times, transport will not be required on a regular basis. It is proposed to store 300,000 L of fuel on site which will be stored in safe fill self-bunded tanks in accordance with relevant Australian Standards and licenced as necessary with the Department of Mines and Petroleum. Spill response kits will be available to manage any potential spills and contingency measures will be in place to ensure potential environmental impacts are mitigated.

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.

Calculations on the noise resulting from the proposed operations in Kemerton determined that both the engine noise and the exhaust noise will need to be attenuated to ensure compliance with noise regulations. It was calculated that at Kemerton, an engine house enclosure with a transmission loss of 26 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise.

Through implementation of appropriate management measures and operational controls it is not anticipated that the implementation of this proposal will cause significant environmental impacts.

7 Limitations

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. 360 Environmental makes no representations or warranties in relation to the nature and quality of soil and water other than the visual observation and analytical data in this report.

In the preparation of this report, 360 Environmental has relied upon documents, information, data and analyses ("client's information") provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

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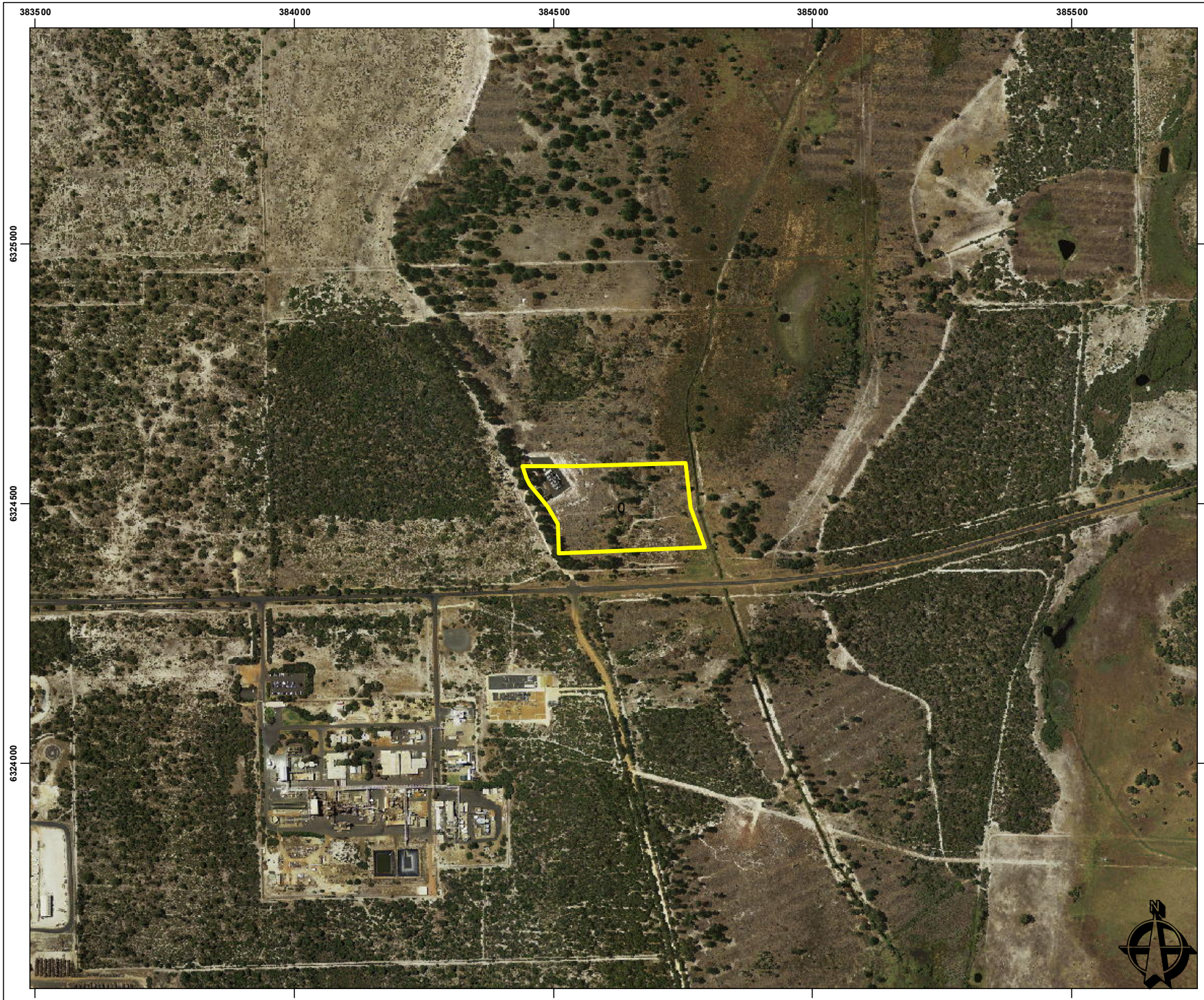
FIGURES



Legend

Site Location

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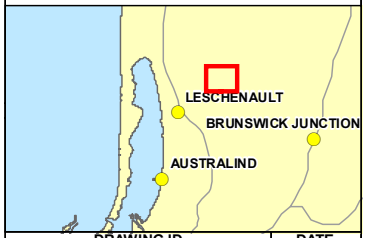

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HORIZONTAL DATUM AND PROJECTION
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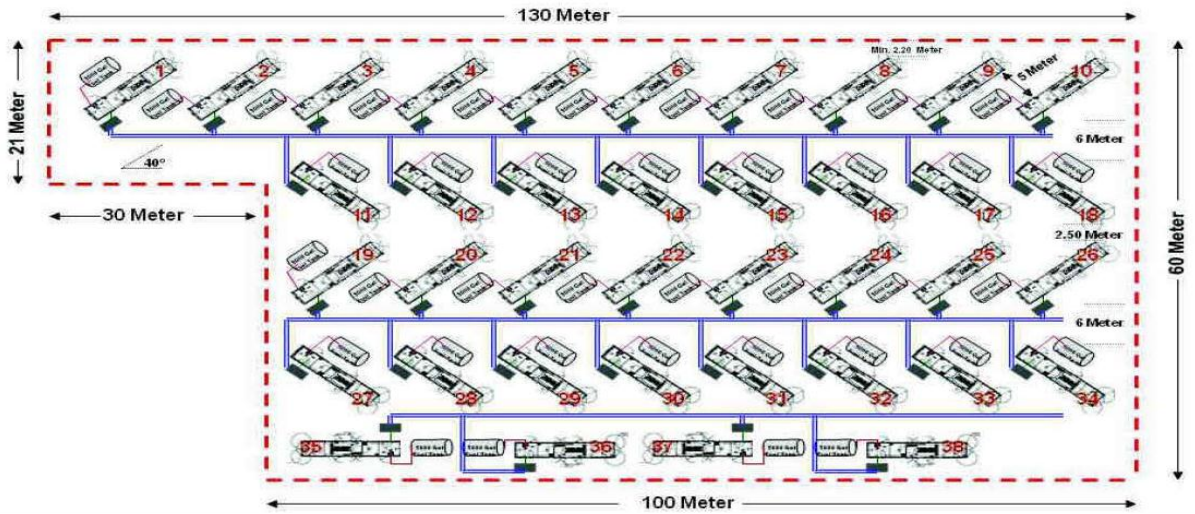
MRS	JR	FD	0

Tesla Kemerton Pty Ltd
Lot 5107 Marriott Rd
Wellesley, WA 6233

60MW Power Station

Figure 1 - Site Location

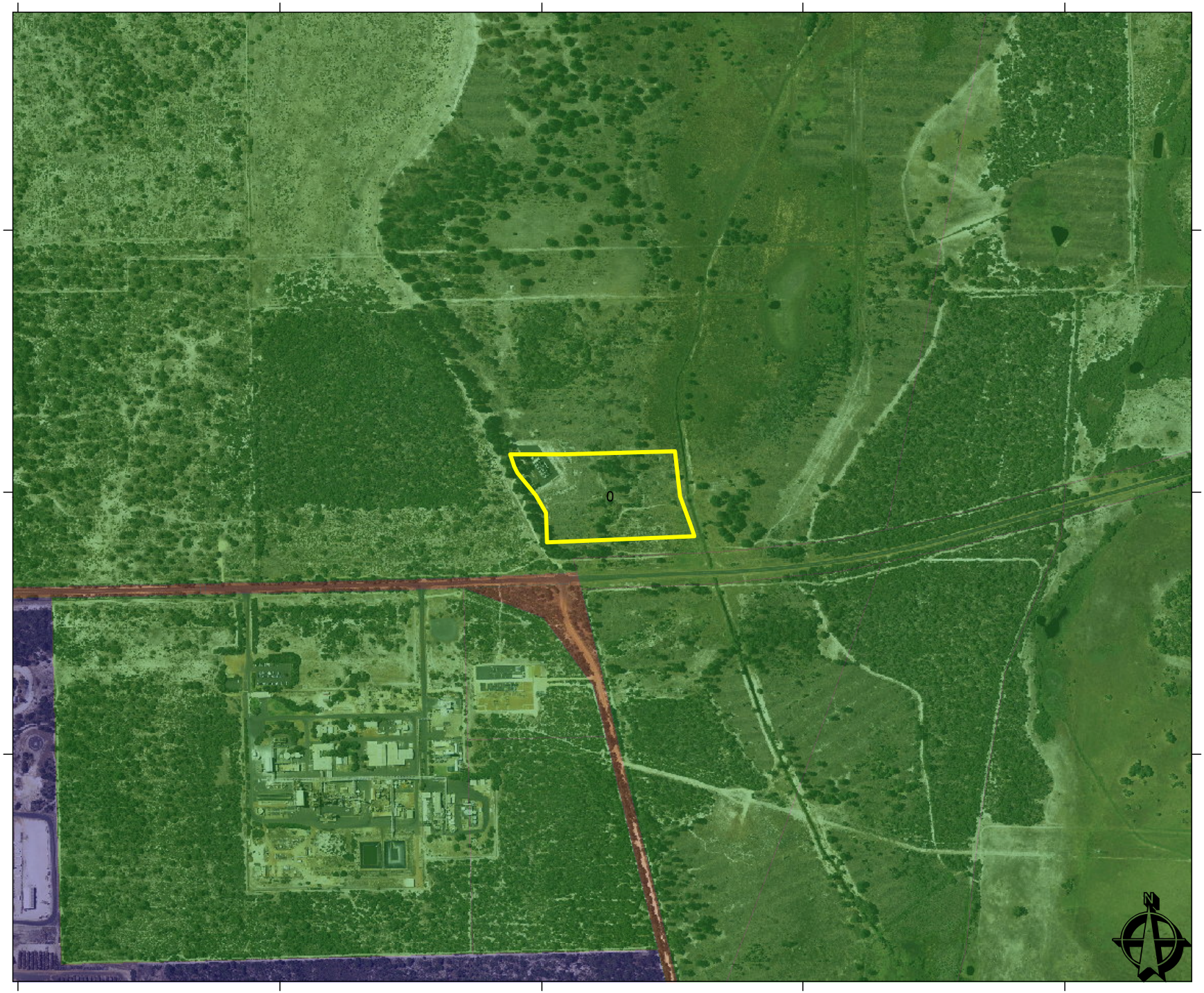
Proposed 60MW Power station layout



Fuel Lines between Tank and Power Module

Low Voltage Cables between Power Module and 11kV Transformer

11kV High Voltage Power Lines



Legend

- Site Location

Surrounding Land Use

- Crown
- Freehold
- Road

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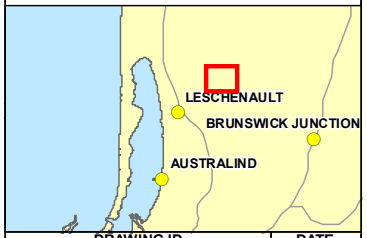

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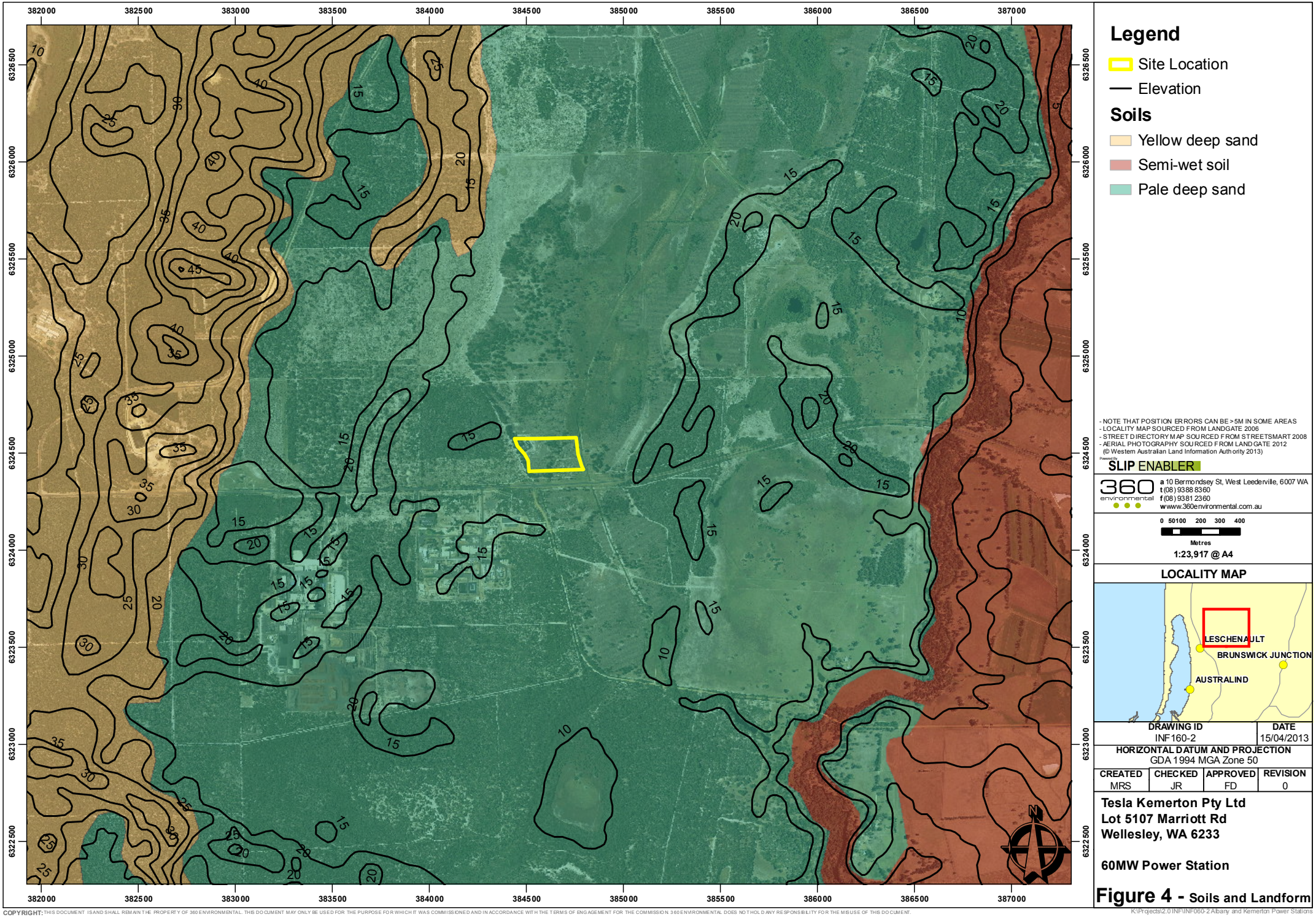
60MW Power Station

Figure 3 - Surrounding Land Use



Legend

- Site Location
- Elevation

Soils

- Yellow deep sand
- Semi-wet soil
- Pale deep sand

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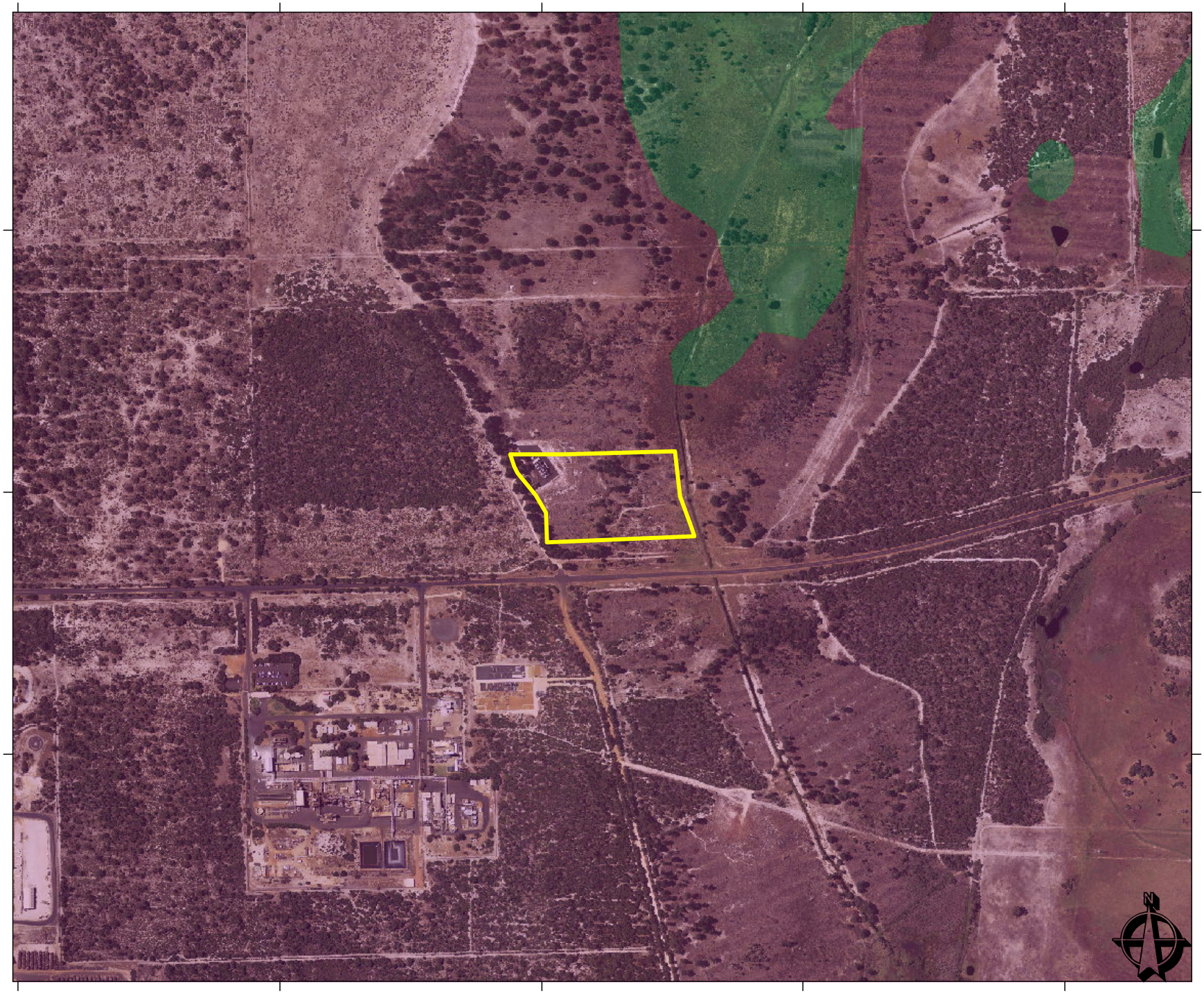
60MW Power Station

Figure 4 - Soils and Landform



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Site Location

Acid Sulphate Soils Risk Category

High to moderate risk

Moderate to low risk

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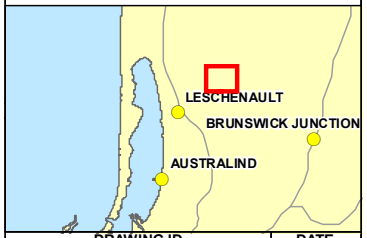

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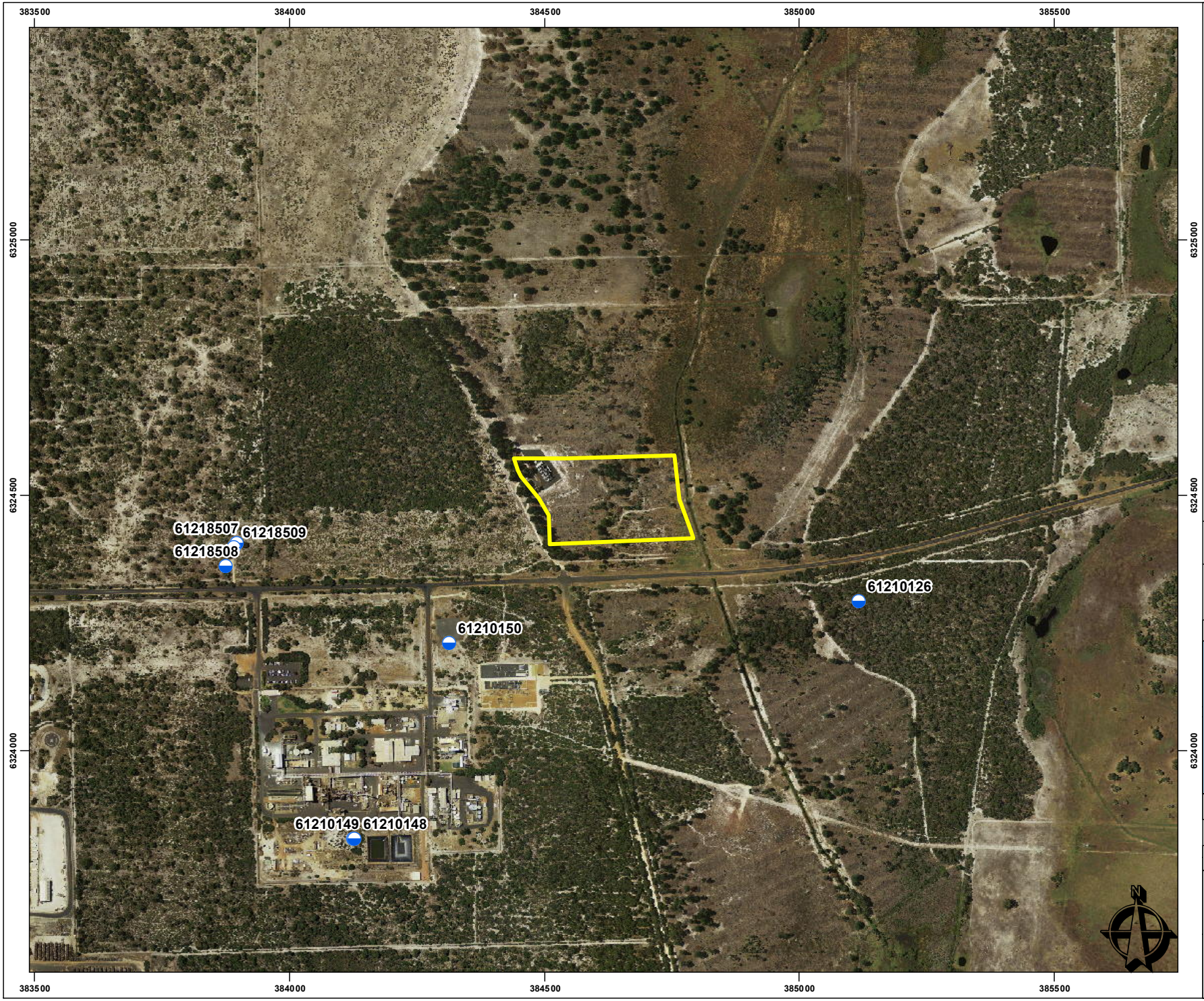
60MW Power Station

Figure 5 -

Acid Sulphate Soils (ASS) Risk



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- Site Location
- WIN Bore Locations

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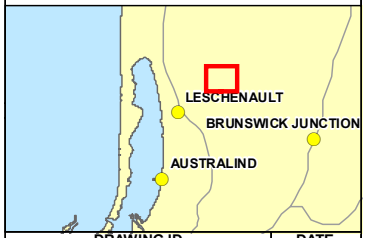

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Lot 5107 Marriott Rd
Wellesley, WA 6233

60MW Power Station

Figure 6 - WIN Bore Locations

Legend

- Site Location

Surface Water Features

- Area Subject to Inundation
- Drain - major
- Earth Dam
- Lake - perennial
- Watercourse - minor, non-perennial

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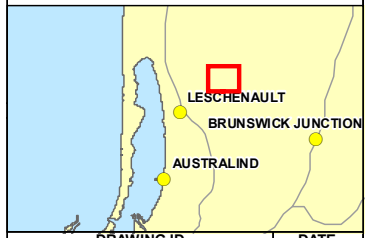

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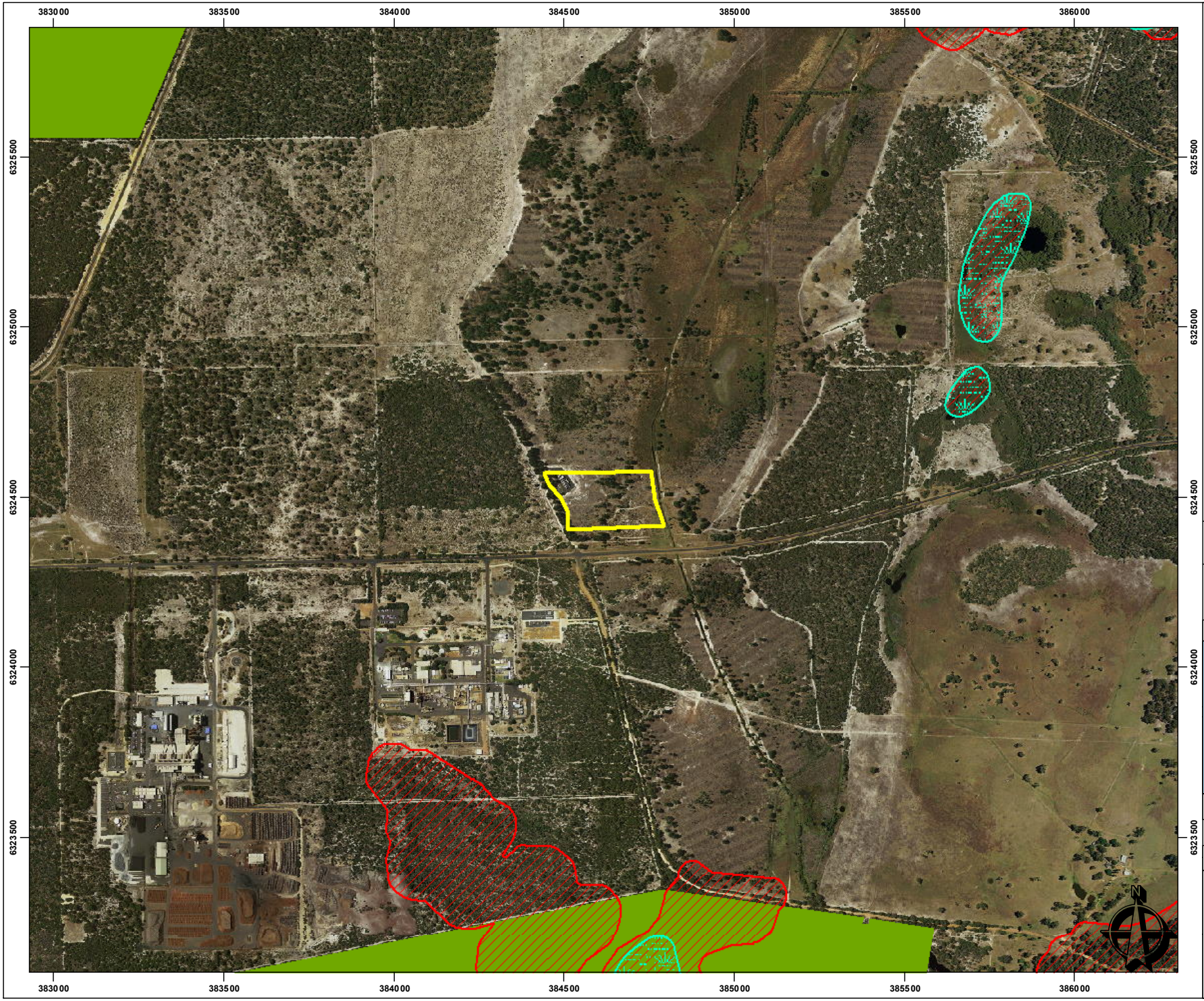
60MW Power Station

Figure 7 - Surface Water



Legend

- Site Location
- Environmentally Sensitive Areas
- DEC Managed Areas
- EPP Lakes

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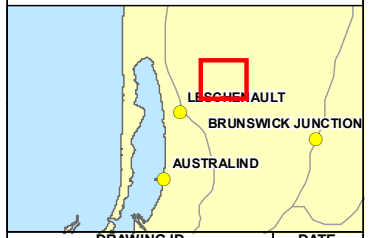
0 75 150 300 450 600

Metres

1:15,000 @ A4

LOCALITY MAP



DRAWING ID	DATE
INF160-2	15/04/2013

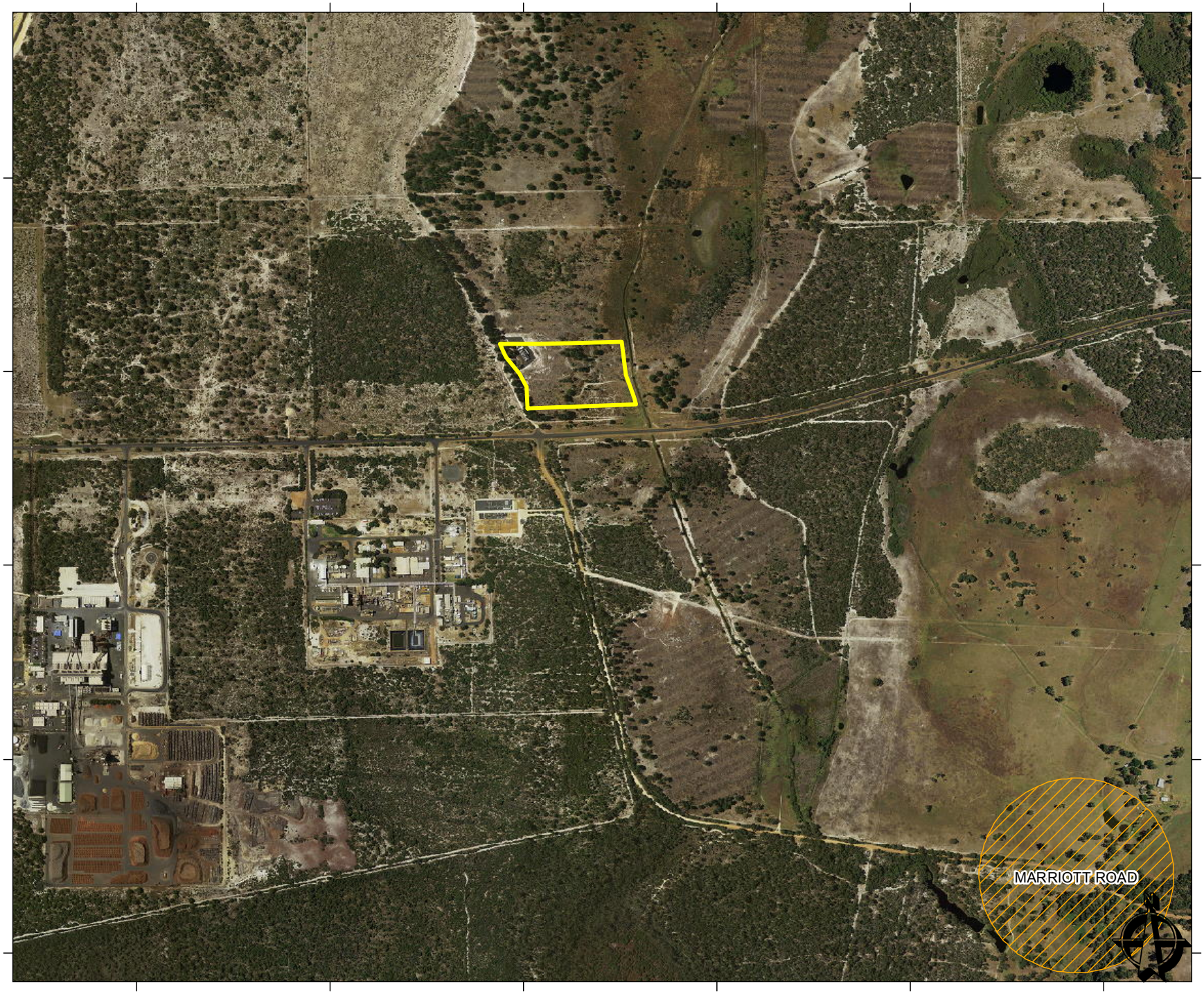
HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Kemerton Pty Ltd
Lot 5107 Marriott Rd
Wellesley, WA 6233

60MW Power Station

Figure 8 - Conservation Areas



Legend

- Site Location
- Aboriginal Heritage Sites

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED FROM LANDGATE 2006
- STREET DIRECTORY MAP SOURCED FROM STREETSMART 2008
- AERIAL PHOTOGRAPHY SOURCED FROM LANDGATE 2012
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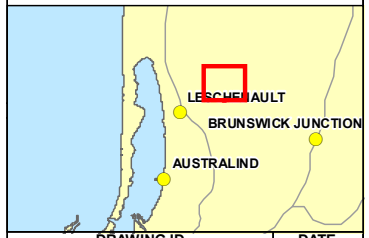
LOCALITY MAP



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CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Kemerton Pty Ltd
Lot 5107 Marriott Rd
Wellesley, WA 6233

60MW Power Station

Figure 9 -
Aboriginal Heritage

K:\Projects\2.0 INP\INF060-2 Albany and Kemerton Power Stations

APPENDIX A

Full Functional Design Specification

ALLIANCE POWER AND DATA

FUNCTIONAL DESIGN SPECIFICATION KEMERTON PEAKING POWER STATION

TESLA CORPORATION

Alliance Power and Data (APD)
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Document Revision Record					
Title:	9.9 MW Diesel Power Station Kemerton				
Job No:	W_APD01991				
Revision:	**Description:**	**Prepared by:**	**Checked by:**	**Approved by:**	**Date:**
A	Draft for Client Comment (not for release)	Michael Lee Steere	Chris Cunningham		10/10/2010
0	Issued for tender	Michael Lee Steere	Chris Cunningham	Ben Tan	27/10/2010

Table of Contents

1. GENERAL

1.1. Introduction

This specification outlines the Tesla Corporation's minimum functional and regulatory requirements and the scope of work for the design, supply, installation and commissioning of a 9.9MWe distribution connected diesel Power Station. The power station is to provide peak lopping capacity into the Western Power SWIS whenever scheduled by the network operator. The power station must operate within the requirements of the Western Power Technical Rules and must deliver the rated capacity to the network under the condition specified in this document. The plant shall be designed to perform at a minimum of 9.9MWe capacity rated at 41 degrees C sent-out to the Western Power network (net of embedded and parasitic loads).

The intent of this specification is to ensure all performance requirements and all necessary standards and regulatory requirements are met and all functionality is included to ensure a compliant design is achieved that will meet the Principal's technical and operational objectives and requirements. It also allows the Contractor the ability to provide a competitive offer based on use of the Contactor's standard plant.

Power station configurations based on Engine Hall or Package Units will be considered as acceptable arrangements for the purposes of this tender and tenderers may offer either or both options.

1.2. Location & Description

The power station will be located at L5107 Marriot Rd, Wellesley. A site location plan is included as Attachment D of this specification.

The power station is to connect to the Marriot Rd zone substation via the Marriot Rd branch of the MRR 516 Marriot Rd East Feeder of open aerial wood pole construction. Adjacent to the site the conductor is 3x19/3.25 AAAC.

There is no reticulated water available at this site.

The site environmental conditions are as described in Table 1.

Table 1: Site Environmental Conditions

Item	Value
Average Ambient Temperature	21.3°C
Maximum Temperature	40.6°C
Minimum Temperature	-3.0°C
Relative Humidity Min	43%
Relative Humidity Max	85%
Elevation	20m
Maximum Wind Speed (Gust)	100km/h
Daily Rainfall Min	Jan/Feb

Daily Rainfall Max	92mm (July 1999)

1.3. Project Program Requirements

The Contractor shall complete the works within the date specified within the General Conditions of Contract and shall demonstrate that it has the capacity to deliver the program within the stated contract delivery period.

1.4. Occupational Safety and Health

The plant shall be designed and constructed to comply with all relevant Occupational Safety and Health regulations and statutory requirements. Consideration shall be given to ensuring the safe operation of the plant during all design phases. Refer to section 10 for further requirements for both construction and operation.

1.5. Resource Efficiency and Sustainability

The design and construction will be compliant with all relevant Federal and State environmental laws, regulations and standards of good practice, as well as local government development approval conditions.

The Contractor where practical and economically viable will seek to incorporate resource efficiency and sustainability principles into the project design and construction activities and outcomes.

Areas of consideration shall include:

- Minimising use of energy including electricity, gas and other forms of energy consumed in the project.
- Conservation of water and promotion of water and wastewater recycling and reuse.
- Avoidance of materials or construction processes that are toxic or create undesirable emissions or discharges.
- Reduction of solid waste from construction activity being disposed of in landfill through increased reuse, recycling and waste avoidance practices.

1.6. Compliance with Western Power Technical Rules

The Contractor shall be responsible for compliance with the Western Power Technical Rules for the South West Interconnected Network as they apply to a dispatchable generator. The Contractor shall indicate compliance by completing the compliance schedules included at Attachment A.

2. SCOPE OF WORKS

The scope of work includes the design supply installation and commissioning of a 9.9MWe power station at a temperature corrected 41 deg C operation, for scheduled operation as a peak lopping power station. It shall be the responsibility of the Contractor to deliver a complete automated and

functional power generating facility, fully suitable for safe reliable and efficient commercial operation.

The system shall include all equipment and systems necessary for the efficient operation of a fully functional power generating facility whether specifically addressed in this specification or not, and shall be compliant with the requirements of Western Power's Technical Rules and Requirements.

All material, plant and equipment shall be new and fit for purpose and wherever possible the facility shall be designed for interchange-ability in alignment with the Principal's desire to maximise commonality of spares. Equipment shall be selected to ensure high reliability and availability with low failure outage rates and minimal inspection and maintenance. Permanent, safe access to all items of plant shall be provided for inspection, operation and maintenance (O&M) activities. Permanent lifting equipment shall be installed where necessary to carry out maintenance.

2.1. Summary of Requirements

The Contractor's scope shall include system design, supply, install and commission all equipment and services required for a fully functional facility. Fully Functional in this context means that, additional services beyond those listed in this section shall be provided by the Contractor if they are:

- Implicitly part of the plant and equipment listed in this section.
- Necessarily required to make listed equipment or services functional for the intended use of the facility.
- Required for the plant to meet State, Federal, Local Government and Statutory Authority requirements, the requirements of all relevant standards and regulations including any special requirements of Local Government.
- Requirements of Western Power for connection to the network.

The facility's features include but are not limited to:

- Generating sets with all necessary ancillary equipment to deliver 9.9MWe to the network under the conditions outlined in this specification including Western Power's Technical Rules and in particular those sections applicable to generating stations of less than 10MWe aggregate capacity. Generator Sets may be packaged units or housed in a Generator engine Hall.
- If an engine hall is proposed then the building shall be designed and constructed in accordance with the requirements of the BCA and in accordance with all relevant Australian Standards. All facilities necessary within the engine hall to properly operate and maintain the equipment shall be provided including provision of capability to remove or replace the complete generator units. The proponent shall outline how all major maintenance including generator replacement will be carried out. Floor ducts shall be provided for cables from the generator to the HV Switchboard.

- Equipment layout including fuel systems, cooling systems, pipework and exhaust shall be arranged so that access is not constrained around each generator and routine maintenance can be carried out safely and efficiently.
- A detailed layout for the engine hall and any associated switchroom shall be submitted to the Principal as part of the Contractor's tender proposal.
- Generating sets to be utilised in the installation for both packaged and engine hall options shall be CAT® 3516B-HD engines fitted with alternator type SR4BHV frame 2770 or equivalent with reactive power capabilities as good or better than those indicated in the chart included in Attachment K.
- Each generating unit to be self bunded.

Generating plant features include but are not limited to:

  - A diesel fuel system complete with all necessary pipe work and transfer pumping systems, bulk and daily service tanks with as a minimum sufficient capacity to provide for fuel for 20 hours of continuous operation at full load. All fuel storage systems to be double walled and all generating plant to be self bunded to prevent oil or fuel contaminants entering the ground. All other storage areas to be adequately bunded as per Australian Standards.
  - Buildings, enclosures or engine hall, plant and site to be acoustically treated to achieve a noise emission level at the site compliant with the relevant environmental standards and based on a fully developed subdivision.
  - Exhaust stack design will ensure that the discharge point is sufficiently high to ensure that any particulate matter is adequately dispersed to meet the Environmental Protection Act and any other relevant environmental standards.
  - All required electrical power distribution systems necessary to deliver the electrical energy to the network in accordance with applicable standards including the network interface transformer.
  - All required electrical switchgear and distribution boards necessary for the efficient function of the power station.
  - All necessary protection, controls and monitoring to ensure the efficient protection, control and operation in accordance with the applicable standards and in particular Western Power's Technical Rules and the Principal's requirements.
  - Provision of a communications link acceptable to Western Power to link the power station RTU to the Western Power substation RTU. The Contractor shall if feasible provide a radio communications link however if after a field strength analysis it is not possible to achieve a suitably reliable radio communication link to the Contractor shall provide the alternative Western Power approved solution which may include a Telstra ADSL landline solution or Telstra PSTN Remote

Telemetry solution.

- Provision of a Telephone/Internet connection (an ADSL enabled telephone connection if possible).
- All required transformer earthing system design and installation to satisfy the requirements of AS2067-2008.
- Soil resistivity testing has been conducted and results are in Attachment I. These results are to be used to produce a soil model for the earthing design above.
- All equipment provided to be brand new, supplied with associated manufacturer's warranty.

- Civil works including surveys, site preparation, site services, foundations, drainage, cable trenches, roads, paving, landscaping and fencing to regulatory Authority requirements. The regulatory Authority include but are not limited to:
  - Local Government bodies;
  - State government bodies;
  - Federal government bodies;
  - Statutory authorities
- In particular the following organisations have an interest in this project:
  - Department of Environment and Conservation; and
  - Water Corporation;
- - These services include, but are not limited to:
  - Site preparation – including clearance, excavation, filling and site grading;
  - Site access roads and hardstand areas to suit the site layout and purpose;
  - Acoustic attenuation works, where required, to meet noise limits according to Environmental Protection (Noise) Regulations WA 1997 and a site boundary noise reading of 65dBA;
  - Storm water drainage systems including oil/water separators and storm water retention and disposal systems if required. Refer to the site Geotechnical report in Attachment J;
  - Utilities and underground services;
  - All fencing, including security fencing and gates;
  - Landscaping;
  - Site Signage;
  - Embankments and berms;

  - Foundations and associated works necessary for all plant and equipment supplied within this Contract, including but not necessarily limited to:
    - Bunded areas for all fuel, lubricating and other oils and chemicals.
    - Transformer foundations and site bunding.
    - Package Generator foundations.
    - Sumps and similar containment structures with discharge facilities.
- Buildings works including the Engine Hall if proposed, Electrical HV switchroom with associated cable trenches and building foundations and floor slabs :
  - All power and lighting to buildings.
  - Site security system, area lighting and fire protection equipment.
  - An appropriately sized reverse cycle split system air conditioning unit is to be installed in the Electrical switch room and will start automatically once the building temperature exceeds a customer adjustable preset temperature of nominally 30^{o} C.
- Approvals including all submissions, approvals, permits, authorisations, licenses etc in order to complete the Works and any costs associated with such approvals, etc. The Contractor shall be responsible for submitting all statutory and design code calculations for third party verification, and obtaining such approvals as required.
- Supply design drawings, as-constructed drawings and comprehensive, fully cross-referenced O&M manuals covering all aspects of the operation and maintenance of the facility; and
- Warranty, as described in the General Conditions of the Contract.

3. LIMITS OF WORK

The Contractor will have responsibility for the delivery of a fully functional system in accordance with this specification and for all approvals and all Works within the site to deliver the project.

The Contractor is to provide space within the HV switchroom to accommodate Western Power's 22kV switchgear, metering equipment and RTU and is to accommodate the Western Power cabling requirements within the design of its cable access system. A typical switchroom layout to meet the requirements of Western power is provided in Attachment B.

The switchroom to remain separate from the engine hall or packaged generators with a minimum of a 2 hour fire rated barrier.

Connections to all services to the site including water, HV Electricity supply and Telephone connection are the responsibility of the Contractor.

The Contractor is to provide all necessary drawings and plans to facilitate the approval for the development of the site.

Prior to submission for approval the Contractor shall provide the complete design drawings to the Principal for review.

Drawings submitted to the Principal shall include all Electrical, Mechanical, Communications, and Civil design drawings for the project. The Drawings shall be compiled in AutoCAD 2007 or Microstation V8 format.

4. APPROVALS BY CONTRACTOR

The preliminary design shall be submitted by the Contractor to the Principal for review prior to submissions for approval by any statutory authorities or Western Power.

The Contractor is to obtain the following approvals:

- Western Power for the connection of the facility to the network.
- All other statutory approvals necessary for the completion and operation of the works.

Note that whilst the Principal has primary responsibility for the Development and Environmental approvals for the site, the Contractor is responsible for providing all necessary supporting documentation and must collaborate with the Principal to enable the Principal to achieve the successful development and environmental approvals for the project.

4.1. Western Power Approvals

4.1.1. Design Approval

The Contractor shall design the proposed power station and compile a submission to Western Power for approval of the design. The submission signed and certified by an NPER Registered Professional Engineer, will be submitted to the Principal for review prior to the submission by the Principal to Western Power.

The submission shall include but is not limited to (subject to Western Power requirements):

- A Single Line Diagram;
- SCADA and Communications Key Diagram;
- An Earthing Diagram;
- Lightning Protection Diagram;
- Protection Schematic;
- Site Layout;
- Building layout plan;

- Substation Layout;
- Site Power and Lighting Layout; and
- Earthing Design.

4.1.2. Commissioning Certification Approval

The Contractor shall, prior to connecting to the network for testing and commissioning, obtain Western Power's approval for commissioning as follows.

- Confirm to Western Power by an NPER registered Professional Engineer that the information contained in Schedule A and that required by Attachment 10 of the Technical Rules is correct and up to date.
- Arrange for an NPER registered professional electrical engineer to certify by completing Schedule C Part 1 that the facility complies with the Technical Rules, manufacturers recommendations and good practice and is ready for testing and commissioning in accordance with the requirements of Attachment 12 of the Technical Rules
- Submit the completed forms and any associated documentation to the Principal who will lodge it with Western Power.

Western Powers approval for commissioning is marked by the signing of this form.

4.1.3. Approval to Operate

The Contractor shall obtain Western Power Approval for the connection of the facility to the network in the manner described below.

Following commissioning and testing but prior to connecting the facility to the network for normal operation the Contractor shall arrange for an NPER registered professional engineer to certify by completing Schedule C Part 2 that the facility complies with the Technical Rules, manufacturers recommendations and good practice and is ready for normal operation.

The Contractor shall submit the completed form and any other associated documentation to the Principal for submission to Western Power.

Western Powers signing of the form will mark the approval for network connection.

4.2. Site Development Approvals

With the exception of the Development Approval and the Environmental Approvals the Contractor shall make all necessary submissions and obtain all necessary approvals and licences from any relevant Authority for all development off and on the site. For Development and Environmental Approvals the Contractor shall provide all necessary supporting documentation and assistance as is necessary to assist the Principal in achieving the approvals.

The submissions for approval shall include, but not be limited to:

- Generator Engine Hall if proposed and associated auxiliaries bulk and service fuel tank installation;
- Generator enclosures if proposed and associated auxiliaries and bulk and service fuel tank installation;
- Transformer, Generator and fuel storage structure and foundations;
- HV Switchroom this is to be a separate building with a 2 hour fire separation from the generator hall of generator enclosures.
- Lighting and antenna masts, as required;
- All necessary fencing including security fence;
- Services;
- Fuel and oil containment;
- Noise emissions;
- Site Drainage; and
- Access road crossovers and internal roads.

5. TECHNICAL REQUIREMENTS

5.1. Civil, Structural and Architectural

All civil, structural and architectural design and construction shall be carried out in accordance with the latest edition of the Building Code of Australia, other relevant codes, standards and all applicable statutory regulations and shall meet the requirements of the Local, State and Federal Authorities. The Contractor to provide a layout for a package generator or generator hall installation, and must ensure that the layout meets all site constraints and Authority requirements.

All designs shall be certified by a NPER registered professional engineer.

The Civil works shall include a 1.8m high cyclone mesh fencing with 2 strands of barbed wire on the perimeter of the site, matching gates and security locks.

5.1.1. Site Survey

The civil works required shall include all site investigations and data collection, as deemed necessary by the Contractor.

The Contractor shall provide the following site survey functions:

- Initial site survey including all services for design and planning purposes.
- Set out all components of the work.
- Carry out “As Constructed” surveys and provide final site drawings.

The Contractor shall be responsible for fully assessing the actual surface and sub-surface ground conditions applicable to the overall site, for the plant, by their own detailed site investigation. The Contractor shall be fully responsible for arranging a site survey, hydro geological, contamination and hydrological investigations which may be necessary to fully assess surface and sub-surface conditions on site.

5.1.2. Earthworks

The Contactor shall provide all earthworks necessary both for the establishment of the site and for the completion of all the Works under the Contract as approved by Authorities, including but not limited to;

- Leveling and filling of the site,
- All underground services,
- Site drainage and storm water run-off capability,
- Roads and paving, relocation and making good any roads and boundaries altered during the construction works and the provision, and removal on completion and making good, of any temporary services as required.
- A 25mm layer of blue metal is to be applied across the entire site area with the exception of landscaped areas or as per Council Requirements.
- It is proposed that internal areas trafficable by vehicles will be constructed using road base or crushed limestone then covered with 25mm layer of blue metal or as per Council Requirements.
- The Contractor shall provide a layout design drawing showing the location of the access roads and all site equipment and buildings with internal driveways and street access shown. All nominated access driveways shall be designed to carry the vehicle and plant loads that are anticipated during construction and for the effective operation of the site. The design drawing is to be submitted for review by the Principal prior to development approval and works commencement.

5.1.3. Foundations and Concrete Works

The Contractor shall provide all plant foundations and substructure systems.

All concrete work shall be carried out in accordance with AS 3600. All concrete elements are to be designed in accordance with Australian standards for foundations, structural design, material selection and production. Concrete elements retaining liquids, or required to be watertight shall be designed in accordance with AS 3735.

All designs shall be certified by a NPER registered professional engineer

Substructures, including basins, pits, and foundations for buildings, superstructures, machines and equipment shall be of a quality and rigidity fit for the intended service and environmental conditions.

The structures shall be founded in such a way that settlements are limited to meet equipment supplier's requirements.

The foundations and sub-structures shall be able to transfer all actual load combinations, including dynamic, horizontal and uplift forces, safely to the support soil material.

The Contractor shall analyse (including sub-soil reactions), design and construct the main machine foundation so that no vibration problems occur during operation. The main machine foundations shall be isolated from adjacent construction in order to minimise transmission of vibrations to surrounding structures either directly or through the soil. The design of the foundations for the diesel generator shall ensure that all criteria including vibration, thermal effects, short circuit torque forces and mechanical resonance and critical concrete tolerances are fully accommodated. The design of the foundations for the diesel generators and other plant foundations subject to dynamic loads shall be in accordance with DIN 4024 : Part 1 (1988) "Machine Foundations" and CP2012: Part 1 "Foundations for Reciprocating Machines".

The transformer support substructures shall be designed to contain any escaping oil. Segregated ducts shall be provided for any cables installed within the substructures.

Each transformer compound shall comply with the requirements of AS 2067-2008 clause 6.7.11 and be provided with oil sump pumping out facilities for use of portable pumps when necessary. Note example of oil containment for transformer compounds are included in Figures 6.3 to 6.8 of AS2067-2008.

Where required by relevant Australian Standards or BCA or Western Power or government standards or regulations, fire resistant walls are to be installed to the sides and rear of the transformer to prevent fire spreading from one compound to any other adjacent structures. Firewalls shall be designed for a minimum 2 hour fire resistance. Refer to AS2067-2008 Table 6.1 G1 separation requirements between transformers-to-transformers and transformers-to-fire resistance surfaces of minimum 2 hours fire resistance. The dimensions of each compound shall be adequate for installation, operation, removal of the transformers, and to allow for sufficient cooling of the transformers.

5.1.4. Piping, Conduits, Trenches and Pits

The Contactor shall provide all underground piping and services required to support the new power station including connecting to any existing underground piping and services.

The Contractor shall ensure that where acid sulfate soil is encountered that the Department of Environment and Conservation Acid Sulfate Guideline document is followed.

Pressurised water pipes, gravity drains and electrical and communications cables, outside of the main plant buildings shall be placed underground to give the least disruption to plant access during construction, operation and maintenance.

Underground services shall have sufficient cover over all pipes to prevent damage due to equipment, machinery and vehicles during construction, operation and maintenance and should meet statutory requirements.

Identification and protection tapes shall be laid in the backfill 150mm above electrical services as a marker to prevent damage during later excavation within the vicinity of the services.

Cable pits, where required, shall be pre-cast concrete or similar. Pit covers shall be rated to sustain the expected loading from pedestrians and site traffic applicable to their location on the power station site. Cable pits shall be designed with appropriate drainage to prevent the accumulation of water within them.

All electrical cable ducts shall be installed not less than 750mm below ground level and shall be plugged with suitable end caps. Draw wires shall be provided in spare ducts. When the ducts are installed prior to the main cable trenching, marker tape shall be installed 150mm above the duct.

In trafficable areas all conduits shall be encased in mortar with the remainder of the trench filled as applicable to resist external loads.

Particular attention shall be paid to the arrangement of conduits into and out of cable pits so as to ensure the appropriate cable bending radii are complied with.

5.1.5. Signage

A 2m X 1 m sign shall be erected on the fence adjacent to and to the left of the main gate

The sign shall be professionally printed onto a powder coated 3mm aluminium sheet

The graphics, colours and fonts will be agreed with the Principal prior to placement of order

The wording shall state

TESLA CORPORATION

AUTHORISED ENTRY ONLY

IN CASE OF EMERGENCY CONTACT (Number to be advised)

5.1.6. Water Supply

At sites where water supply is available, the Contractor shall connect the water supply to the site and provide outlets where necessary and convenient for the proper functioning of the plant and associated facilities, and for compliance with all relevant regulations and standards and the requirements of all statutory bodies including local government.

There is currently no reticulated water supply available at this site.

5.1.7. Bunding Of Facilities

All installations containing oil and corrosive substances shall have bunding and drainage in accordance with AS 1940 and AS 3780, as applicable.

Mechanical equipment with oil tanks and tanks with chemicals shall be provided with a bund to contain any spillage.

Storage or handling systems for hazardous substances, that may react dangerously when mixed, shall not be located in common containment bunding arrangements. Similarly containment areas of hazardous substances that may adversely react in the presence of water shall be enclosed within suitable weatherproof structures and protected against the ingress of water. Containment bunds shall be suitably graded.

5.1.8. Environmental Compliance

5.1.8.1. Environmental Legislation And Guidelines

The Marriot Road development must conform to all relevant environmental legislation including:

- Environmental Protection Act 1986; and
- Environmental Protection (Noise) Regulations 1997.

Other environmental guidelines and codes of practice relevant to the Marriot Road development include:

- Australian Standard AS1940:2004: The Storage and Handling of Flammable and Combustible Liquids;
- National Environment Protection Council - National Environmental Protection (Ambient Air Quality) Measure (NEPM) 2003; and
- National Environmental Protection Council - National Environmental Protection (Air Toxics) Measure (NEPM) 2004.

5.1.8.2. Noise

The Contractor is responsible to demonstrate and document that the proposed Marriot Road development will be compliant with the WA Environmental Protection (Noise) Regulations 1997. This should be undertaken in association with the Environmental Authority Guidance for the Assessment of Environmental Factors - Environmental Noise - May 2007. As a minimum, it will be necessary to detail the following aspects such that they can be included as an appendix to the Works Approval application:

Project Characterisation

- Operational Information (plant noise sources, levels, operating hours, etc);
- Identification of assessment criteria and sensitive receiver locations; and
- Estimation of existing ambient noise levels at sensitive receptor locations.

Environmental Characterisation

- Characterisation of local meteorological parameters;
- Topography and noise barriers; and
- Establishment of "worst case" conditions.

Modelling During Operations

- Establishment of a site specific noise model;
- Provision of various scenarios including worst case conditions;
- Noise level prediction at sensitive receptor locations and surrounding industrial and residential areas; and
- Noise level prediction at site boundaries to allow for future development adjacent to site.

5.1.8.3. Construction Environmental Management Plan

The proposed development will be constructed in accordance with the conditions listed within a Construction Environmental Management Plan (CEMP) as prepared by the Contractor and approved by the relevant environmental regulator. As a minimum, the CEMP will detail the following:

- Acid sulphate soil management.
- Air quality and dust management.
- Hydrocarbon management.
- Spills and contamination.
- Erosion and sediment control.
- Noise and operating hours.
- Waste management.
- Complaint handling.
- Environmental incidents and emergencies.

5.1.8.4. Environmental License

The proposed Marriot Road development will be compliant with the relevant conditions listed within the Environmental Licence.

5.1.8.5. Hydrocarbons

To ensure impacts to the surrounding environment are minimised, hydrocarbons will be stored and managed in accordance with Australian Standard AS1940:2004: The Storage and Handling of Flammable and Combustible Liquids.

5.2. Generator System

The Generating System to utilise CAT® 3516B-HD engines or equivalent and be fitted with Alternator type SR4BHV frame 2770 or equivalent with reactive capabilities as good or better than those included in the chart contained in Appendix K.

The Generating System shall be delivered, installed and commissioned as a complete working system and includes;

- Diesel Engines;
- Alternator;
- Engine Controller;
- Voltage Regulator;
- Control systems;
- Electrical protection systems;
- Necessary ancillary equipment ie. Air cleaner, Cooling, Exhaust, Fuel system, lubrication, starting, batteries, etc.; and
- Installed to comply with Environmental Protection (Noise) Regulations 1997.

The generator shall be capable of supplying 9.9MWe power output at 41 deg C for the expected range of operating conditions at the point of connection with Western Power. The proponent shall provide in its submission a de-rating curve for the generator that indicates the generators performance between 33 degrees C and 50 degrees C and certifies its performance at 41 deg C.

The generator starting system shall be capable of reliably starting the generators under all conceivable conditions including all environmental conditions and when there is no mains power available at the site. The batteries shall be adequately sized to perform a minimum of four, three second fail to start cranking sequences in succession without becoming discharged. The battery charging system shall be a two rate, equalize and float system having the capacity to restore full battery charge from a fully discharged state within 5 hours.

The installation needs to be compliant with the Western Power Technical Rules & Schedules. The generator shall be capable of operating at its Maximum Continuous Rating [MCR], at rated frequency, at a voltage that may vary between the limits stipulated in the Western Power Technical Rules & Schedules and deliver the range of reactive power specified therein.

The generator emissions shall meet all current relevant Australian and Western Australian standards for this class of facility. The Contractor shall provide evidence that the installation complies with the relevant standards and the requirements for any statutory approvals that may apply.

The generator and exciters shall comply with the requirements of the relevant sections of AS 1359, Western Power Technical Rules and any local requirements. The generator insulation systems shall be suitable for the intended purpose in accordance with IEC 60085.

The generator and prime mover shall also be capable of supplying the rated output, at rated voltage and power factor, at a frequency that may vary between the extreme limits stipulated in the Western Power Technical Rules for the specified duration.

The generator enclosure or engine hall shall be adequately ventilated to provide an acceptable level of temperature control for maximum ambient temperatures of up to 50 degrees C by use of suitably sized electrically operated ventilation fans drawing air through acoustic weatherproof louvers.

The generator shall have a short-circuit ratio that is acceptable within the Western Power Technical Rules requirements. The generator terminals shall comply with AS 60137 and shall be suitable for the proposed busbar or cable connections.

The generator shall be designed to withstand, without incurring any damage, the forces experienced during the following conditions:

- Three phase short-circuit fault, with zero impedance, applied at the generator terminals.
- Line-to-line fault, with zero impedance, applied at the generator terminals.
- Out of phase synchronism to the distribution network, with the voltage 120° out of phase.
- Line-to-ground fault, with zero impedance line-to-ground.
- Fault clearance.

5.3. Fuel System

The fuel system for the power station will consist of one approximately 35,000 litre bulk tank and one 10,000 litre service tank to provide greater than 20 hour power station runtime capacity (subject to engine fuel usage rating). The supplied system shall comply with all required laws, regulations and standards. The system shall be compatible with the fuel specifications detailed in Appendix H.

The Proponent shall detail the plants capability of use of other fuels including but not limited to bio diesel and recycled fuels. The Proponent to provide any additional cost and performance impacts (if

any) of modifying the generation units to use these other fuels. The Principal to review the proposed fuel alternative, and have the right to refuse the alternative fuel proposed.

All tanks shall be integrally bunded (double walled) and monitored. In areas where bunding is required a sump shall be installed in the floor of the bund to enable the bund to be emptied during a leak or spill.

The service tank will act as a manifold for all engine fuel (supply and return), to allow bulk tank system isolation during maintenance activities and minimize sediment transfer (settlement in bulk tank) and to keep the fuel within the capability of the engine fuel system (fluid level, pipe lengths and restriction). The system shall be capable of recycling the fuel between the service tanks and the bulk tanks via a return line in order to prevent settlement and contamination.

Transfer between the bulk tank and the service tank shall be carried out by a transfer pump system which is to be controlled by the fuel level of the service tank. Once the level of the tank reaches a predetermined minimum the transfer pump shall switch on to replenish the service tank from the bulk fuel tank and shut off at a predetermined maximum on the service tank. The service tank shall be shared by all the generator sets. Transfer from the service tank to the engine systems shall be done by the engine driven fuel transfer pump.

Provision shall be made for filling of the system at the bulk tank by camlock nozzle. For mitigating risk, i.e. transfer system failure or bulk tank isolation the service tank shall be able to be splash filled. Standard industry equipment is to be used throughout.

The Contractor shall provide a security system to prevent theft and malicious damage, including locks, pad-locks, security alarm and tamper alarms connected to the station monitored security system. Video surveillance shall also be provided through the site security cameras.

The fuel system shall be fitted with sensors to monitor fuel levels and alarm when remaining fuel falls below a customer adjustable preset level. The fuel level status shall be monitored by the high level controls and shall be available remotely via the site internet VPN connection.

The fuel system shall be designed to the appropriate Australian Standards and also to Caltex Tank specifications including those listed in Section 10 Laws, Regulations, Codes and Standards.

The fuel system design must be compatible with the safe operation requirements of Caltex Australia Limited who are the fuel supplier for the station. Some requirements are included at Attachment G however, the design must be compliant with all Caltex safe fuel handling guidelines and requirements.

5.4. Electrical Requirements

The complete electrical installation must comply with the requirements of the Western Power Technical Rules and the Contractor shall undertake the design, supply and construction in a manner that ensures compliance is achieved. The Contractor shall indicate compliance by completing the compliance schedules included at Attachment A.

A typical electrical arrangement for Tesla peaking plant is as shown in the Single Line Diagram (SLD) at Attachment C.

The SLD is included for guidance only and shows the circuit breaker and control arrangements envisaged for the plant but does not set the design for the facility. The number of Generators required to deliver the specified 9.9MWe to the grid and design of protective and control elements necessary to comply with the Western Power Technical Rules is entirely the responsibility of the Contractor.

Western Power no longer requires the provision of a Customer Paralleling Switch (CPS) and the functions of the CPS can be installed at the Customer Main Switch (CMS) as indicated in the typical Single Line Diagram.

Western Power requires a total of two CMS's to be installed in series at the property boundary. The reason for this requirement is to provide adequate backup protection if the main CMS fails to operate.

Each generator must have a dedicated Generator Main Switch (GMS) with the required protection elements to protect the generator unit in compliance with this specification, the relevant Australian Standards and the Western Power Technical Rules (refer to Table 1 at Clause 5.4.10).

The arrangement shown anticipates generation at 11kV and a single step up transformer with a delta connected 22kV winding for connection to the network. Should the Proponent wish to use a different step up transformer arrangement this should be detailed in its proposal and will be considered by the Principal.

5.4.1. HV Switchroom

The Contractor is responsible for the design supply, construction and commissioning of the HV Switchroom. The HV Switchroom will also function as the control room for the station, housing the Western Power RTU, controls system interface, the high level controls and UHF/Telstra Communications equipment. The HV switchroom design shall be submitted to Western Power for approval prior to ordering of equipment or commencement of construction.

Western Power substation requirements are captured in the following documents available from the Western Power Website (http://www.westernpower.com.au/mainContent/connectionsUpgrades/policiesRegulations/technicalDocumentation.html);

- Distribution Substation Manual – Specifically Section 1-10, Section 3-22, Section 6-2, Section 6-4 and Section 6-6
- DSB 95/6.

5.4.2. Substation and Switchroom Layout

The Contractor shall develop a layout plan that incorporates, but is not limited to, the following requirements:

- The Western Power 22kV connection and metering equipment as per Western Power approved connection arrangement (For Western Power requirements refer to the Distribution Substation Manual and DSB 95/6 mentioned in Clause 5.4.1 – HV Switchroom).
- The 22kV circuit breakers for the Customer Main Switches for the installation.
- The 11kV circuit breakers for generator protection, isolation, control and synchronisation.
- Western Power RTU.
- 50V Power Supply and battery bank for Western Power RTU.
- UHF/Telstra Communications Link for connection to the Western Power Zone Substation RTU.
- High level / supervisory control station with PC, SCADA and Desk.
- Enclosed rack unit to house:
    - Western Power station RTU.
    - Cable interface and terminations.
    - Radio/Telstra communication link equipment.
    - High level control system interface.
    - UPS and battery supplies to support all operation of critical loads for a minimum of 8 hours.

The design is to consider all Western Power standards and requirements for design of substations housing Western Power equipment, including access and egress requirements (refer to Western Power Distribution Substation Design Manual).

5.4.3. Security System

A site security system shall be installed with remote monitoring capabilities to a manned security centre. The security system shall include a minimum of 6 Infra Red capable site security cameras, entry trips to site gate and switchroom, tamper alarms on fuel systems, alarm controller with remote alarm and monitoring capabilities. The site audible alarm must comply with Local Council regulations for noise levels.

The security system camera controller shall include the capability for selecting and viewing of camera images remotely via the VPN connection. The system must continuously record and store camera video and have the capacity for at least 2 weeks video records available on its hard disk for later retrieval if required.

A security camera or cameras need to be positioned to adequately monitor the diesel tanks.

The Contractor shall provide design details of the proposed security system including a functional description of its features and a site layout plan showing location of controls, sensors and cameras for review by the Principal prior to placement of orders or commencement of work

5.4.4. Fire Protection & Emergency Management

The fire protection systems and emergency management plan for the station shall meet the requirements of the relevant fire & safety standards and must comply with any conditions stipulated by local government or any relevant regulatory authority as a condition of the approval process.

5.4.4.1. Fire & Safety Management Plan

The Contractor shall develop and submit a complete Fire and Safety Management Plan for the power station. The plan shall consider in particular the storage and handling of diesel fuel on site and the requirements for refilling of tanks. The plan shall consider the requirements of the fuel suppliers (Caltex Australia Ltd or relevant supplier) safe operating procedures and be based on industry best practice.

5.4.4.2. Fire Alarm System

A station fire alarm system incorporating a smoke detection system with alarm monitoring via the security system shall be installed inside the HV switchroom. The Fire alarm shall also be monitored by the high level control SCADA system and an alarm displayed whenever an alarm condition occurs, including where the activated alarm sensor is located.

Each generator shall be equipped with a fire detection sensor connected to the generator main controller. The generator fire alarm signal shall be monitored on the station main fire alarm system and the SCADA system.

Fire detection on the generator shall cause;

- The effected generator set to shutdown, including fans;
- Tripping of the effected generator set circuit breaker and auxiliaries;
- Remote alarm; and
- Isolation of fuel supply (ie. fail safe solenoid).

5.4.4.3. Fire Extinguishers

The Contractor shall provide fire extinguishers and other protection measures as required by the relevant authorities and in accordance with relevant standards. The power station should include as a minimum:

- In the HV switchroom, two 3.5kg CO_2 type extinguishers;
- In each generator enclosure, one 3.5kg CO_2 type extinguisher. Or at each access point to the generator hall, one 3.5kg CO_2 type extinguisher; and
- Any additional units as identified in the Fire & Safety Management Plan.

5.4.5. HV Switchgear

The Contractor is to use only 22kV and 11kV rated switchgear suitable for cable connection. All switchgear must be suitable for the voltage, current and fault levels of the installation and comply with the Western Power requirement for network connected applications and be approved for that purpose.

The switchgear selected should be adequately rated for fault break and fault make operation with the 12.5MVA transformer connected and the site maximum fault level available with both the full generator capacity and maximum network capacity connected.

The switchgear may be withdrawable or may incorporate a switch with a visible open point or use other approved means. To create an isolation point when required for maintenance purposes the switchgear must be capable to be lockable and be fitted with a safety lock.

The Contractor is to use only indoor switchgear that is approved for connection to the Western Power network and incorporates the required protection relays for correct and reliable functioning.

The Contractor shall submit its equipment list identifying the type and manufacturer of the switchgear as part of the design review to be conducted prior to submission of the proposal to Western Power.

5.4.6. 22kV Main Connection

Western Power will provide the 22kV service to the site, metering and isolation of the 22kV overhead connection from the Marriot Road overhead network. Refer to switchroom conceptual layout Attachment B and refer to single line diagram Attachment C. The Contractor shall provide the 22kV circuit breakers and its protection relays and controls. The Contractor is to make space available for Western Power equipment within the HV switchroom and provide for access by Western Power to install and connect the switchgear and metering equipment and Station RTU and other Western Power required equipment. The Contractor is to provide an enclosed rack with space for the associated batteries and power supplies within the HV switchroom.

5.4.7. Transformers

The transformer shall be configured such that the 22kV windings are delta connected and the 11kV windings are star connected and have vector grouping Dyn1. The transformer shall comply with Western Power requirements and preferably have an impedance of 8% or greater.

The transformer shall be rated at 12.5MVA when operating under the installed site conditions for the full range of ambient conditions possible at the site.

The transformer shall be outdoor type fitted with cable connection boxes suitably designed for heat shrink terminations.

The transformer shall be fitted with Bucholz relay and over temperature sensing.

The transformer shall be installed outdoors on a concrete footing and shall be suitably bunded to ensure that in the event of a rupture of the transformer tank the transformer oil would be retained within the bund. The bund should include a sump with access for portable pump when required refer to AS2067-2008 clause 6.7.11 for requirements.

The transformer installation shall comply with the requirements of AS 2067 -2008 and AS/NZS 3000.

Each type of transformer shall have been type tested and compliant with applicable Australian Standard, including but not necessarily limited to AS 2374 and other listed standards. Type test certificates issued by an accredited testing authority shall be provided by the Contractor.

All transformers shall have been subjected to routine tests and be compliant with applicable Australian Standard, including but not necessarily limited to, AS 2374. The routine test reports issued by the manufacturer(s) shall be provided to the Principal by the Contractor.

5.4.8. Cables

All cables shall comply with the relevant Australian Standards for the particular classification and voltage rating of cable and shall be rated according to the requirements of AS 3008-1 with respect to current rating. Voltage requirements shall comply with the requirements of AS 3000-2007. The selected cables including any screens must be adequately rated for the fault levels applicable within the installation.

If the substation is not on the site boundary adjacent to the road reserve provision shall be made for the installation of cable ducts for Western Power 22kV cables from the Lot boundary to the substation. These shall be installed in accordance with Western Power requirements.

All ducts shall be installed not less than 750mm deep with warning tape at 150mm above ducts.

All site HV cables within the station shall be installed in accordance with the requirements of AS 2067-2008. All 22kV cable shall have fault rated screens rated for the network fault level at the point of connections.

All site Low Voltage cables shall be installed according to category A requirements of AS 3000-2007.

5.4.9. Earthing

The Contractor is responsible for the design, including earthing study, supply and installation of the earthing system for the complete site including substations, generators switchroom and all associated facilities. Soil resistivity results are contained in Attachment I.

The Contractor shall provide a single line earthing diagram to illustrate the earthing system to be applied for the total installation. The earthing single line diagram will form part of the Contractor's submission to Western Power for approval.

The design of all earthing facilities shall be in accordance with the requirements of AS 2067-2008 and AS 3000-2007 and shall include a complete earthing design and earthing diagram as required by the standards. The complete design details including analysis, calculations, modelling results and drawings shall be submitted to the Principal for review.

Cable armouring and screens shall be earthed as per AS/NZS 3000-2007 and AS 2067-2008.

The installation shall be tested on completion to confirm it meets the design requirements for step, touch and transfer potential. The test results shall be provided to the Principal or its representative.

5.4.10. Protection

The Contractor shall design, supply, install and commission a protection scheme in compliance with the Western Power Technical Rules and in accordance with Western Power requirements. In addition to complying with the Western Power Technical Rules the scheme shall adequately protect the installed assets from damage due to faults.

All protective devices shall conform to the requirements of IEC 60255 as required in the Western Power Technical Rules.

Generator protection relays can be discreet or integrated with the controller, the Network protection shall be provided by stand alone protection relays.

Protection Settings shall be implemented to adequately grade with the Western Power feeder circuit breaker and comply with any other protection requirements of Western Power. The Contractor shall submit its Protection settings scheme to the Principal for review as part of the submission to Western Power. The Protection scheme should describe how the Western Power requirements are to be met but also describe how the Principal's assets such as the Generators and Power Transformers will be protected. It is anticipated that differential protection will be employed for both categories.

The typical scheme SLD at Attachment C includes the paralleling functions at the Customer Main Switch and it is at this point the synchronisation and connection to the network takes place.

The protection requirements include:

TABLE 1 : Protection Requirements

	PROTECTIVE DEVICE	DESCRIPTION	ANSI CODE
	CMS #1 – supplying the main transformer	Over current	50/51
		Earth Fault	50N/51N
		Sensitive Earth Fault	50G/51G
		Breaker Fail	50 BF
		Restricted Earth Fault	64REF
		Check Synch	25
		Over Voltage	59
		Under Voltage	27
		Transformer differential protection	87T
		Under frequency	81L
		Over frequency	81H
		Rate of Change of Frequency ROCOF	81R
		Directional Overcurrent	67
		Negative Phase Sequence (Unbalance)	46
		Phase Sequence (Voltage)	47
		Reverse Power	32P
		Transformer Temperature	49T
		Feeder Breaker Inter Trip	
		WP NOCC Trip	
		Transformer Bucholz Relay	
		Synchronisation Time Limit	
	CMS #2 – connected between the Western	Over current	50/51

	PROTECTIVE DEVICE	DESCRIPTION	ANSI CODE
	Power network and CMS #1		
		Earth Fault	50N/51N
		Sensitive Earth Fault	50G/51G
		Breaker Fail	50 BF
		Restricted Earth Fault	64REF
		Check Synch	25
		Over Voltage	59
		Under Voltage	27
		Transformer differential protection	87T
		Under frequency	81L
		Over frequency	81H
		Rate of Change of Frequency ROCOF	81R
		Directional Overcurrent	67
		Negative Phase Sequence (Unbalance)	46
		Phase Sequence (Voltage)	47
		Reverse Power	32P
		Transformer Temperature	49T
		Feeder Breaker Inter Trip	
		WP NOCC Trip	
		Transformer Bucholz Relay	
		Synchronisation Time Limit	
	GMS (1- N)	Over current	50/51
		Earth Fault	50N/51N
		Breaker Fail	50 BF

	PROTECTIVE DEVICE	DESCRIPTION	ANSI CODE
		Over Voltage	59
		Under Voltage	27
		Over Speed	12
		Under Speed	14
		Check Synch	25
		Loss of Synchronisation (Pole Slip)	78PS
		Differential Protection (Machine)	87M
		Generator Field Loss	40

5.4.11. Metering of Export Power

The Contractor shall provide metering class CTs on the line side of the CMS to monitor Power and VARs exported to the network and shall install a tariff meter to record export power independent of the Western Power metering system. The metering kWh and kVARh data shall be recorded in the high level control system data base in a format that allows it to be conveniently used to check export energy recorded against the Western Power meter reading data.

Western Power tariff metering data shall also be logged by the control system to enable convenient comparison.

5.4.12. Auxiliary Supply & UPS

The Contractor shall make provision for the necessary supply and back up supply to auxiliary equipment.

Permanent Low Voltage supply will be from a 22kV/415V transformer connected to the 22kV bus upstream of the Customer Main Switch as indicated on the SLD Attachment C. The Contractor will supply and install;

- Low Voltage switchboard or switchboards as necessary to supply all LV loads within the installation.
- All associated LV power circuits for auxiliary services and building and site requirements.

The Contractor shall design, supply and install a UPS complete with maintenance free battery, capable of supplying all protection and controls within the installation for a minimum standby period of 8 hours in the event of supply failure or as per Western Power requirements.

The UPS shall display the following conditions and shall be monitored by the site SCADA system.

a) Mains power failure;
b) Low battery voltage;
c) Inverter output over voltage/under voltage;
d) Static bypass inhibited; and
e) UPS fault.

The electrical output of the UPS shall be 240 V AC ± 10V at 50 Hz. The output frequency shall be 50 Hz ± 1 Hz. Total harmonic distortion shall be less than 10%. The UPS shall provide high-frequency noise attenuation for common-mode and normal-mode, commencing at 10 KHz and exceeding 40 dB at 100 KHz and higher frequencies. Output overload protection (current limiting) shall be provided, capable of supplying a continuous short circuit.

The Contractor shall supply install and commission a 50V DC power supply and battery system capable of supplying Western Power RTU plus the radio/Telstra modem and associated equipment for a period of at least 8 hours. The Power supply shall comply with the requirements of Western Power.

5.4.13. General Building Services and Lighting

The Contractor shall provide all building services (electricity, telephone, computer, local area network, water, HVAC, fire protection, security, site area lighting, sewerage, etc) required for the proper functioning of the plant and ensure that they are readily accessible for maintenance and repair and adequate clearance is provided from main structural members and foundations. All relevant requirements of the Building Code of Australia shall be complied with when designing and installing the services.

5.4.14. SCADA & Communication

The Contractor shall design, supply, install and commission a SCADA and communications remote monitoring and remote control system for the power station to Western Power requirements. This will include all equipment, radios, antennas, modems, licensing, etc. needed for radio communication (or a Telstra ADSL/PSTN communication) with Western Power Zone substation. An enclosed rack will be installed in the HV switchroom for;

- Cable interface and terminations
- UHF Radio/Telstra communication link equipment
- Supervisory Control system interface
- UPS and battery supplies to support all operation critical loads for a minimum of 8 hours
- Western Power's RTU

The Contractor shall supply, install and commission the aerial and radio-modem and interconnection to the Western Power RTU in the Western Power zone substation. The Contractor will require an entry access permit to enter the Western Power zone substation. The Contractor shall undertake its own investigations to determine the requirements for antenna mounting within the zone substation.

If after analysis of the radio field strength shows that it is not possible to achieve a suitably reliable radio communication link the contractor shall provide a Western Power approved alternative which may be a Telstra ADSL landline solution or Telstra PSTN Remote Telemetry solution. The Contractor shall submit details to the Principal for approval prior to proceeding with the proposal.

It should be noted that in line with utility industry standard practice the Western Power RTU serial communications protocol is DNP3 and the radio modems will need to be configured for this protocol.

The communication system should be equipped with sufficient diagnostics and data collection to analyse and disseminate any communication link issues and determine the cause. This is important to distinguish between Principal equipment failures as opposed to Western Power equipment failure.

5.4.14.1. Control System Hierarchy

The Hierarchy for the SCADA system is as shown at Attachment D and shall consist of a high level control system connected with distributed controls located at each generator unit.

The high level control system will provide a HMI via a terminal located in the HV switchroom and will interconnect with the internet via a broad band connection to allow remote control via a VPN connection. The Contractor shall provide the software for the local terminal and two remote terminals. To ensure flexible management of the system the Contractor shall also provide remote desktop capability to the high level controls computer terminal to enable remote use of the SCADA software application via the VPN without the need to install the SCADA application on the remote PC or Laptop.

5.4.14.2. Control System Functionality

The high level control system will interface with the individual controllers associated with each generator unit and manage the synchronisation between generators and to the network. The high level control capabilities will include but is not limited to:

- Station starting and stopping;
- Synchronising and connecting;
- Set export power level;
- Set power factor and voltage; and
- Access to the full range of system performance information.

Graphic screens will provide a logical and schematic layout of the plant on which all key monitored functions, controls and alarms shall be displayed.

The screens will be in two levels, the first will show the whole plant including the HV electrical distribution and circuit breakers. The second level screens will show each of the main generator units in greater detail. The screens shall be controlled by touch screen or selection by mouse.

The screens shall be designed to ensure they are intuitive to operate clear in presentation and simple to understand.

Distributed control units will manage the local control of each generator including engine management functions and the start and stop sequence.

1. High Level Controls

a) Monitoring

Plant faults and alarms from plant including:

- Emergency Stop.
- Low oil pressure.
- Overcrank.
- High water temperature.
- Overspeed.
- Underspeed.
- Undervoltage.
- Overvoltage.
- Fuel level indication and user settable alarm.
- UPS Status.
- Protection system Battery Status.
- Monitoring of real and reactive power (RMS).
- Metering of Power and VARs including exported kWh and kVARh for any user defined period to allow audit of accounts.
- Monitor voltage (RMS).
- Monitor Current (RMS).
- Monitor status of all HV Circuit Breakers.

- Monitor fuel consumption litres/hr.
- Record Engine hours.
- Event Logging active whenever the powerhouse is operating.
- Real time clock.

b) Control functions

- The master control will perform the synchronising and open close control of the Customers main breaker (CMS) and each generator main breaker (GMS).
- Perform critical alarm tripping functions on the Main and Generator Breakers as required.
- Control soft loading and unloading of the generator to the mains.
- Voltage and Power factor control of Generation facilities as required by the Western Power Technical Rules for connection at Attachment A.
- Setting the user defined level of Power and Reactive Power being supplied to the network in customer defined increments (10%).
- Include the necessary programmable logic functionality to include control of the stopping and starting of the station under all operational conditions and alarms.
- Provide an easily interpreted graphic display showing the status of all system circuit breakers and generators and all faults and alarms and monitored engine data.
- Provide a control interface with the Western Power SCADA system.
- Include remote connection capability via internet to provide remote access to permit remote control and monitoring of the complete set of high level functions. Including but not limited to:
    - All monitored values.
    - Event log details.
    - All fuel level monitoring and preset alarm functions.
    - All metering data including export kWh and kVARh.
    - Input pre defined set points for and control of Power (Ws) and VARs.
    - Initiate starting and stopping of the generators.
    - Initiate connection of the station to the network (conditional to Western Power enabling the connection).

- Remote diagnostics functions.

The control system real time clock shall be automatically synchronised to world standard time from a time server across the site internet connection.

c) Protection Functions

The High Level Control system may perform some protection functions other than those associated with the HV Distribution system Protection. Protection functions associated with the generator include Rate of Change of Frequency (ROCOF), Vector Shift and Pole Slip.

2. Distributed Generator Controls

Each generator shall have a dedicated local control unit that shall monitor and control functions associated with each generator and provide an interface with the high level system.

Each unit will have an operator interface with an easily readable LCD graphical display and have a three position key switch to stop, start or auto control mode. The unit shall have the facility to acknowledge alarms and test lamps.

Functions of the low level controls shall include but not be limited to;

- Emergency Stop.
- Low oil pressure.
- Low fuel alarm.
- High water temperature.
- Overspeed.
- Underspeed.
- Overcrank.
- Battery Voltage.
- Frequency.
- Monitoring of real and reactive power (RMS).
- Metering of Power and VARs.
- Monitor voltage (RMS).
- Monitor Current (RMS).
- Record Engine hours.
- Event Logging.

- Real time clock synchronised to high level controller.

3. Western Power SCADA interface

The preliminary list of signals required between the station and Western Power NOCC are contained in Schedule B2 and will be connected directly as digital and analogue signals to the RTU. These will be confirmed by Western Power upon design approval. These shall include:

- Status of Customer Main Circuit Breaker Status – send;
- Trip - receive;
- Close Enable – receive;
- Measured values - send;
    - Active power
    - Reactive power
    - Voltage
    - Battery/UPS fail
    - Protection alarm
- Generator Circuit Breaker Status – send.

5.4.14.3. Communications

The communication between the power station and the Western Power zone substation will be via UHF radio link. It will require radio transceiver modems at the Western Power Marriot Rd Zone Substation and the Tesla Power Station. The Contractor will design, supply, install and commission the communications link, and arrange licensing for the full operational system.

It should be noted that the Western Power RTU communicates serially using the standard DNP3 Electricity Utility protocol and the UHF modems at both the station and the Western Power Zone Substation will need to be configured for this.

The communication link shall be able to re-connect within 5 seconds on drop-out to avoid the possibility of a trip being initiated by NOCC if reconnection is not achieved within the allowed 7 second window.

The Contractor shall install a mast at the power station site for the purpose of mounting the UHF antenna and security camera. At the zone substation the UHF antenna shall be installed on a new mast or roof post. The height of the mast at the zone substation and power station site, to be determined by the Contractor and to be sized to ensure an adequate communications path profile between the Western Power Zone substation and the Tesla Power Station.

Alternatively if after a field strength analysis it is not possible to achieve a suitably reliable radio communication link the Contractor shall install a Western Power approved alternative which may be a Telstra ADSL landline solution or Telstra PSTN Remote Telemetry solution. The Contractor shall submit details to the Principal for approval prior to proceeding with the proposal.

The Contractor should be aware that there are access requirements for entering a Western Power Zone substation. Western Power has preferred providers who are qualified and approved to undertake this work.

6. COMMISSIONING AND TESTING

The Commissioning tests should achieve the following outcomes.

- Demonstrate to Western Power that the system complies with their requirements for connection to the network and achieve approval for connection to the network having passed all testing and inspection deemed necessary by Western Power for such connection. This includes achieving approval to commission and achieving approval to operate as detailed in Schedules C1 and C2 respectively.

- After achieving permission to connect with the network, demonstrate to the Principal that the plant is able to deliver its rated capacity of 9.9MWe to the network on a reliable and continuous basis at 41^{o}C ambient or a temperature corrected equivalent at some lower or higher temperature for a period of at least 1 hour.

- Demonstrate to the Principal that the functionality and performance of the plant meets the specification in all respects including demonstrating all controls and monitoring features operate as required as per an agreed site acceptance test plan between the Contractor and the Principal.

The Contractor is responsible for pre-commissioning, commissioning, functional testing, tests for Plant Readiness, Performance Tests and Reliability Testing of the installation. The Contractor shall submit a Commissioning Test Plan and Schedules to detail all pre-commissioning, commissioning and testing requirements of the installation to the Principal or his representative for approval at least 6 weeks prior to commissioning. The Contractor shall schedule and coordinate commissioning activities with Western Power.

After approval the Contractor shall submit the Commissioning Test Plan and Schedules to Western Power at least 4 weeks prior to commissioning. The test plans shall also incorporate the requirements for compliance with the Western Power Technical Rules, Attachment 10 and Attachment 12. The requirements of Attachments 10 and 12 of the Technical Rules have been included as Attachment F Western Power Requirements: Design Data and Certification Testing and Commissioning. It should be noted that Western Power may change their requirements (including those contained in Attachments 10 and 12) or replace them with other requirements.

Should such changes be introduced the Contractor shall bear any cost associated with those changes.

Technical Rules Attachment 10 includes the Western power design data required for Small Power Stations connected to the distribution system. This data was initially provided by Tesla in spreadsheet format to Western Power and shall be updated by the Contractor during the Design phase and presented to Western Power. It will require updating again by the Contractor prior to connection and will require to be finalised by the Contractor post connection.

Note that the codes associated with Attachment 10 are:

S= Standard Planning

D = Detailed Planning

R = Registered Data (R1 pre connection, R2 post connection)

Technical Rules Attachment 12 Includes the complete Western Power requirements for certification, testing and commissioning of the station. Among other matters it includes the tests that Western Power may perform to verify the system. The Contractor is to cooperate with and assist Western Power in completing the required Western Power certification, commissioning and connection process.

Separate from the Western Power Tests Commissioning Tests for each System shall be performed on a System by System basis to cover the complete installation; and shall include the inspection and checking of equipment and supporting sub-systems, trial operation of supporting equipment, initial operation of the System, operation of the System to obtain data, perform system calibration and corrective works, and shutdown inspection and correction of defects and non-conforming work identified during the Commissioning Tests.

These tests shall include, but are not be limited to; testing of the generator, verification and checking of all protection settings, checking of plant inter-tripping circuits and inter-tripping circuits between the plant and zone substation equipment.

The Contractor shall functionally commission the system from individual process devices through to sequenced operation and complete subsystems, right through to the remote control system facilities.

Prior to the start of commissioning, the Contractor shall ensure that the Principal has been provided with the latest edition of all relevant documents and drawings.

Any additional testing or retesting required by Western Power or the Principal shall be the responsibility of the Contractor and shall be undertaken by the Contractor entirely at the Contractor's expense.

A copy of the completed and signed test schedules for the commissioning test plan shall be submitted to the Principal. The information of the Schedules in Attachment A shall be;

- Schedule A: Part 1 - Updated and compliance confirmed.
- Schedule A: Part 2 - Updated and compliance confirmed.
- Schedule B: Part 1 – Compliance confirmed, where applicable.
- Schedule B: Part 2 – Compliance confirmed.
- Schedule C: Part 1 - Signed by an NPER Registered Professional Engineer.
- Schedule C: Part 2 - Signed by an NPER Registered Professional Engineer following commissioning and testing, prior to connecting to the network.

6.1. Site Acceptance Tests

Site acceptance testing shall be conducted after the Contractor has completed the commissioning tests and met all the approval requirements for connection to the network. The Site acceptance testing will be conducted in accordance with the approved Site Acceptance Test Plan provided by the Contactor to the Principal.

The Contractor shall provide all completed test schedules from the commissioning tests as part of the acceptance process and the Principal will accept the Western Power approvals as evidence that the network protection operation is satisfactory.

Acceptance testing will demonstrate that the system functions in accordance to this specification.

As part of the acceptance testing a load test will be conducted to confirm that the system can deliver its contracted rated output. This test will ensure the station can deliver its rated capacity of 9.9MWe to the network on a reliable and continuous basis at 41^{o}C ambient or a temperature corrected equivalent at some lower or higher temperature for a period of at least 1 hour.

The Contractor will be responsible for the provision of fuel for the site acceptance tests.

7. PROJECT DOCUMENTATION

Comprehensive design drawings for Mechanical, Electrical, Civil and Building facilities shall be submitted for design review by the Principal, at least two weeks prior to placing orders or commencement of construction.

Immediately following final system commissioning a full set of “As Constructed” documentation shall be submitted to the Principal.

Project written documentation shall be submitted in Microsoft Word or PDF format.

Design Drawings shall be in AutoCAD 2007 or Microstation V8 format and shall include;

- Site Layout and Locality plan.
- Single Line Diagram.
- Earthing diagram.
- Control system and SCADA I/O schematics and wiring diagrams.
- Control system philosophy and functional design specification.
- Protection key diagram.
- Switchboard schematics and design drawings.
- Security system layout plans.
- Communication hierarchy.
- Substation Layout.
- Substation design drawings.
- Earthing system layout and design drawings.
- Protection hierarchy.
- Generator enclosure or generator engine hall mechanical drawings.
- Generator enclosure or generator engine hall wiring diagrams light power and control.
- Fuel system layout plan.
- Fuel system design drawings.

Operation and Maintenance Manuals for the complete power station plant shall be provided and shall include as a minimum;

- Monitoring and control systems.
- SCADA system.
- Fuel system.
- Generator system.
- Engine workshop manuals.
- Communication system.
- Fire and security system.

- Fire and Safety Management Plan.
- Protection systems.
- All OEM handbooks, manuals, maintenance recommendations and guidelines shall be included in the material provided.
- A detailed maintenance plan for the site. (Required prior to execution of the Contract)

Note that the detailed maintenance plan should include requirements for all key components including diesel generators, transformers, batteries, fuel installation, switchgear and switchboards. It should also provide a list of recommended spares holdings.

Other documents and software should include;

- All final revision software and PLC Code, including ladder diagrams.
- All equipment manufacturers' manuals.
- All design calculations.
- All approvals from authorities.
- Factory and site test results.
- Commissioning ITP's, including all readings and adjustments made during commissioning.

8. OPERATOR TRAINING

Prior to station handover the Contractor shall provide training for up to four people on the operation of the installation. The training shall cover all areas of operation of the plant, including but not limited to;

- Fuel systems.
- Generator operation.
- Control systems.
- Emergency procedures.
- Maintenance procedures.
- Western Power operational requirements.

9. WARRANTY

The Contractor shall provide 12 Months Warranty against defective parts and labour for the complete installation. All equipment manufacturers' standard warranties must be transferable to

the Principal. The Contractor must warrant the total installation and all equipment and facilities within for a period of five years against defective design.

a) The warranty term must commence upon the Final Acceptance date for the completed system and must continue for a twelve month period.

b) The Final Acceptance will be subject to the successful completion of all Site Acceptance Tests and commissioning tests.

The Contractor shall also provide a performance guarantee on the performance of the Plant to the following requirements:

- 9.9MWe at 41 deg C sent out capacity to the network.
- 9.9MWe capacity available when required with a minimum of 20 minutes' notice.

10. MAINTENANCE AND OPERATION

The Contractor shall be responsible for the maintenance of the plant for 12 Months from the date of practical completion according to the agreed maintenance schedule.

The Contractor shall supply a maintenance plan for the facility which shall include but not be limited to:

- The maintenance program for the facilities in accordance with manufacturers' requirements and good maintenance practice.
- A list of minimum spares holdings for the facility.

The maintenance plan shall include:

- A requirement for the maintenance provider to hold sufficient spares to satisfy the minimum requirements.
- A requirement within the contract with the maintenance provider to include holding of spares within the performance criteria.

The Contractor shall provide a safety management plan for the construction project and a separate safety management plan for the operation of the facility.

11. LAWS, REGULATIONS, CODES AND STANDARDS

The Contractor shall design and construct the facility in accordance with all Laws, Regulations, Codes, Standards, supplier requirements and industry best practices.

The following list is not all inclusive and the Contractor is responsible for compliance to all relevant Laws and Regulations;

AS 1020	Static Electricity Code
AS/NZS 1170-2007	Structural design actions Set
AS 1359	Rotating electrical machines
AS 1210-1997	Pressure Vessels
AS/NZS 1269-2005	Occupational Noise Management Set
AS 1275-1985	Metric Screw Threads for Fasteners
AS 1345-1995	Identification of the contents of piping, conduits and ducts
AS 1349-1986	Bourdon Tube Pressure and Vacuum Gauges
AS 1359	Rotating Electrical Machines – General Requirements
AS 1470-1986	Health and Safety at Work – Principles and practices
AS/NZS 1554-2008	Structural Steel Welding Set
AS 1603	Automatic Fire Detection and Alarm Systems
AS 1627	Metal finishing – preparation and pre-treatment of surfaces
AS1657	Design, Construction & Installation of ladders and walkways
AS 1670	Fire detection, warning, control and intercom systems – System design, installation and commissioning - fire
AS 1692-2006	Steel tanks for Flammable and Combustible Liquids
AS1841	Portable fire extinguishers
AS1851	Maintenance of the protection equipment
AS 1940-2004	The storage and handling of flammable and combustible liquids
AS/NZS 2053	Conduits and fittings for electrical installations
AS 2067-2008	Substations and high voltage installations exceeding 1kV AC
AS/NZS 2344-1997	Limits of electromagnetic interference from overhead a.c. powerlines and high voltage equipment installations in the frequency range 0.15 to 1000MHz
AS 2374 (Set)	Power transformers
AS2430	Classification of hazardous areas

AS2683	Hose and hose assemblies for distribution of petroleum products
AS 2732-1984	Guide to the lightning impulse and switching impulse testing of power transformers and reactors
AS2809	Road tank vehicles for dangerous goods
AS/NZS 3000-2007	Electrical Installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2-2009	Electrical Installations: Selection of cables – Cables for alternating voltage up to and including 0.6/1kV
AS/NZS 3010-2005	Electrical Installations – Generating sets
AS/NZS 3439	Low-voltages Switchgear and Control gear Assemblies
AS 3600-2001	Concrete structures
AS 3735-2001	Concrete structures retaining liquids
AS 3780-2008	The storage and handling of corrosive substances
AS/NZS 3835.1-2006	Earth potential rise – Protection of telecommunication network users, personnel and equipment – Code of practice
AS 3851-1991	The calculation of short-circuit currents in three-phase a.c. systems
AS/NZS 3947.3-2001	Low voltage switchgear and control gear – switches, disconnectors, switch-disconnectors and fuse combination units.
AS 4024.1-2006	Safety of Machinery
AS 4041-2006	Pressure Piping
AS 4594-1999	Internal Combustion Engines – Performance
AS 60044.1-2007	Instrument transformers – Current transformers
AS 60044.2-2007	Instrument transformers – Inductive Voltage transformers
AS 60076	Power Transformers
IEC 60085	Electrical insulation – Thermal evaluation and designation
AS 60137	Insulated bushings for alternating voltages above 1000 V
AS 60204	Safety of machines
IEC 60255	Measuring relays and protection equipment

AS 60529-2004	Degrees of protection provided by enclosures (IP Code)
AS 60947	Low-voltages Switchgear and Control gear
AS/NZS 61000	Electromagnetic compatibility (EMC)
AS IEC 61131-2004	Programmable controllers
AS 61204.1-2003	Low voltage power supply devices, dc output
BCA-2009	The Building Code of Australia (2009)
CP 2012-1:1974	Code of practice for foundations for machinery. Foundations for reciprocating machines
ENA EG1-2006	Substation Earthing Guide
API 620	Design and construction of large, welded, low-pressure storage tanks
BS 8007- 1987	Code of practice for design of concrete structures for retaining aqueous liquids
DIN 4024	Machine foundations

Occupational Health and Safety Act 1991

Environmental Protection (Noise) Regulation 1997

Environmental Protection Act 1986

National Environmental Protection Council – National Environmental Protection (Ambient Air Quality) Measure (NEPM) 2003

National Environmental Protection Council – National Environmental Protection (Air Toxics) Measure (NEPM) 2004

Technical Rules	Western Power Technical Rules for SWIN
WAER	Western Australian Electrical Regulations

Guidelines for PPG SCADA Connections Comms (DMS # 6476988v1C)

Electricity Industry Metering Code 2005

The Australian Dangerous Goods Code (ADG Code)

Caltex Safe Delivery Guide, Self Audit requirements and operations guide

ATTACHMENT A: WESTERN POWER CONNECTION SCHEDULES

Schedule A: Part 1 – Specific technical requirements for generators connected to the Western Power distribution system

Schedule A: Part 2 – Protection apparatus requirements and settings

Schedule B: Part 1 – Operating procedures for generators connected to the Western Power distribution system

Schedule B: Part 2 – Remote control, monitoring and communications

Schedule C: Part 1 – Commissioning

Schedule C: Part 2 – Approval to operate

Schedule A: Part 1 – Specific technical requirements for generators connected to the Western Power distribution system

	Description/Heading	Units	Technical Rules clauses	Requirement	Contractor Compliance / Yes or No
A1	**General**				
A1.1	Name of Customer or Generator:			Tesla Corporation	Information Only
A1.2	Facility Name & Address:			L5107 Marriot Rd, Wellesley	Information Only
A1.3	Technical Requirements review period:	Years	3.6.12, 4.1.4, A10, A12.15	3 Years	Information Only
A2	**Connection Arrangements**		3.4, 3.6.3		
A2.1	Mode of operation (e.g. bumpless transfer), connection duration and frequency:		3.6.2	Occasional for System Peak Load Management	Information Only
A2.2	Simplified SLD No. & revision:		3.6.7, 3.6.12, 5.11	Contractor to Provide	
A2.3	Connection Voltage	kV	3.6.2	22kV	Information Only
A2.4	Location of point of connections		3.6.7.2		
A2.5	Source of LV supply for generator auxiliaries (e.g. battery chargers, lighting etc.)			Required for safety and power outage consideration.	
A2.6	Number of Generating	kVA	3.6.3, 3.6.6,	State proposed number and rating	

	Description/Heading	Units	Technical Rules clauses	Requirement	Contractor Compliance / Yes or No
	units and ratings		Table 3.5	of sets.	
A2.7	Generator types. E.g. synchronous or induction, method of excitation		3.6.3, 3.6.6, Table 3.5 3.6.8 (d)	Synchronous Generator	
A2.8	Generator terminal voltage	kV	3.6.2	11kV	
A2.9	Prime mover types		3.6.3, Tables 3.5	Internal Combustion Diesel	
A2.10	Prime Mover continuous rating	kW	3.6.3, Tables 3.5	Contractor to provide	
A3	**Safety requirements**				
A3.1	Safety Risk categories				
A3.1.1	Overload Risk: Does the facility generation capacity exceed 50% of the network supply capacity at the point of connection?		3.6.9	Yes	Information Only
A3.1.2	Switching Risk: Does the facility generation fault current contribution exceed 50% of the network fault current interrupting capacity?		3.6.9, 3.6.10.2	No	Information Only
A3.1.3	Energisation Risk: Does the facility generation capacity exceed 50% of the minimum load plus 10% of the minimum load on any portion of the HV network that		3.6.10.3	Yes	Information Only

	Description/Heading	Units	Technical Rules clauses	Requirement	Contractor Compliance / Yes or No
	may be left connected to the facility following the operation of an automatic switch?				
A3.2	Earthing Diagram		3.6.7.1	Contractor to Provide	
A3.3	Maximum network fault current contribution at points of connection	kA, seconds 3ph & 1ph	2.5.6, 2.5.7, 3.6.4, 3.6.6	3Phase 4.57 kA 1Phase 5.84 kA	Information Only
A3.4	Maximum facility fault current contribution at points of connection	kA, seconds 3ph & 1ph	3.6.4, 3.6.6, 5.5.1(b)	3Phase 1.3 kA 1Phase N/A (Contractor to update)	
A3.5	Minimum facility fault current contribution at points of connection	kA, seconds 3ph & 1ph	3.6.4, 3.6.6	3Phase Nil 1Phase N/A	Information Only
A4	**Quality of supply**				
A4.1	**Quality of supply risk categories**				
A4.1.1	Damage or disruption risk: Does the generation capacity exceed 2% of the network minimum fault contribution at the points of contribution?		3.6.8	Yes	Information Only Network minimum generation fault level 158MVA
A4.1.2	Annoyance risk: Does the generation		3.6.8	Yes	Information Only

	Description/Heading	Units	Technical Rules clauses	Requirement	Contractor Compliance / Yes or No
	capacity exceed 1% of the network minimum fault contribution at the point of connection?				
A4.2	Particular requirements including those for wind generators		3.6.3	None	
A4.3	**Power Flow, power factor and voltage control (normal network connection)**		3.6.3, 3.6.8, 3.6.9, Table 3.5		
A4.3.1	Maximum export real power	MW	3.6.3, 3.6.9	9.9MW	
A4.3.2	Maximum export reactive power	MVAr	3.6.3, Table 3.5	7.425 MVAr	
A4.3.3	Maximum import real power	MW	3.6.3	0.002MW	
A4.3.4	Maximum import reactive power	MVAr	3.6.3, Table 3.5	4.792 MVAr	
A4.3.5	Power factor during normal operation	Cos Φ , lead & lag	3.6.3, Table 3.5	Unity	
A4.3.6	Voltage/power control strategy		3.6.8, Table 3.5	A. Power Factor Control B. Technical Rules clause 3.3.3.3 c&g are applicable for this case. Initially operating at unity power factor. The full	

	Description/Heading	Units	Technical Rules clauses	Requirement	Contractor Compliance / Yes or No
				range of reactive power capability as per section 3.3.3.1 of the Technical Rules is required and may be called upon during operation of the generator.	
A4.3.7	Voltage/power control requirements: set point range	kV	3.6.8, Table 3.5	As per Section 3.6.8 of the Technical Rules HV limit for voltage 1.06 pu measured at 22kV.	
A4.3.8	Frequency control requirements:		Table 3.5	As per Technical Rules	
A4.4	**Power flow, power factor and voltage control (for alternative network connection – when required)**		2.5.4.1(b), 3.6.3, 3.6.8, 3.6.9, Table 3.5, 3.6.12(a)(3)	No alternative network connection	Information Only
A4.4.1	Maximum export real power	MW		Not applicable	
A4.4.2	Maximum export reactive power	MVAr	3.6.3, Table 3.5	Not applicable	
A4.4.3	Maximum import real power	MW	3.6.3	Not applicable	
A4.4.4	Maximum import reactive power	MVAr	3.6.3, Table 3.5	Not applicable	
A4.4.5	Power factor during normal operation	Cos Φ , lead & lag	3.6.3, Table 3.5	Not applicable	

	Description/Heading	Units	Technical Rules clauses	Requirement	Contractor Compliance / Yes or No
A4.4.6	Voltage/power control requirements: set point range	kV	3.6.8, Table 3.5	Not applicable	
A4.4.7	Frequency control requirements:		Table 3.5	Not applicable	
A4.5	**Frequency response requirements**				
A4.5.1	Immunity to frequency excursions	Hz	3.3.3.3(b), Fig 3.4	Set as per Technical Rules section 3.3.3.3(b) and figure 3.4. That is Trip for under frequency 47.5hz for 10 seconds and over frequency 52.0hz for 6 seconds. Instantaneous trip below 47.0hz and above 52.5hz.	
A4.5.2	Other settings			Not applicable	
A5	**Remote control, monitoring and communications**		3.6.9, 3.6.10.3		
A5.1	Particular requirements			Intertripping with the Feeder Circuit Breaker	

Schedule A: Part 2 – Protection Apparatus Requirements and Settings

ANSI No	Protection Scheme	Settings	Technical Rules	Notes	Contractor Compliance / Yes or No
Western Power Circuit Breaker MRR 516					
51V	Three Phase IDMT Overcurrent	Pickup= 450Amp, TMS= 0.25, Curve= SI		Refer note 13	Information Only
50	Three Phase Instantaneous/Highest Overcurrent	Pickup=3600Amp, Definite Time Delay=Inst		Refer note 13	Information Only
64G	IDMT Earth Fault	Pickup=60Amps, TMS=0.25, Curve= SI		Refer note 13	Information Only
51G	Sensitive (definite time) Earth Fault	Pickup=___Amps, Definite Time Delay= ___ secs		Not Applicable	
CMS#1 & CMS#2 Tripping					
51V	Three Phase IDMT Overcurrent	Pickup= ___Amp, TMS=___, Curve= ___	3.6.10.1(f)	Refer note 1 & 3	
50	Three Phase Instantaneous/Highest Overcurrent	Pickup=____Amp, Definite Time Delay=___secs	3.6.10.1(f)	Refer note 1	
64G	IDMT Earth Fault	Pickup=____Amp, TMS=___, Curve= ___	3.6.10.1(g)	Refer note 1 & 3	
51G	Sensitive (definite time) Earth Fault	Pickup=___Amps, Definite Time Delay= ___ secs	3.6.10.1(g)		
	Any CPS fails to open("local backup")	Fails to open when required by protective apparatus, maximum delay of 0.3seconds	3.6.10.1(g)		
	Insert additional lines for any other event that cause tripping		3.6.10.1(d)	Refer note 8 & 10	
	Trip power supply failure or irregularity	1 second	3.6.10.4		

ANSI No	Protection Scheme	Settings	Technical Rules	Notes	Contractor Compliance / Yes or No
CPS Tripping (or CMS as required if no CPS)					
51V	Three Phase IDMT Overcurrent	Pickup= ___Amp, TMS=___, Curve= ___	3.6.10.1(f)	Refer note 1 & 3	
50	Three Phase Instantaneous/Highest Overcurrent	Pickup=____Amp, Definite Time Delay=___secs	3.6.10.1(f)	Refer note 1	
64G	IDMT Earth Fault	Pickup=____Amp, TMS=___, Curve= ___	3.6.10.1(g)	Refer note 1 & 3	
32	Real and Reactive Power Import (max)	____kW or ____kVAr for 1 second	3.6.10.1(h),(i), 3.6.10.3, 3.6.12(b)	Refer note 4	
32	Real and Reactive Power Import (min)	____kW or ____kVAr for 1 second	3.6.10.1(h)		
27	Under Voltage	0.90 per unit for 10 seconds	3.6.10.1(f), Table 3.5	Refer note 5	
59	Over Voltage	1.06 per unit for 10 seconds	3.6.10.1(f), Table 3.5	Refer note 6	
81	Under Frequency	<47.5Hz for 10 seconds	3.6.10.1(f), Table 3.5		
81	Over Frequency	>52.5Hz for 6 seconds	3.6.10.1(f), Table 3.5		
	Reactive Power Perturbation	1%, 0.5 second pulse / second 3%, 0.5 second check pulse		Refer note 7	
	Loss of 1 or more phases	TBA	2.9.2(b)(2), 3.6.10.1(h)		
32R	Reverse Power	TBA	3.6.10.1(h),(i), 3.6.10.3, 3.6.12(b)		
67	Directional over current	TBA	3.6.10.1(h),(i), 3.6.12(b)		
	Voltage vector shift	TBA	2.9.2(b)(2),3.6.10.1(h), 3.6.10.3		
	Neutral voltage displacement	TBA	3.6.10.1(g)		

ANSI No	Protection Scheme	Settings	Technical Rules	Notes	Contractor Compliance / Yes or No
51G	Sensitive (Definite Time) Earth Fault	Pickup=____Amp, Definite Time Delay=_____secs	3.6.10.1(g)	Not Applicable	
	Transformer Overpressure		3.6.10.4		
	Any GMS fails to open ("local backup")	Fails to open when required by protective apparatus, maximum Delay 0.3 seconds	3.6.10.1(d)		
	Disconnection Timer	Less than 1 or 60 seconds per transfer	3.6.2(d),(4), 3.6.10.1(k),(l)		
	RTU Trip signal				
	Insert additional lines for any other events that cause tripping				
	Trip power supply failure or irregularity	1 second		Refer note 8 & 10	
CPS Prevent Closing (or GMS if no CPS)					
27 59	Under and Over Voltage	Ensure supply is within trip limits for at least 1 minute	3.6.10.1(f)		
	Check Synchronising		3.6.7.3		
	Protection Healthy		3.6.10.1(d)		
	Insert additional lines for any other events preventing closing			Refer note 9	
	RTU Close Enable Signal (Permissive)		3.6.9(a)(2)	Refer note 2	
GMS Tripping					
51V	Three Phase IDMT Overcurrent	TBA			
50	Three Phase Instantaneous/	TBA			
64G		TBA			
32		TBA			
	Pole Slip	Trip before second pole slip	3.6.10.2		

ANSI No	Protection Scheme	Settings	Technical Rules	Notes	Contractor Compliance / Yes or No
	Any CPS (CMS if no CPS) fails to open	Fails to open when required by Protective Apparatus, maximum Delay of 0.3 seconds	3.6.10.1(d)		
	Trip power supply failure or irregularity	1 second	3.6.10.1(j), 3.6.10.4(b)		
	Transformer Overpressure	TBA	3.6.10.4		
	Transformer Overtemperature	TBA	3.6.10.4		
	Insert additional lines for any other events that cause tripping			Refer note 8 & 10	
Islanding protection options (for CPS tripping)					
	Reactive Power Perturbation	1%, 0.5 seconds pulse / second 3%, 0.5 second check pulse		Refer note 7	
	Loss of 1 or more phases	TBA	3.6.10.1(h)		
	Reverse Power	TBA	3.6.10.1(h)		
	Directional over current	TBA	3.6.10.1(h),(i), 3.6.12(b)		
	Voltage vector shift	TBA	3.6.10.1(h)		
	Neutral voltage displacement	TBA	3.6.10.1(g)		
	Sensitive (Definite Time) Earth Fault	Pickup=_____Amps, Definite Time Delay=_____secs	3.6.10.1(g)		
	Negative Phase Sequence	TBA	3.6.10.1(h)		
	LV Standby Earth Fault	_____ Amps for ____ seconds	3.6.10.1(h)	Refer note 11	

NOTES:

1. CMS protection settings to grade with Western Power equipment protection settings with a minimum of 0.3 seconds.
2. The CPS shall be prevented from closing unless the RTU Enable Signal is present or the mechanical interlocking is arranged to prevent paralleling of generators.
3. Definition of TMS = (Required time to trip)/(Time to trip with TMS=0.1)
4. From previous implementation of non-exporting generators, 10kW & 30kVAR for 2 seconds was not sufficient during zone sub cap bank switching due to slow response; the governor/excitation system could not respond in time
5. Under-voltage set points depend on the Distribution Transformer tap settings in the area of the point-of-connection (typically determined during the system study). Should not fall below the value of 0.900pu. This level is somewhat arbitrary.
6. Over-voltage set points depend on the Distribution Transformer tap settings in the area of the point-of-connection (typically determined during the system study). Should not ever exceed value of 1.060pu local Distribution Transformers supplying other customers are on Tap 2. The normal maximum voltage for Tap 2 is 1.051pu. The value of 1.06 provides some buffer to allow for control of voltage via lowering but may be placed.
7. In the past, an example value has been; kW: 1%, 0.5 second pulse/second; kVAR: 3%, 0.5 second check pulse
8. List any other protection that trips the circuit breaker in question, eg: Transformer Overpressure, Overtemperature, etc.
9. Other events preventing closing may include interlocking, eg: CMS Open prevent CPS closing.
10. Insert all items that cause tripping, eg: this may include other items no specifically under CMS/CPS/GMS heading such as FSU (Fuse Switch Units)
11. The single line diagram to define where the LV Standby Earth Fault protection is being implemented (where applicable)
12. Protection key diagram to be submitted with the schedule to assist in review.
13. Included for information only to protection coordination

Schedule B: Part 1 – Operating procedures for generators connected to the Western Power distribution system

	Description	Technical Rules clause	Contractor Compliance / Yes or No
B1	**General details**		
B1.1	**Name of Customer or Generator: Tesla Corporation**		Information Only
B1.2	**Facility Name: TBA** **Fax:** **Email:** **Telephone (s) – office hours:** **Address:**	5.10.2 3.6.9(d)	Information Only
B2	**Contact Personnel : TBA**		Information Only
B2.1	**Customer's contact: TBA** The customer shall ensure that a responsible person can be contacted by Western Power at all times for the purpose of performing switching operations and adjusting generator performance. The customer's contact is: **Title:** **Phone (daytime): (after hours):** **Mobile:**	5.3.3 5.10.2 5.10.3	Information Only
B2.2	**Western Power's contact:** The Western Power Network Operations Control Centre (NOCC) is manned at all times. The Western Power contact person is: **Title: Network Controller** **Phone: (08) *<dedicated number to be entered – list is maintained internally in DMS#2756426>***	5.3.2 5.10.3 5.10.4	Information Only
B3	**Customer Operations:**		
B3.1	**Title of customer operating procedure document: TBA**	5.9.1 A12.5	Information Only
B3.2	**Customer protection apparatus:** Western Power's protection requirements for this facility are specified in the Technical Rules and Schedule A. Upon request the Customer shall demonstrate the accuracy and operation of the facility's protection apparatus	3.6.10 5.5.2	
B3.3	**Operating requirements:** The customer shall operate the facility including the generators and protective apparatus in accordance with good electricity industry practice. The following conditions shall be observed for any equipment associated with the facility's electrical system:	5.9	Information Only
B3.3.1	***Maintenance in good order:*** The customer shall ensure that all equipment in the facility is maintained in good order and that all protective apparatus and control equipment is at all times capable of performing its required function	4.1.4, 5.3.3 5.7.1 5.8	Information Only
B3.3.2	***Competent Personnel:*** The customer shall ensure that all operating personnel are competent in that they have adequate knowledge and sufficient judgment to take correct action when facing an	5.3.3	Information Only

	Description	Technical Rules clause	Contractor Compliance / Yes or No
	emergency. All testing and maintenance work is to be carried out by suitably trained and qualified personnel.		
B3.3.3	***Approval and Notice for Modifications:*** The customer shall provide Western Power with full details of any intended modifications to the electrical arrangements shown on the simplified Single Line Diagram stated in Schedule A. Modifications shall not be implemented without Western Power approval. Unless otherwise agreed, the notice period for the implementation of modifications shall be as specified in the Technical Rules (currently 65 business days)	4.2.4	Information Only
B3.3.4	***Service Intervals:*** The customer regularly shall service and test for equipment including protective apparatus (as specified in Schedule A) associated with the electrical path between the facility's generators and the Western Power distribution system. The maximum interval shall be 3 years.	4.1.4 A12.15	
B3.3.5	***Testing of customer equipment requiring changes to agreed operation:*** The customer shall provide Western Power with notice in writing (currently 15 business days) of commissioning, calibration and trip tests on any existing or direct replacement equipment associated with the electrical path between the facility's generators and the network. The customer shall permit Western Power representatives to witness any such tests that Western Power deems to be relevant to safe and reliable operation of the distribution system.	4.1.5	Information Only
B3.3.6	***Records:*** The customer shall maintain logbooks detailing: inspection and operating activities equipment settings and results of commissioning and periodical tests	5.3.3, 5.8 5.10.4, 5.11,	Information Only
B3.3.7	***Western Power access:*** The customer shall at all times permit and enable representatives of Western Power to access Western Power equipment installed within the facility, subject to adequate prior notice. The customer shall also grant access to Western Power to inspect or test customer facilities in accordance with the Technical Rules. In the case of an emergency condition, prior notice may not be given.	4.1.1, 4.1.2, 4.1.3, A12.16	Information Only
B3.4	**Procedure for restoration on loss of Western Power supply:** In the event of loss of supply, the following steps shall be taken: 1. Check whether the loss of supply has been caused by a trip on one of the facility's protection devices or if supply from Western Power has been lost. This may be determined by checking if any of the facility's circuit breakers have tripped and then by checking with NOCC if any Western Power protective devices connecting the facility have tripped. 2. If supply from Western Power has been lost then check that the CPS has opened and isolated the facility's generating equipment from the network. While restoration work on the network is being performed by Western Power, the facility generation may be run islanded with the CPS open to supply internal load only. 3. When Western Power has completed restoration work, NOCC will, upon request, send an 'enable' signal to permit re-	5.3.2, 5.3.3	Information Only

Description		Technical Rules clause	Contractor Compliance / Yes or No
	synchronisation of the facility.		
B4	**Western Power Operations**	5.3.1	
B4.1	**General:** General procedures dealing with distribution connected generators are contained in Western Power Network Operating Instruction NWI-82 ***"Private parallel generators- General operating guidelines"***. Specific requirements are detailed in the following sections.		Information Only
B4.2	**Feeder connections:** The facility will be normally connected to the Marriot Rd substation via the MRR 516 feeder. The facility may only be connected to this MRR 516 feeder from the Marriot Rd substation. There is no alternative supply provided. Connection to other feeders can only be considered after further power system studies.	2.5.4.1(b)	Information Only
B4.3	**Feeder protection:** All feeder circuit breakers and field reclosers are normally fitted with overcurrent and earth fault protection. Feeder switches are **not** normally fitted with protection to prevent unsynchronised automatic or manual switching. The MRR 516 feeder has the following features: • The feeder circuit breaker does have an automatic reclose facility • The feeder circuit breaker does not have a synchronisation or dead line closure check facility. • The feeder contains no field reclosers • SCADA inter trip signal between the MRR 516 feeder circuit breaker and the facility. When the MRR 516 feeder circuit breaker opens, a 'trip' signal is sent to the facility to isolate the facility's generating equipment from the network via the CPS. There is no automatic acknowledgement signal from the facility to confirm receipt of the command.		

Schedule B: Part 2 – Remote control, monitoring and communications

B5 The SCADA scheme needed for the satisfactory monitoring and control of the facility in accordance with clauses 3.6.9 and 3.6.10.3 of the Technical Rules is given in the following table:

Contractor Compliance Yes or No

Generator SCADA I/O Description	**Facility Equipment**	**Facility RTU**	**NOCC**	
From Power Station →			→ **To NOCC**	
Voltage on Western Power side of CPS	Field transducer	Analog Input	Voltage Measurement	
MW/MVAr Import/Export at the CPS	Field transducer	Analog Input	Signed MW/MVAr Measurement	
CPS open/closed	Field contact	Digital Input	CPS CB Status	
CMS open/closed	Field contact	Digital Input	CMS CB Status	
GMS open/closed	Field contact	Digital Input	GMS CB Status	
50V battery charger fail	Field contact	Digital Input	Alarm	
CMS/GMS/CPS Protection Alarm	Field contact	Digital Input	Alarm	
To Power Station ←			← **From NOCC**	
'Close Enable' - paralleling latch (Notes 2,4)	Enable latched interpose relay	Digital Output	Operator Action	
'Trip' - isolate the facility's Customer Main Switch or generation equipment Notes 3,4,5)	Trip interpose relay	Digital Output	Operator or Automatic Action	

NOTES:

1. All signals between the Facility and the Network Operations Control Centre (NOCC) will be direct to NOCC, or, via the Substation normally connecting the Facility where deemed necessary for feeder inter-tripping.
2. The 'Close Enable' signals shall be issued by Western Power and incorporated in the Facility to operate as follows:
'Close Enable' will allow the paralleling switches to be closed, therefore connecting the Facility's generation equipment to the Network. The NOCC operator issues a 'Close Enable' command via the SCADA with a resultant relay contact closure at the Facility RTU. Once the 'Close Enable' command is issued, the 'Close Enable' contacts will be held closed by the RTU for a period of "x" mins or until a 'Trip' signal is received.

3. The 'Trip' signals shall be issued by NOCC and incorporated in the Facility to operate as follows:

'Trip' shall isolate the Facility's generation equipment from the Network via the CPS. The Facility RTU issues a 'Trip' signal with a contact opening.

Whenever practicable, Western Power will warn the Customer of an impending NOCC 'Trip' signal. 'Trip' signals will generally only be issued for an emergency or routine maintenance on

	the Network. (Also see Note 5) 4. The 'Trip' and 'Close Enable' signals shall be 'Fail Safe', i.e. a trip signal be sent on fail of DC supply and the 'Close Enable' signal be unlatched if it is latched. 5. A feeder inter-trip from the Substation is deemed necessary by Western Power the following additional events will result in a 'Trip' signal being automatically sent by Wester Power: a) Automatic switching operations on the network such as feeder circuit breakers opening; b) Facility RTU communications failure (>7secs) to the Substation; 6. Facility CPS Voltage and MW/MVAR transducer metering inputs to the Facility RTU are typically 0-10mA and -5 to +5mA respectively. Alternative input options may be considered by WP if compatible with the WP Facility SCADA RTU. 7. Facility digital inputs to Facility RTU are to be voltage free (RTU supplies 50V DC, 20mA wetting) 8. Facility RTU digital outputs will be voltage free and rated 50V DC @ 1Amp.	

			Contractor Compliance Yes or No
B6	**Customer responsibilities** The Customer shall have available at all times a sole-purpose telephone link to enable voice communications between the facility and NOCC. The Customer shall be responsible for the following components of the SCADA scheme: • Provision and maintenance of a continuous communications link between the facility and NOCC or Marriot Rd Substation for the monitoring and control of generating units. • Provision and maintenance of the input signals to and output commands from Western Power's SCADA Remote Terminal Unit (RTU) at the Facility. The output commands shall be incorporated into a Fail Safe electrical interlocking scheme. • Provision and maintenance of a suitable environment for the satisfactory operation and maintenance of the RTU.	3.6.9 5.10.1 5.10.2	
B7	**Western Power responsibilities** Western Power shall be responsible for provision and maintenance of a back-up voice communication channel. Western Power shall be responsible for the following components of the SCADA scheme: • Provision and maintenance of a SCADA RTU at the Facility • Provision and maintenance of all SCADA equipment between NOCC and the Western Power Marriot Rd Substation		Information Only
B8	**Metering signals** The customer shall provide for remote monitoring at NOCC of (signed) MW, MVAR and voltage	3.6.9	
B9	**Acceptance** The undersigned accept the above operating procedures for the facility.		Information Only
	---------- (Western Power Network Operations Engineer) Date:	---------- (Customer) Date:	

Schedule C: Part 1 – Commissioning

Certification & Approval for Commissioning of a Facility with Embedded Generating Units to be connected to the Western Power Distribution System

Name of Customer or Generator:
Authorised Representative:
Facility Name & Address:

CERTIFICATION

I,
(name of chartered professional engineer with NPER standing)
certify that the facility complies with the Technical Rules, the relevant connection agreement, good engineering practice and relevant standards and are ready for operation. In particular that the following have been verified:

1. The single line diagram approved by the Network Service Provider has been checked and accurately reflects the installed electrical system;
2. All required switches present and operate correctly as per the single line diagram;
3. The specified generation facility is the only source of power that can be operated in parallel with the distribution network;
4. The earthing systems complies with Australian Standards AS3000 and AS2067 and do not rely upon the Network Service Provider's earthing system;
5. Electrical equipment is adequately rated to withstand specified network fault levels;
6. All protection apparatus (that serves a network protection function, including backup function) complies with IEC 60255 and has been correctly installed and tested.
7. Interlocking systems specified in the connection agreement have been correctly installed and tested;
8. The islanding protection operates correctly and disconnects the power station from the network within 2 seconds;
9. Synchronising and auto-changeover equipment has been correctly installed and tested;
10. The delay in reconnection following restoration of normal supply is greater than 1 minute;
11. The protection settings specified in the connection agreement have been approved by the Network Service Provider and are such that satisfactory coordination is achieved with the Network Service Provider's protection systems;
12. Provision has been made to minimise the risk of injury to personnel or damage to equipment that may be caused by an out-of-synchronism fault;
13. Control systems have been implemented to maintain voltage, active power flow and reactive power flow requirements for the connection point as specified in the connection agreement;
14. The facility complies with the quality of supply requirements specified in the Technical Rules
15. Systems or procedures are in place such that the testing, commissioning, and operation requirements specified in the Technical Rules and the connection agreement are adhered to; and
16. Operational settings are as specified.

Notes: _____

Signature: ..... Date: ……..
(Signature of Registered Professional Engineer)

APPROVAL

Approval is hereby given for the above facility to be connected to the Western Power Network for the period from……to…….for the purpose of testing and commissioning.

Notes: _____

Signature: ..... Date: ……
(Signature of Western Power Operations Engineer)

Schedule C: Part 2 – Approval to operate

Certification & Approval for Commissioning of a Facility with Embedded Generating Units to be connected to the Western Power Distribution System

Name of Customer or Generator:
Authorised Representative:
Facility Name & Address:
CERTIFICATION
I,
(name of chartered professional engineer with NPER standing)
certify that the facility complies with the Technical Rules, the relevant connection agreement, good engineering practice and relevant standards. In particular that the following have been verified:

1. The single line diagram approved by the Network Service Provider has been checked and accurately reflects the installed electrical system;
2. All required switches present and operate correctly as per the single line diagram;
3. The specified generation facility is the only source of power that can be operated in parallel with the distribution network;
4. The earthing systems complies with Australian Standards AS3000 and AS2067 and do not rely upon the Network Service Provider's earthing system;
5. The facility's electrical equipment is adequately rated to withstand specified network fault levels as defined in the Technical Rules;
6. All protection apparatus (that serves a network protection function, including backup function) complies with IEC 60255 and has been correctly installed and tested.
7. Interlocking systems specified in the connection agreement have been correctly installed and tested;
8. The islanding protection operates correctly and disconnects the power station from the network within 2 seconds;
9. Synchronising and auto-changeover equipment has been correctly installed and tested;
10. The delay in reconnection following restoration of normal supply is greater than 1 minute;
11. The protection settings specified in the connection agreement have been approved by the Network Service Provider and are such that satisfactory coordination is achieved with the Network Service Provider's protection systems;
12. Provision has been made to minimise the risk of injury to personnel or damage to equipment that may be caused by an out-of-synchronism fault;
13. Control systems have been implemented to maintain voltage, active power flow and reactive power flow requirements for the connection point as specified in the connection agreement;
14. The facility complies with the quality of supply requirements specified in the Technical Rules
15. Systems or procedures are in place such that the testing, commissioning, and operation requirements specified in the Technical Rules and the connection agreement are adhered to; and
16. Operational settings are as specified.

Notes: _____

Signature: .....Date: ……..
(Signature of Registered Professional Engineer)

APPROVAL
Approval is hereby given for the above facility to be connected to the Western Power Network for the agreed mode of operation until further notice

Notes: _____

Signature: .....Date: .....
(Signature of Western Power Operations Engineer)

Glossary

User, Customer and Generator have the meanings defined in the Technical Rules. However most facilities covered by this document both consume and generate power, so for simplicity the term Customer has been used to cover the User, Customer and Generator roles unless otherwise indicated.

CB (Circuit Breaker): Circuit breaker, a switching device capable of breaking load and fault current.

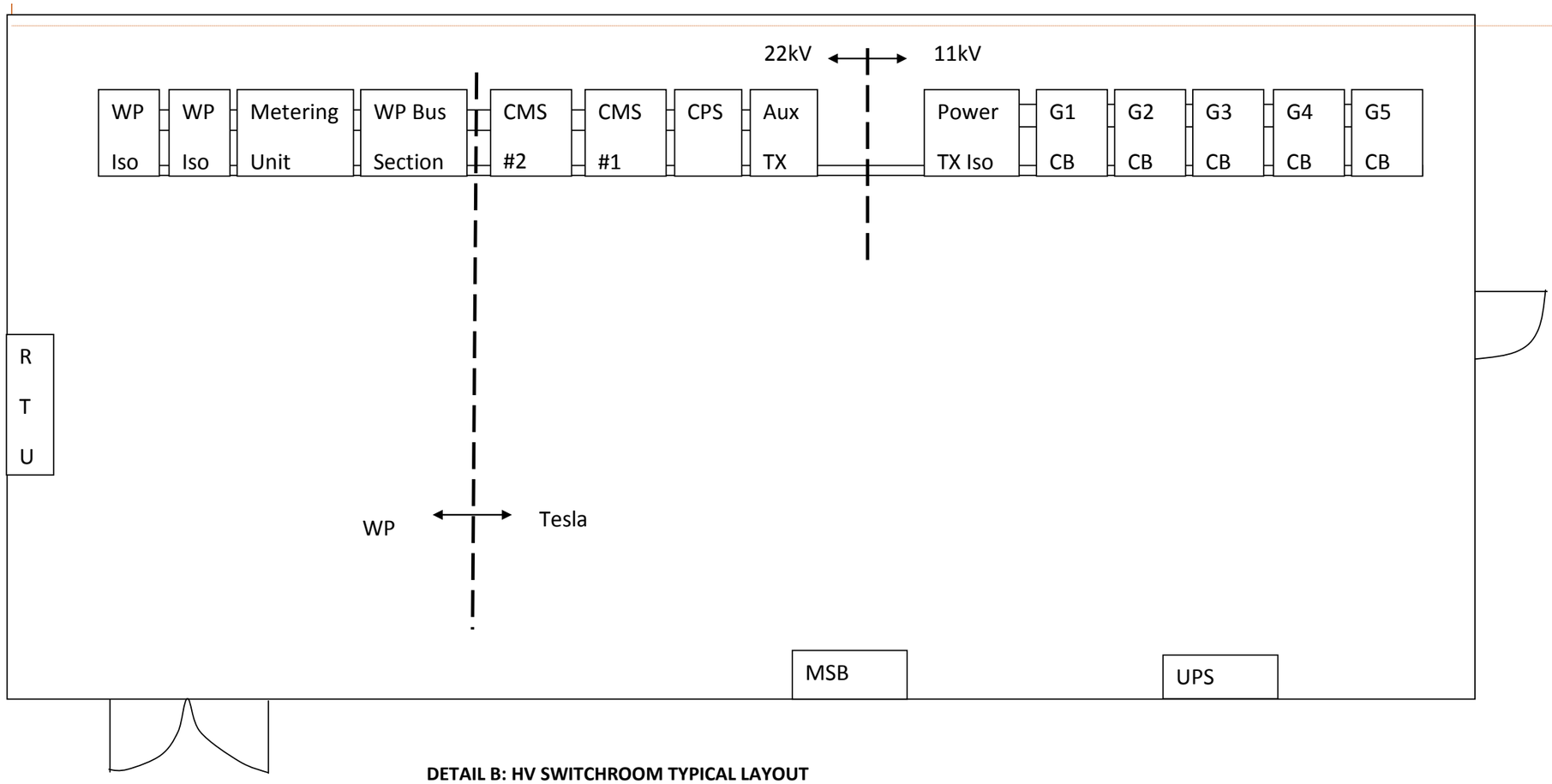
CMS (Customer Main Switch): Circuit breaker that serves to connect the facility to the network.

GMS (Generator Main Switch): Circuit breaker that connects a facility's generator to the Network via CMSs and CPSs.

NOCC (Network Operation Control Centre): Control centre for the Western Power's distribution system.

RTU (Remote Terminal Unit): A communication unit located at the remote end of a communication channel.

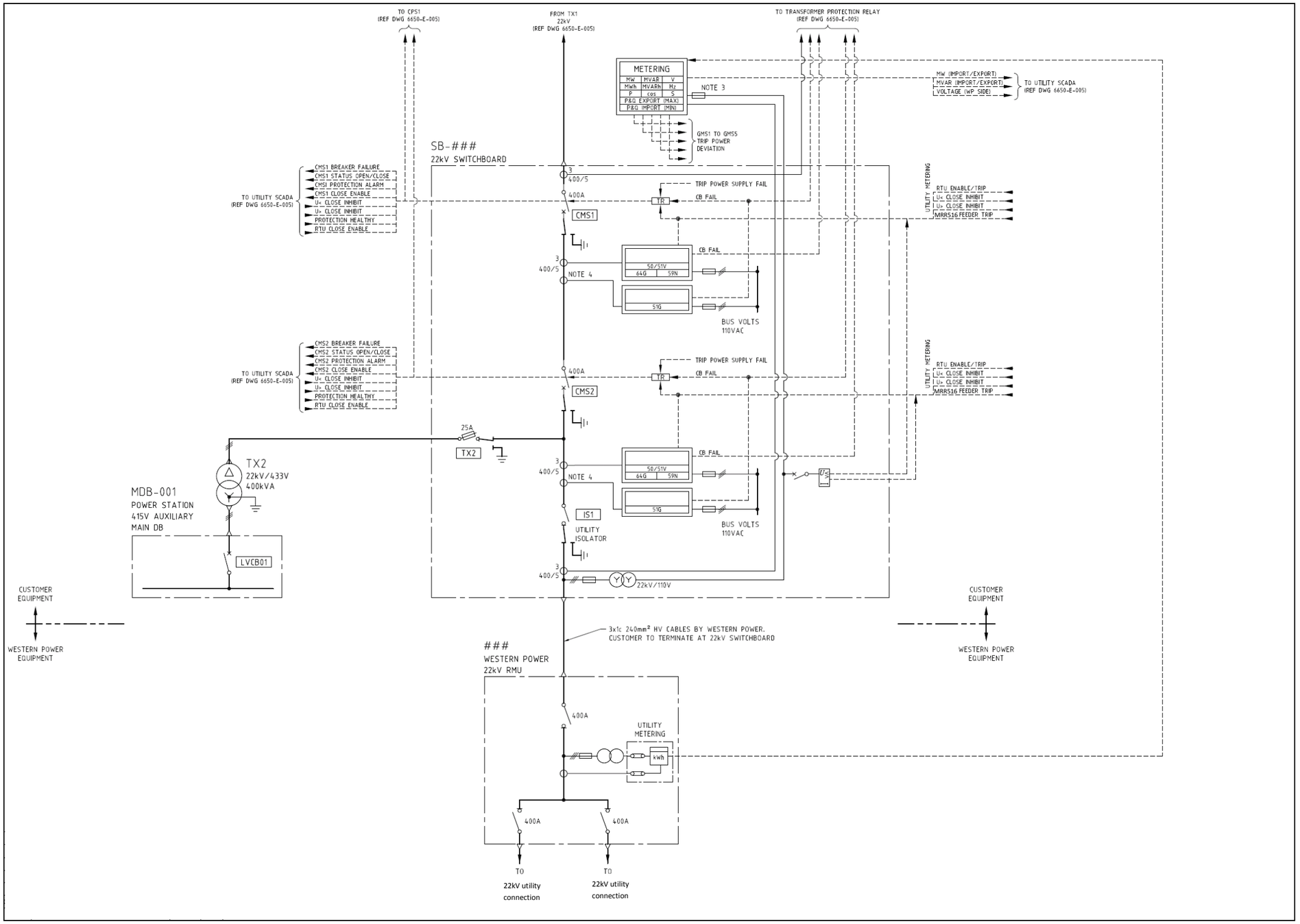
ATTACHMENT B: TYPICAL SITE LAYOUT FOR TESLA PEAKING PLANT (DETAIL B)

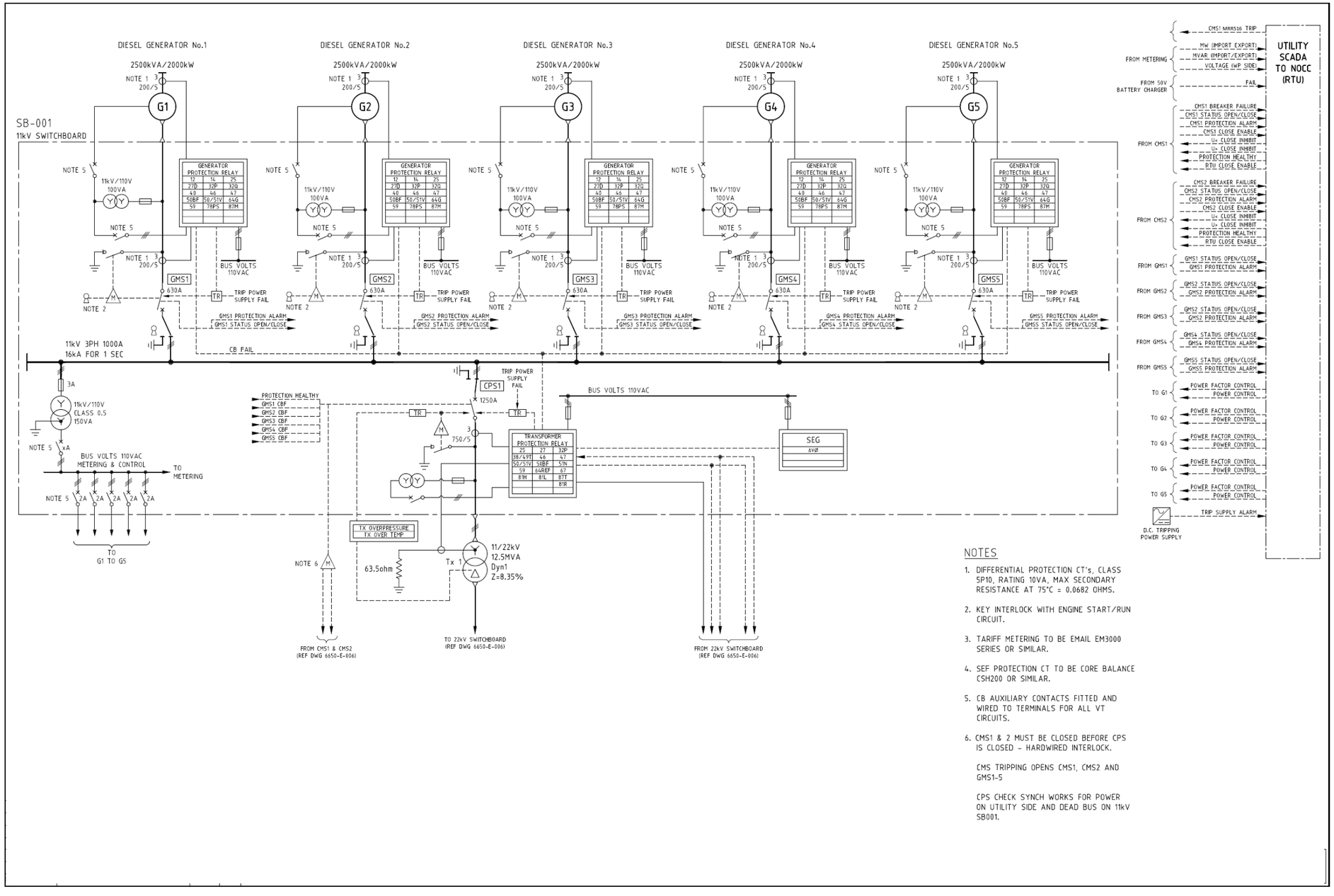


DETAIL B: HV SWITCHROOM TYPICAL LAYOUT

Comment [c1]: Needs to include the second back up CMS
Note that the single line shows the Western Power RMU, metering and isolator separately housed? Need to refer to BT- Leave as is but add CMS2

ATTACHMENT C: TYPICAL SINGLE LINE DIAGRAM FOR TESLA PEAKING PLANT





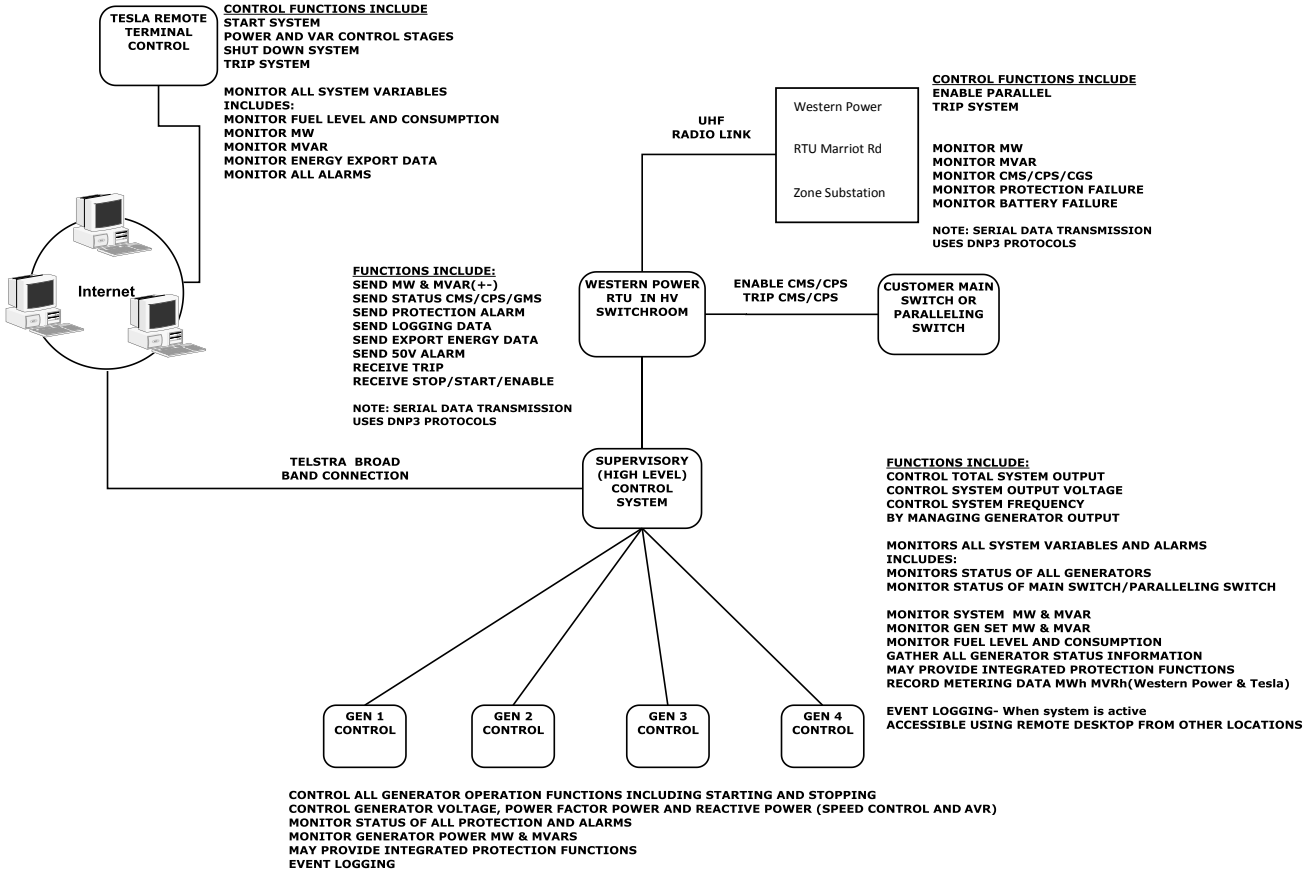
NOTES

1. DIFFERENTIAL PROTECTION CT's, CLASS 5P10, RATING 10VA, MAX SECONDARY RESISTANCE AT 75°C = 0.0682 OHMS.
2. KEY INTERLOCK WITH ENGINE START/RUN CIRCUIT.
3. TARIFF METERING TO BE EMAIL EM3000 SERIES OR SIMILAR.
4. SEF PROTECTION CT TO BE CORE BALANCE CSH200 OR SIMILAR.
5. CB AUXILIARY CONTACTS FITTED AND WIRED TO TERMINALS FOR ALL VT CIRCUITS.
6. CMS1 & 2 MUST BE CLOSED BEFORE CPS IS CLOSED - HARDWIRED INTERLOCK.

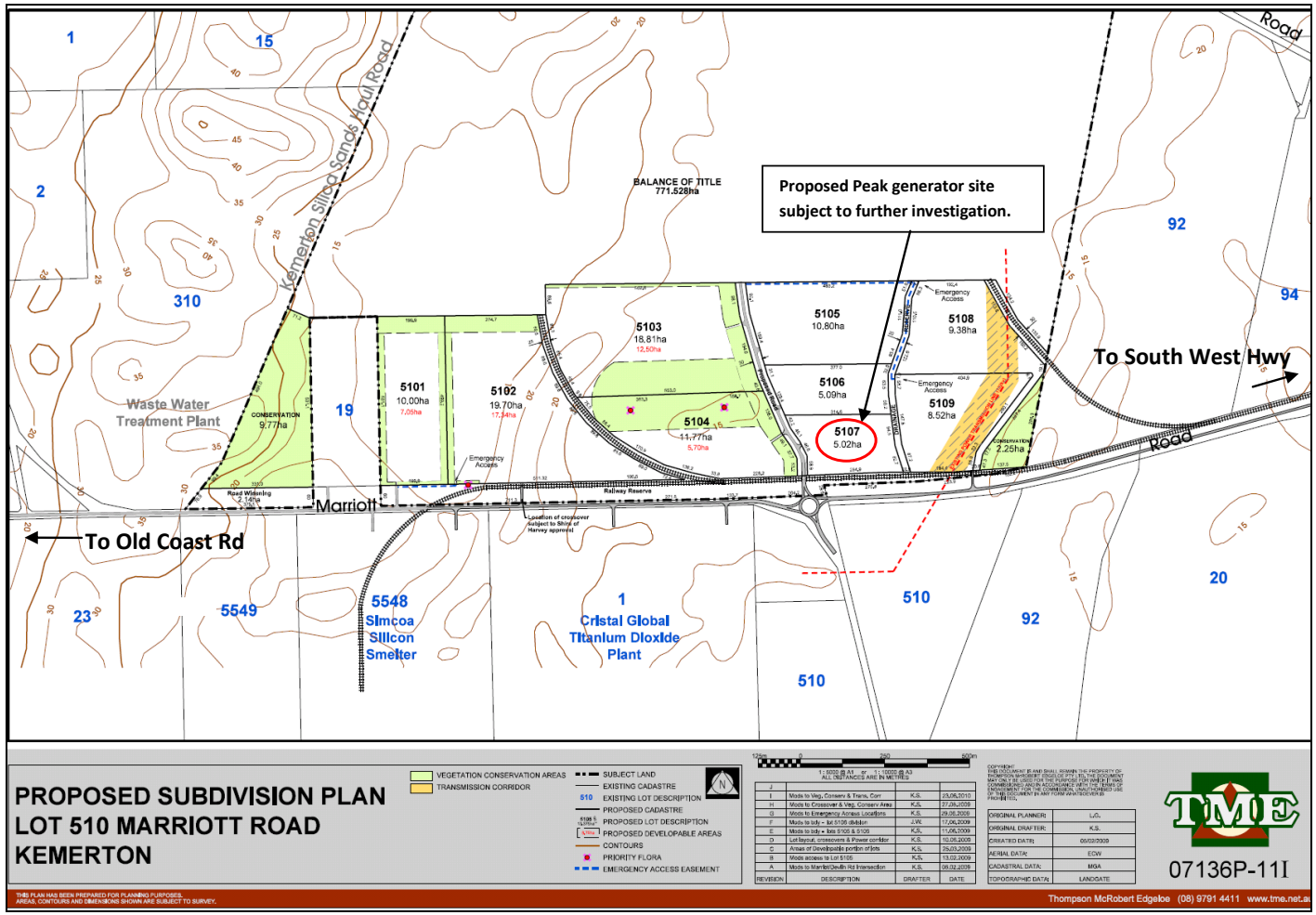
   CMS TRIPPING OPENS CMS1, CMS2 AND GMS1-5

   CPS CHECK SYNCH WORKS FOR POWER ON UTILITY SIDE AND DEAD BUS ON 11kV SB001.

ATTACHMENT D: CONTROL SYSTEM TYPICAL HIERARCHY



ATTACHMENT E: PROPOSED SITE LOCATION PLAN



ATTACHMENT F: WESTERN POWER PROJECT REQUIREMENTS: DESIGN DATA & TESTING & COMMISSIONING

TECHNICAL RULES FOR THE SOUTH WEST INTERCONNECTED NETWORK

ATTACHMENT 10 *DESIGN* DATA FOR SMALL *POWER STATIONS* CONNECTED TO THE *DISTRIBUTION SYSTEM*

ATTACHMENT 10 : DISTRIBUTION SYSTEM CONNECTED GENERATORS UP TO 10 MW (EXCEPT INVERTOR-CONNECTED GENERATORS UP TO 30 KVA)

Power Station	**Data Category**
Address	S, R1
Description of power station, for example, is it a green or brownfield site, is there a process steam or heat requirement, any other relevant information	S
Site-specific issues which may affect access to site or design, eg other construction onsite, mine site, environmental issues, soil conditions	S, D
Number of generating units and ratings (kW)	S, D, R1
Type: eg synchronous, induction	S, D, R1
Manufacturer:	D
Connected to the network via: eg inverter, transformer, u/g cable etc	S
Prime mover types: eg reciprocating, turbine, hydraulic, photovoltaic, other	S
Manufacturer	D
Energy source: eg natural gas, landfill gas, distillate, wind, solar, other	S
Total power station total capacity (kW)	S, D, R1
Power station export capacity (kVA)	S, D, R1
Forecast annual energy generation (kWh)	S, D

Normal mode of operation as per clause 3.6.2.3 of Technical Rules ie (a) continuous parallel operation (b) occasional parallel operation (c) short term test parallel operation (d) bumpless transfer, ((1) rapid (2) gradual)	S
Purpose: eg power sales, peak lopping, demand management, exercising, emergency back up	S

Associated Facility Load

Expected peak load at facility (kW)	S, D, R1
Forecast annual energy consumption (kWh)	S
Construction supply required?	S
Max construction power	S
Required connection date	S
Required full operation date	S
Expected life	S

Additional Information Required

(1) proposed arrangement & site layout of the power station including prime movers, generators, transformers, synchronising circuit breakers and lockable disconnect device. Each component should be identified so that the plan can be cross-referenced to the data provided.	S, D
(2) single line diagram & earthing configuration	S, D, R2
(3) details of generator maximum kVA output over 60 second interval	S, D, R2
(4) a typical 24 hour load power curve measured at 15 minute intervals or less	S, D. R2
(5) calculation of expected maximum symmetrical 3 phase fault current contribution	S, D,
(6) Data on power quality characteristics for wind generators (including flicker and harmonics) to IEC 61400-21	S, D, R2
(7) where required by Western Power, aggregate data required for performing stability studies in accordance with clause 3.2.16 & 3.3.3 and results of preliminary studies (if available)	D

Transformers1

Item	Unit	Data Category
Identifier2		
Number of windings	Number	S
Rated MVA of each winding	MVA	S, D
Principal tap rated voltages	kV/kV	S
Positive sequence impedances (each wdg)3	(a+jb)%	D, R1
Negative sequence impedances (each wdg)3	(a+jb)%	D, R1
Zero sequence impedances (each wdg)3	(a+jb)%	D,R1
Tapped winding	Text or diagram	S
Tap change range	kV-kV	D
Tap change step size	%	D
Number of taps	Number	D
Tap changer type, on/off load	On/Off	S
Tap change cycle time	S	D
Vector group	Text or diagram	S
Attachments required		
Earthing arrangement		S, D

Notes:
1: A separate data sheet is required for each transformer.
2: Where there is more than one transformer, the identifier should be the same as used on the single line diagram.
3: Base quantities must be clearly stated.

Synchronous Generators1

Item	Unit	Data Category
Identifier2		
Make	Text	D
Model	Text	D
Rated kVA	kVA	S, D, R1
Nominal terminal voltage	kV	D
Number of pole-pairs	No	
Speed	rpm	
Rated kW (sent out)	kW (sent out)	S, D, R1
Minimum load (ML)	kW (sent out)	D, R1
Inertia constant (H) for generator only	kW-sec/rated kVA	D, R1
Inertia constant (H) for all rotating masses connected to the generator shaft (for example, generator, turbine, etc). Include gearbox (if any)	kW-sec/rated kVA	D, R1
Short circuit ratio		D, R1
Neutral earthing impedance3	(a+jb)%	D, R1
Sequence Impedances (saturated)		
Zero sequence impedance3	(a+jb)%	D, R1
Negative sequence impedance3	(a+jb)%	D, R1
Reactances (saturated)		
Direct axis transient reactance3	%	D, R1
Direct axis sub-transient reactance3	%	D, R1
Reactive capability (at machine terminals)		
Maximum lagging (overexcited) reactive power at rated kW	kVAr export	S, D, R2

Maximum leading (underexcited) reactive power at rated kW	kVAr import	S, D, R2
Lagging reactive short time capability at rated kW, terminal voltage and speed	kVAr for time	D, R1

Synchronous Generators (continued)

Attachments

Capability chart (Indicate effect of temperature and voltage)	Graphical data	**S, D, R1**

Notes:
1: A separate data sheet is required for each generator.
2: Where there is more than one generator, the identifier should be the same as used on the single line diagram.
3: Base quantities must be clearly stated

Induction Generators1

Item	**Unit**	**Data Category**
Identifier2		
Make	Text	D
Model	Text	D
Rated kVA	kVA	S, D, R1
Rated kW (sent out)	kW (sent out)	S, D,R1
Reactive consumption at rated kW	kVAr	S, D, R1
Nominal terminal voltage	kV	D
Synchronous speed	rpm	D
Rated speed	rpm	D, R1
Maximum speed	rpm	D, R1

ATTACHMENT 12 - TESTING AND COMMISSIONING OF SMALL POWER STATIONS CONNECTED TO THE DISTRIBUTION SYSTEM

A12.1 Application

This attachment specifies the specific requirements for the certification, testing and commissioning of *generating units* connecting to the *distribution system* in accordance with clause 3.6 and for which the provisions of clause 4.2 apply.

A12.2 Certification

The *Generator* must provide certification by a chartered professional engineer with National Professional Engineers' Register Standing in relevant areas of expertise that the facilities comply with the *Rules*, the relevant *connection agreement*, good engineering practice and relevant standards. The certification must confirm that the following have been verified:

1. The single line diagram approved by the *Network Services Provider* has been checked and accurately reflects the installed electrical system;
2. All required switches present and operate correctly as per the single line diagram;
3. The specified generation *facility* is the only source of power that can be operated in parallel with the distribution network;
4. The earthing systems complies with Australian Standards AS3000 and AS2067 and do not rely upon the *Network Service Provider's* earthing system;
5. Electrical equipment is adequately rated to withstand specified network fault levels;
6. All protection apparatus (that serves a network protection function, including backup function) complies with IEC 60255 and has been correctly installed and tested. Interlocking systems specified in the *connection agreement* have been correctly installed and tested;
7. The islanding protection operates correctly and disconnects the small *power station* from the network within 2 seconds;
8. Synchronizing and auto-changeover *equipment* has been correctly installed and tested;
9. The delay in reconnection following restoration of normal supply is greater than 1 minute;
10. The *protection* settings specified in the *connection agreement* have been approved by the *Network Services Provider* and are such that satisfactory coordination is achieved with the Network Service Provider's *protection systems*;
11. Provision has been made to minimise the risk of injury to personnel or damage to *equipment* that may be caused by an out-of-synchronism fault;
12. *Control systems* have been implemented to maintain *voltage*, *active power* flow and *reactive power flow* requirements for the *connection point* as specified in the

connection agreement;
13. Systems or procedures are in place such that the testing, commissioning, operation and maintenance requirements specified in the *Rules* and the *connection agreement* are adhered to; and
14. Operational settings as specified.

A12.3 Pre-commissioning

Commissioning may occur only after the installation of the metering *equipment*.

A12.4 Commissioning Procedures

The commissioning of a *generating unit* shall include the checks and tests specified in clauses A12.5 to A12.14.

A.12.5 Operating Procedures

• The single line diagram shall be checked to confirm that it accurately reflects the installed plant;
• The documented operating procedures agreed with the *Network Service Provider* and have been implemented as agreed;
• Naming, numbering and labelling of plant agreed with the *Network Service Provider* has been followed; and
• Operating personnel are familiar with the agreed operating procedures and all requirements to preserve the integrity of the protection settings and interlocks and the procedures for subsequent changes to settings.

A12.6 *Protection Systems*

• *Protection apparatus* has been manufactured and installed to required standards;
• The settings and functioning of *protection system*s required for the safety and integrity of the *distribution system* operate correctly (at various power levels) and coordinate with the *Network Service Provider's protection systems*. This will include the correct operation of the *protection systems* specified in the *connection agreement* and, in particular,
    - o islanding *protection* and coordination with automatic reclosers export/import limiting *protection*;
    - o automatic changeover schemes; and
    - o fail-safe generator shutdown for auxiliary *supply* failure or loss of *distribution system supply;* and
• Any required security measures for protection settings are in place.

A12.7 Switchgear Installations

• Switchgear, instrument transformers and cabling have been manufactured, installed and tested to required standards.

A12.8 *Transformers*

• Transformer(s) has been installed and tested to required standards; and
• Transformer parameters (nameplate inspection) are as specified and there is correct functioning of on-load tap changing (when supplied).

A12.9 Earthing

• The earthing connections and value(s) of earthing electrode impedance are correct; and
• The earthing systems comply with Australian Standards AS3000 and AS2067 and do not rely upon the *Network Service Provider's* earthing system

A12.10 *Generating Units*

A12.10.1 Unsynchronised/ disconnected

• *Generating unit* parameters are as specified (nameplate inspection);
• *Generating units* have been manufactured to meet the requirements of the *Rules* for riding through *power system* disturbances;
• Earthing arrangements of the generating unit are as specified;
• Correct functioning of automatic voltage regulator for step changes in error signals (when specified);
• Achievement of required automatic voltage regulator response time (when specified); and
• Correct functioning of automatic synchronizing equipment prior to synchronisation.

A.12.10.2 Voltage Changes

• Voltage transients at the *connection point* on connection are within specified limits; and
• Step changes in *voltage* on connection and disconnection (both before and after tap-changing) are within required limits.

A12.10.3 Synchronous *Generating Units*

• The *generating unit* is capable of specified sustained output of *real power* (when required);
• The *generating unit* is capable of required sustained generation and absorption of *reactive power*, (when required);
• Correct operation of over- and under-excitation limiters (when required); and
• Response time in constant *power factor* mode is within limits (when required).

A.12.10.4 Asynchronous Generating Units

• Starting inrush current is within specified limits;
• *Power factor* during starting and normal operation is within specified limits; and

• Rating and correct operation *of reactive power* compensation *equipment.*

A.12.10.5 Inverter connected Generating Units

• *Power factor* during starting and normal operation is within specified limits; and
• Rating and correct operation of *reactive power* compensation equipment.

A.12.10.6 Harmonics and Flicker

• Network flicker and harmonics levels before and after connection and confirmation that limits have not been exceeded (not required for directly connected rotating machines)**.**

A12.10.7 Additional Requirement for Wind Farms

• The level of variation in the output of a wind *generating unit* or wind farm is within the limits specified in the *connection agreement*.

A12.11 Interlocks and Intertripping

• Correct operation of interlocks, check synchronizing, remote control, permissive interlocking and intertripping.

A12.12 Voice and Data Communications

• Correct operation of primary and back up voice and data communications systems

A12.13 Signage and Labelling

• Signage and labelling comply with that specified in the relevant *connection agreement*.

A12.14 Additional Installation Specific Tests

• The *Network Service Provider* may specify additional installation specific tests and inspections in respect of the physical and functional parameters that are relevant for parallel operation of the small *power station* and coordination with the *distribution system*.

A12.15 Routine Testing

• The *Generator* must test *generating unit protection systems*, including backup functions, at regular intervals not exceeding 3 years for unmanned sites and 4 years for manned sites and keep records of such tests.

A12.16 Non-routine Testing

• The *Network Service Provider* may inspect and test the small *power station* from to re-confirm its correct operation and continued compliance with the *Rules*, *connection agreement*, good engineering practice and relevant standards. In the event that the *Network Service Provider* considers that the installation poses a threat to safety, to *quality of supply* or to the integrity of the *distribution system* it may *disconnect* the *generating equipment*.

ATTACHMENT G: CALTEX CUSTOMER OPERATIONS GUIDE

Customer Operations Guide

CALTEX

Supply & Distribution / Logistics

Please Note:
Caltex does not make any representation or warranty as to the accuracy or completeness of the contents of this guide. This guide is not intended to provide legal or other professional advice or opinion on the subject matter (s) of this guide, and it should not be used as a substitute for such advice.
Nothing in this guide will in any way relieve your organisation from, or reduce, its responsibilities and obligations (including but not limited to those relating to the environment and occupational health and safety, and any contractual obligations to Caltex or to others) in respect of its business and property (including and that its owns or operates)

PURPOSE OF THIS GUIDE

The purpose of this guide is to provide a reference tool to assist your organisation in determining and meeting its obligations with respect to receiving, storage and handling of fuel and lubricant products under relevant legislative requirements and Standards.

However, this guide is intended only as a primary source of information. Its contents are not intended to be exhaustive. In providing this guide, Caltex must not be taken to have assumed any such responsibilities or obligations. Ultimately, it is your organisation's responsibility to know and comply with all laws and regulations that are applicable to its business and facilities. Such laws and regulations may change from time to time, and it is your responsibility to keep up to date with all such changes.

EMERGENCY PROCEDURES

AS 1940 requires that emergency response procedures are in place for spills, fires & tanker Incidents.

Under AS1940 if your site is involved in the, storage of dangerous goods in excess of 5000 litres of Packaging Group I, II or III flammable Liquids or 10,000 Litres of Packaging group C1 Combustible liquids, you are required to have emergency response procedures. These procedures must be specific and cover topics including

- Hazard identification
- List of emergency contact phone numbers
- Emergency operation flow charts
- Duty List
- Capacity of resources (including mutual aid arrangements, fire teams, fire drills & Evacuation procedures)
- Assembly points
- First Aid
- Spill Control
- Clean Up
- Decontamination
- Site Plan
- Revision schedule

It is a requirement of AS1940 that all employees and contractors in your organisation are trained in the procedures to be followed *in* the event of an accident (spillage, accident or fire).

Employees and contractors assigned emergency response duties must be given specific training, including fire fighting, spillage control, clean-up and decontamination, evacuation control and first aid.

INCIDENT REPORTING & EMERGENCY RESPONSE

In the event that an incident occurs that relates to a delivery made by or on behalf of Caltex, or the storage or use of fuels or lubricants involving Caltex owned storage or fuel handling equipment; you must notify Caltex immediately utilising the contact numbers provided. Caltex can assist in the investigation of such indents on request, although in providing any such assistance, Caltex shall not be taken to have assumed any responsibility for such incident or the investigation

EMERGENCY CONTACT: 1800 033 111
Non- Emergency incidents as follows involving Caltex or Caltex owned equipment should be promptly reported to your business manager:

- REPORT SPILLS
- REPORT EQUIPMENT MALFUNCTION
- REPORT OTHER INCIDENT

The following documents and standards may Assist you in preparation of your organisations Emergency response procedures:

- Location site plan
- Local government drainage plans
- Local environment health and safety policy
- Australian dangerous goods code volume I
- A practical guide to basic risk Management (Work Cover publications)

PROVISION OF INFORMATION

On request, Caltex will provide material safety data sheets (MSDS) for all products supplied.

MSDS are also available on line at;
www.caltex.com.au

MANAGEMENT OF FUEL & LUBRICANT FACILITIES

When you own operate a facility which us used for storage and dispensing of fuel or lubricants, there are certain laws, regulations and standards with which you must comply.

This section of the guide is aimed at broadly describing some of your obligations and assisting you in locating additional information about those obligations. Whilst the applicable laws, regulations and standards may vary from location to location, there are in general, minimum standards which must be met for all sites.

Licensing

The types of licenses will depend upon the applicable laws of the relevant State or Territory and the amount and type of products stored.

Typical licenses that may be required include, but are in limited to:

- Dangerous goods
- Clean Air
- Trade Waste
- EPA Licence etc.

You should check the State and local authorities to ensure that correct licenses are in place for all your sites and facilities.

Facilities Design

Your organisation's facilities should be designed to comply with the relevant codes and standards.

Relevant standards include, but are not limited to:

- AS 1940: The storage and handling of flammable and combustible liquids.
- AS 1020: Static Electricity Code
- AS1345: Identification of the contents of piping, conduits and ducts.
- AS1692: Tanks for flammable and combustible liquids.
- AS1841: Portable fire extinguishers
- AS1851: Maintenance of the protection equipment
- AS2430: Classification of hazardous areas
- AS2683: Hose and hose assemblies for distribution of petroleum products
- AS2809: Road tank vehicles for dangerous goods
- The Australian Dangerous Goods Code (ADG Code)
- AS1657: Design, Construction & Installation of ladders and walkways
- These standards and codes address, amongst other things, the following:

Note:
Customers should develop their own Facility safety plan- see AS1940 (9.3.1 (a)

Labelling of tanks and pipe work

All products in the storage facility and leaving the facility must be correctly labelled as specified in the ADG Code.
It is a requirement of AS1940 that pipe work be painted or labelled to readily identify its contents. There should be sufficient labelling to allow easy identification of pipelines.

Truck and Machinery filling areas

Design

Issues to address include:

- Means of escape from the platform for the operator
- Safe access to the top of the truck and hatches
- Availability of eye wash and safety shower
- Deadman switch operation
- Drip collection
- Emergency stops
- Spill containment and collection
- Control of static electricity charge generated during filling
- Fire protection.

Tank farm design

Tank farms should be designed to comply with AS 1940. The major issues to address include:

- Tank bundling and compounds including isolation of drain valves.
- The base of tanks should be free draining to stop water accumulating around the tank base.
- Tank earthing for static electricity control, in particular, the requirements of AS 1020.
- Ongoing continuity testing.
- Fire protection.
- Drum storage area layout
- If drums are stored on site, they must be stored
- In accordance with the appropriate standards and codes.

Additional consideration should be given to

- Position of portable tanks to electrical hazards and other sources of ignition
- Safe vehicle access & on site manoeuvring
- Adequate levels of lighting
- On site traffic management
- Fall prevention /protection
- Housekeeping (on site rubbish/ obstacles)
- Safe fill levels clearly marked
- Calibration of level indicators
- Proximity of spill kits

Areas addressed by these standards and codes include:

- AS 1940 requires the drum storage area to be bunded.
- The bund wall should be regularly checked for breaches.

- Over stacking of products can result in packages/ drums falling and splitting, causing a spill. Old drums should be stored safely to ensure no residual product can leak out.
- Flammable liquids must not be stored in areas that are designed only for combustible liquids.
- Where possible eliminate filling of 205 litre drums. If filling is carried out AS1940 must be satisfied.
- Filling procedures must be displayed. Filling equipment must be earthed, free of leaks and safe to operate.

Underground Tanks and Product Quality

- Fill points must be clearly identified to prevent products mixing during discharge.
- Fill points must be designed to prevent storm water entering in-ground storage tanks.
- Tank vent pipes should be checked regularly to ensure that they are clear of any blockages.
- Tanks should be dipped to check the presence of water. If water is present, it should be removed and then stored for appropriate waste disposal.
- Dipsticks should be checked regularly for wear and replaced if required.
- If cathodic protection is provided, you should ensure that the system is serviced by a corrosion specialist.
- Product dispensers must be calibrated to comply with relevant regularly requirements.
- Ground water monitoring wells should be checked in accordance with the above publication.
- Leak detection equipment should be serviced according to the manufacturer's specifications.

Safe Distances

AS2430 deals with the classification of hazardous zones, in particular those relating to the dispensing of petroleum products. Areas defined as hazardous mean that there is a potential for explosive atmosphere to be present.

This requires special precautions for the control of ignition sources.

Security

Site access should be controlled in accordance with the relevant standards and codes, which address issues including the following:

- All restricted areas shall be protected by a security fence.
- Procedures should be in place to control the entry of unauthorised people or vehicles to a restricted area.
- All restricted areas shall be locked up whenever they are unattended.
- Appropriate signs and notices should be present at the main gate.
- Unattended facilities should have valves locked.

High-level Tanks

Any tank that produces a gravity head at the dispenser must be equipped with a fail safe solenoid valve or other equally effective device that will shut off supply at the tank outlet when the dispenser is not in use. A manual valve shut-off system is acceptable for category 1 and 2 tanks: please refer to AS1940.

Water Effluent and Waste Disposal

Your organisation should ensure that all relevant employees and contractors are trained in the following:

- How to isolate any wastewater discharge to contain a spill.
- Where the local waterways are, and the impact a spill could have.
- Principles, maintenance and cleaning of oily water interceptors
- Waste water licensing issues.

Waster water treatment must be to the approval of the local authorities. In the event, the minimum acceptable treatment prior is discharge is to be through an oily water interceptor, or any other part of the waste water system.

The general philosophy with waste water control is to keep it isolated from non polluted stormwater. Hence non-polluted stormwater should not be allowed to drain into an oily water interceptor. The oily water interceptors should be inspected on a frequent and regular basis, and any oil present should be skimmed off to avoid build up.

The oily water interceptor should be cleaned out at least every six (6) months to remove any sludge build up in the bottom. Records of when the interceptor was cleaned should be kept.
Licensed contractors shall be used to transport and dispose of waters, as required by statutory regulations. Records of all wastes removed from a site should be kept in a log-book, which should include a description of the waste, an estimated volume, who transported the waste, and the disposal site.

Fire Protection

AS1940 should be referred to for information on fire protection requirements. This standard contains requirements for extinguishers, hydrants and other fire protection systems. It is important that an adequate number of fire extinguishers of the correct

type are correctly positioned and are maintained in good working order. The extinguishers must always be available for use and your organisation's employees and contractors should be trained in their effective operation.

Electrical

Electrical equipment used in hazardous areas shall be of a certified type and installation and shall comply with AS 3000.

MAINTENANCE OF EQUIPMENT

It is a requirement of AS 1940 that regular checks of equipment be undertaken. These checks shall include pipelines, hoses, flanges, valve stem packagings, and pump seals, etc. The results of equipment checks should be documented and retained for the life of the installation.

In addition to the above requirements, where the equipment is owned by Caltex, you are obliged to report to Caltex any items requiring repair or maintenance. This reporting should be done as soon as practicable or at least on the next working day that you become aware of the issue.

Drain pits and channels for both the waste water system and the stormwater (non-polluted) system shall be inspected to ensure they are free from rubbish, debris and vegetation. Tank bunds should be kept free of any vegetation.

Work Clearance Procedures

Your organisation should develop policies and procedures covering work clearance and authorisation for facilities where work is carried out on or in the vicinity of the bulk fuel storage Facilities.

Any work of a non-routine nature on fuel equipment and within the hazardous zone around the fuel equipment should not be undertaken without an appropriate work permit system.

Hot Work and Confined Space Entry

For any work within a hazardous area, which has the potential to create an ignition source, an appropriate work permit system should be employed to deal with all hazards present. Entry into a confined space should also be controlled.

You should refer to the relevant legislation and AS2865 "Safe working in a confined space".

TRAINING OF PERSONNEL IN SAFE HANDLING OF FUELS AND LUBRICANTS

AS 1940 states that, "it shall be the responsibility of the occupier of the installation to ensure that training or instruction in established procedures is provided".

All your site employees and contractors should be trained in areas including the following:

1. Procedures to be followed in the event of an incident (spillage, accident or fire).
2. Layout of the installation;
3. Location of fire fighting equipment;
4. Basic principles of fife fighting and use of equipment.
5. All laws and regulations relevant to their tasks;
6. Awareness of the properties, characteristics and hazards of any materials kept or handled;
7. Correct use of any personnel protective equipment provided;
8. Area housekeeping; and
9. Safety rules of the installation including access and work permits.

It is a requirement of AS1940 that all visitors be instructed in the safety rules of the installation including restrictions on movement, access and activities. Visitors must also be instructed in evacuation procedures including location of assembly points.

Records of training and incidents (fires, significant spills, injuries, etc) are required to be kept, as are records of drills and practices.

Product Characteristic and Material Safety Data Sheets

Petroleum products can be classified as either dangerous goods (flammable) or combustible liquids. Materials with a flash point below 61C are classed as dangerous goods, whilst those with flash points above 61C are classed as combustible. Petrols are therefore classed as flammable liquids, whilst diesels and fuel oils are classed as combustible liquids.

Caltex makes Material Safety Data Sheets (MSDSs) available to customers dispensing and using Caltex fuels and lubricants. These MSDSs are available on the Caltex's web site at www.caltex.com.au

As an employer, your organisation is, among other things, under an obligation through occupational health and safety legislation to make available to employees information about the safe use and handling of substances used in the work place.

FACILITY INSPECTIONS

Inspection of Bulk Fuel Storage Equipment
Prior to commencement of supply, and periodically after that time, Caltex may inspect the total fuel storage and dispensing system and assess its condition; although any such inspection will not in any way relieve your organisation from, or reduce, its responsibilities for its fuel storage and dispensing system. Caltex reserves the right to refuse to supply fuel and or lubricants should there be a concern about the safe operation of the facility.

You should ensure sufficient time is allocated for this activity prior to scheduling for first order in case of

- Equipment recommendation
- Vehicle selection
- Improvement recommendation

INVENTORY RECONCILIATION

Manual Inventory control remains one of the most cost effective ways of detecting leaks from equipment. In addition, inventory control can identify and prevent high working losses and detect possible pilferage. Whilst the principles of stock control are very simple, the application can become confused by the many complexities involved. Inventory reconciliation is a critical process that can aid in:

- Early detection of leaks and spills
- Preventing shutdowns and interruptions as a result of safety and environmental hazards minimising working losses.
- Providing useful information on stock turnover.
- Providing information to allow accurate ordering identifying incorrect billing.
- Indicating potential theft
- Aiding in the due diligence process.

All sites will experience some form of inventory losses. Some of these losses are unavoidable and may result from tank venting, measurement inaccuracy, and temperature variation. The size of these unavoidable losses will vary depending upon the local site conditions. When deciding whether a detailed loss investigation should be commenced, historical trends should be examined. Any sudden departure from the historical loss pattern should be investigated further.

In order to obtain the full benefits of inventory control, it is important that the practice be conducted accurately and diligently. Inventory control activities should be conducted at the same time each day to allow the greatest consistency. This is also best done in periods of lower activity. To conduct reconciliation a simple volume balance calculation is done for each individual tank.

Loss Investigation
The key points are summarised as follows,

1. Check stock reconciliation records for previous 3 months for arithmetic or record-keeping errors.
2. Check for delivery shortages. i.e. a single loss.
3. Check security issues; is it possible stock has been stolen?
4. Check dip sticks for wear and check that each tank has the correct dip stick.
5. Check each tank for the presence of water by either use of probes or water finding paste.
6. Check meter calibration
7. Check for leaks around product pumps, manifolds and vents.

If none of the above reveals a reason for the discrepancy then an equipment integrity test should be performed.

Reconciliation Process

ATTACHMENT H: CALTEX FUEL SPECIFICATIONS

Approved

CALTEX **Product Sales Specification**

Extra Low Sulfur Diesel

This product conforms to: AS 3570 - 1988 Amendment no. 1, Qld Environmental Protection Amendment Regulation (No. 3) 2000 (in Qld only), SA Environment Protection (Motor Vehicle Fuel Quality) Policy, WA Clean Fuels Regulations 1999 (in WA only), Fuel Standard (Diesel) Amendment Determination 2002 (No. 1) , Diesel Operability Standards endorsed June 2002

Effective Date: **15.10.2007**

Properties

Property	Unit	Limit	Method	Note
PHYSICAL				
Density at 15 °C	kg/L	0.820 - 0.850	ASTM D1298 or D4052	
Colour		2 max.	ASTM D1500 or D6045	
Visual inspection at 25 °C		1 max.	ASTM D4176 procedure 2	
COMPOSITION				
Sulfur	mg/kg	10 max.	ASTM D2622 or D5453	
Polyaromatic Hydrocarbons	mass %	11% max.	IP 391	
CORROSION & WEAR				
Copper strip (3 h at 50 °C)		1 max.	ASTM D130	
Acidity			ASTM D664 or D974	
Strong	mg KOH/g	nil		
Total	mg KOH/g	0.30 max.		
Lubricity (wsd 1.4) at 60 °C	µm (mm)	460 (0.46) max.	IP 450	
VOLATILITY				
Distillation 95% recovered	°C	360 max.	ASTM D86	
Flash point	°C	61.5 min.	ASTM D93	
STABILITY				
Oxidation stability	mg/L	25 max.	ASTM D2274	
COMBUSTION				
Ash	mg/kg	100 max.	ASTM D482	
Carbon residue (on 10% dist. residue)	mass %	0.2 max.	ASTM D4530	
Cetane index or number		46 min.	ASTM D4737 or Calculated	5
FLUIDITY				
Cloud point	°C	notes 1,2,3	ASTM D2500, D5773 or D5772	1,2,3
Viscosity at 40 °C	mm^2/s (cSt)	2.0 - 4.5	ASTM D445	
CONTAMINANTS				
Filter blocking tendency		2.0 max.	IP 387 or ASTM D2068	
Water and sediment	volume %	0.05 max.	ASTM D2709 or D1796	
ADDITIVES				
Static dissipating	mg/L	proprietary		
Lubricity	mg/L	proprietary		4
FAME	volume %	2% max.		6

ATTACHMENT I: SOIL RESISTIVITY RESULTS

TESLA CORPORATION

KEMERTON PEAK LOPPING SITE

SOIL RESISTIVITY TESTING

Soil

Soil Type	Sand
Soil Condition	Soft Dry Sand

Test Position 1

1	Probe Spacing (Meters)	1	Resistance (Ohms)	593	Result (Ohm Meters)	3726
2	Probe Spacing (Meters)	2	Resistance (Ohms)	167	Result (Ohm Meters)	2095
3	Probe Spacing (Meters)	5	Resistance (Ohms)	14100	Result (Ohm Meters)	442965
4	Probe Spacing (Meters)	7.5	Resistance (Ohms)	13900	Result (Ohm Meters)	655022
5	Probe Spacing (Meters)	10	Resistance (Ohms)	15100	Result (Ohm Meters)	948761

Test Position 2

1	Probe Spacing (Meters)	1	Resistance (Ohms)	51	Result (Ohm Meters)	320
2	Probe Spacing (Meters)	2	Resistance (Ohms)	17	Result (Ohm Meters)	217
3	Probe Spacing (Meters)	5	Resistance (Ohms)	2	Result (Ohm Meters)	51
4	Probe Spacing (Meters)	7.5	Resistance (Ohms)	2400	Result (Ohm Meters)	113097
5	Probe Spacing (Meters)	10	Resistance (Ohms)	2500	Result (Ohm Meters)	157080

ATTACHMENT J: GEOTECHNICAL RESULTS

Refer to Geotechnical Report by MBS Environmental. Details from the report are as follows:

SITE DETAILS:

The Kemerton site is located on Marriot Road within the Kemerton Industrial Park, approximately 17 kilometres northeast of Bunbury, Western Australia

Figure 1). A legal description of the site is provided in Table 1.

Table 1: Kemerton Site Details

Identification	Details
Coordinates (MGA94, Zone 50)	384617 metres east, 6324475 metres south
Street Address	Lot 5107 Marriot Road, Kemerton Industrial Park.
Property Description	Vacant lot
Property Size	9.01 hectares
Local Government	Shire of Harvey
Current Land Use	Heavy Industrial
Proposed Land Use	Heavy Industrial

SITE HISTORY:

The Kemerton Industrial Park was established in 1985 as a strategic industrial area to provide appropriate buffered land for heavy industry. It covers an area of 7,543 hectares, comprising an industrial core of 2,100 hectares and a support industry area of 300 hectare. The area of the buffer zone is 5,437 hectares of bushland, wetland, protection zones and recreational area.

Prior to establishment of the Kemerton Industrial Park, most of the land was undeveloped. The area was not considered suitable for agriculture because of poor soils and inadequate drainage, although some land was used by pastoralists for seasonal grazing.

A family owned abattoir has operated in the area since the late 1970's. A commercial piggery also operated in the area.

Lot 5105 had been historically cleared and its current bushland description is described as 'the structure of the vegetation is no longer intact and the area is completely or almost completely without native species' (SKM 2008).

Industries established at Kemerton are detailed in Table 2.

Table 2: Kemerton Surrounding Industries

Name	Type/Description
Millennium Inorganic Chemicals	Titanium dioxide pigment plant.
BOC Limited	Air separation plant that provides industrial grade oxygen and nitrogen gases.
Nufarm-Coogee Pty Ltd	Produces chlorine gas and caustic soda.
Simcoa Operations	Silicon smelter.
Kemerton Silica Sand	Silica sand mine to the north of Kemerton Industrial Park.
Transfield Services	Gas-fired (with diesel backup) power station.
Water Corporation	Wastewater treatment plant. Some of the wastewater is used to irrigate nearby tree farms.

SOIL ASSESSMENT:

The objectives of this soil assessment are:

- To determine whether or not the sites have been contaminated by common organic and inorganic (metals) pollutants as a result of previous land use activities.
- To determine whether or not Acid Sulphate Soil (ASS) materials are present on the sites to a depth of up to two metres below the existing ground surface.
- To determine basic engineering properties of the Kemerton soil.

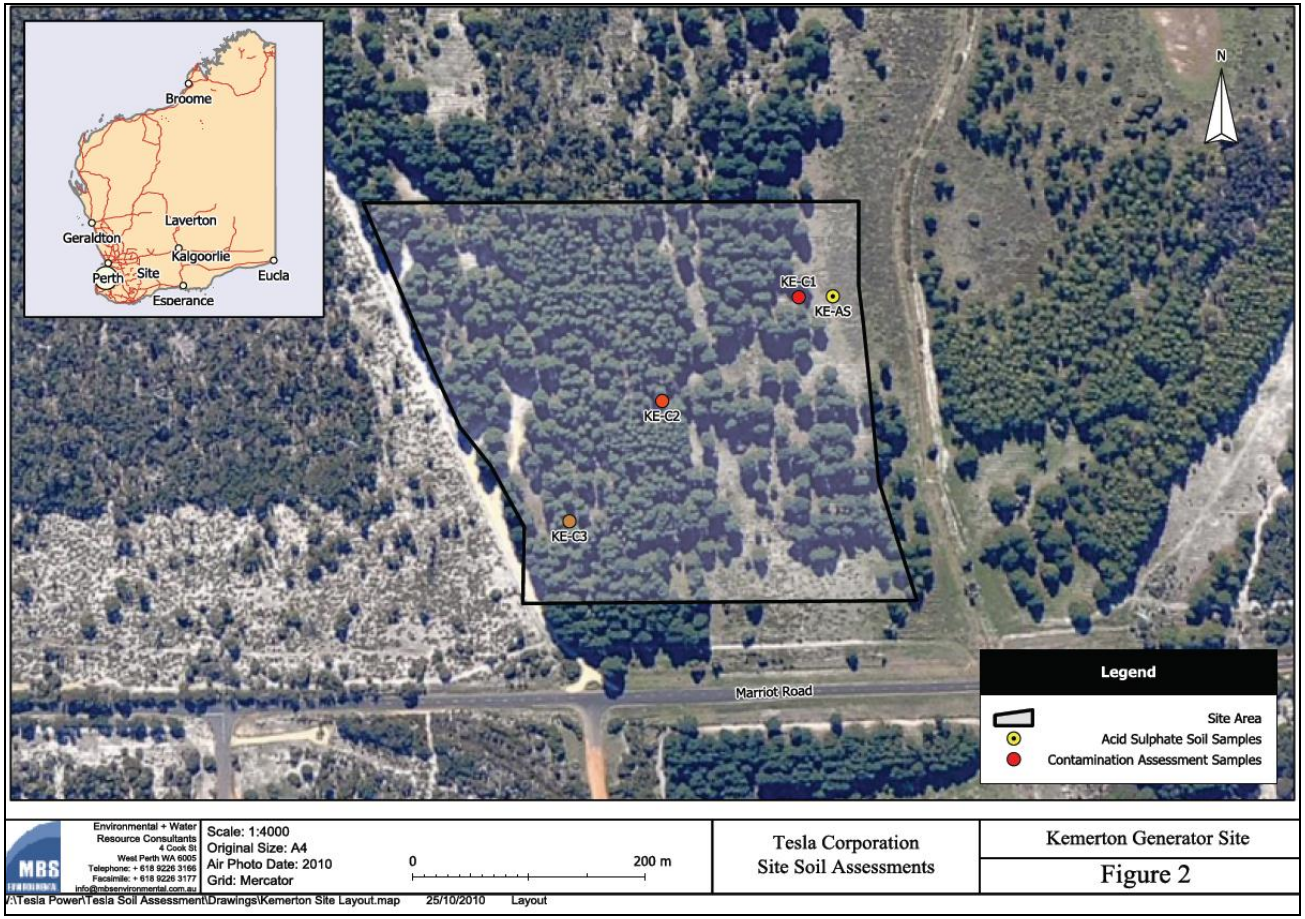


Figure 1: Kemerton Soil Assessment

CONTAMINATION LIABILITY ASSESSMENT:

On the basis of a previous land use history of mainly rural activity, it was found that the only likely potential contaminants are very small amounts of nutrients and trace amounts of heavy metal contaminants present in fertilisers and animal manure.

Contamination of the site by fallout from atmospheric emissions from existing industries within the Kemerton Industrial Park was considered possible, although significant contamination is highly unlikely. The most likely contaminants emitted by these industries were found to be petroleum hydrocarbons and polycyclic aromatic hydrocarbons.

Acid sulphate soil risk maps for the Swan Coastal Plan indicate that the site is located in an area of low to moderate ASS risk. The nearest area of moderate to high risk was found to be located in an area of lower topographical elevation approximately 500 metres northeast of the site. GHD undertook an ASS investigation in 2008 for the Transfield Services Limited along the route of the proposed water pipeline corridor, approximately 10 kilometres northeast of the site. ASS were only encountered at depth in low lying areas adjacent to the Wellesley River.

ACID SULPHATE SOIL ASSESSMENT:

A total of 8 soil samples were collected during the site ASS assessments. A single sampling location was selected at each site and samples were collected in 250 millimetre intervals to a depth of up to two metres using a hand auger.

Samples were stored in sealed plastic bags and refrigerated prior to being transported to the laboratory in an esky filled with ice bricks. Each sample was tested for pH_F and pH_{FOX} at the laboratory.

Descriptions of each sample and results for the pH_F and pH_{FOX} tests are presented in Table 3. No visible indications of physical contamination were observed in any of the sampled material.

Table 3: ASS Sample Descriptions

Site	Depth (metres)	Description	pHF	pHFOX
Kemerton	0.00 – 0.25	Dark grey sand turning lighter down the profile. Organic matter in top 100 mm. Moist.	5.3	5.1
	0.25 – 0.50	Grey sand turning lighter down the profile. Moist.	5.3	5.3
	0.50 – 0.75	Dark to black sand with high organic matter content. Moist.	5.2	5.5
	0.75 – 1.00	Light grey to very light brown sand.	5.5	5.6
	1.00 – 1.25	Light grey to very light brown sand.	5.6	5.7
	1.25 – 1.50	Light grey to grey sand. Wet.	5.5	5.7
	1.50 – 1.75	Light grey to grey sand. Wet.	5.6	5.7
	1.75 – 2.00	Light grey to grey sand. Wet.	5.6	5.7

On the basis of screening tests for pH_F, which ranged from pH 5.2 to 9.0, and pH_{FOX} which ranged from pH 5.1 to 9.0, it was concluded that no Actual Acid Sulphate Soil (AASS) or Potential Acid Sulphate Soil (PASS) materials were encountered in any of the samples collected from any of the sites.

CONTAMINATION ASSESSMENT – SOIL SAMPLING:

Three to four soil samples were collected from the proposed power station site. Each sample was collected from the surface to a sampling depth of up to 100 millimetres below existing ground levels.

The samples were placed in pre-washed, laboratory-provided, 250 millilitre glass containers. The samples were then refrigerated prior to being placed in an esky with ice/cooling blocks and delivered to the laboratory.

CONTAMINATION ASSESSMENT – LABORATORY RESULTS AND DISCUSSION:

All samples were analysed by SGS Laboratories, which is accredited by NATA for all tests performed. The samples were tested for a range of potential organic and inorganic contaminants. A summary of results for major organic and inorganic contaminants are presented in Table 4 and Table 5 respectively. Measured concentrations are compared to Ecological Investigation Levels (EIL) listed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC 1999).

A sample collected from Kemerton contained very low concentrations of the heavier hydrocarbon fractions (C_{15}-C_{28} and C_{29}-C_{35}). These are expected to be attributable to naturally occurring aliphatic organic compounds within the soil. All results were well below the Ecological Investigation Level (EIL). Based on these results, the site is considered free of contamination by common organic pollutants such as aromatic hydrocarbons, PCBs, organochlorine pesticides and organophosphate pesticides.

Table 4: Organic Contaminant Analytical Results

Parameter	Units	EIL	Kemerton		
			KEC1	KEC2	KEC3
Total Recoverable Hydrocarbons					
C_6-C_9	mg/kg	100	<20	<20	<20
C_{10}-C_{14}	mg/kg	500	<20	<20	<20
C_{15}-C_{28}	mg/kg	-	<45	<45	59
C_{29}-C_{35}	mg/kg	-	<45	<45	57
Monocyclic Aromatic Hydrocarbons					
Benzene	mg/kg	1	<0.2	<0.2	<0.2
Toluene	mg/kg	3	<0.6	<0.6	<0.6
Ethyl benzene	mg/kg	5	<0.6	<0.6	<0.6
Xylenes	mg/kg	5	<1.6	<1.6	<1.6
Organochlorine Pesticides (OC)					
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2
Chlordane	mg/kg	0.5	<0.2	<0.2	<0.2
Heptachlor	mg/kg	0.5	<0.1	<0.1	<0.1
Total OCs	mg/kg	1	-	-	-
Polychlorinated Biphenyls (PCBs)					
PCB Congener C28	mg/kg	<0.1	<0.1	<0.1	<0.1
PCB Congener C52	mg/kg	<0.1	<0.1	<0.1	<0.1
PCB Congener C101	mg/kg	<0.1	<0.1	<0.1	<0.1
PCB	mg/kg	<0.1	<0.1	<0.1	<0.1

Parameter	Units	EIL	Kemerton		
Congener C118					
PCB Congener C138	mg/kg	<0.1	<0.1	<0.1	<0.1
PCB Congener C153	mg/kg	<0.1	<0.1	<0.1	<0.1
PCB Congener C180	mg/kg	<0.1	<0.1	<0.1	<0.1
Total PCBs	mg/kg	1	-	-	-

Table 5 shows the analytical results for metals at the Kemerton site. All concentrations for the Kemerton site were found to be below the limit of reporting. These results confirm that heavy metal contamination from previous land use activities has not occurred on the Kemerton site.

Table 5: Inorganic Contaminant Analytical Results

Parameter	Units	EIL	Kemerton		
			KE-C1	KE-C2	KE-C3
Arsenic	mg/kg	20	<2	<2	<2
Cadmium	mg/kg	3	<0.4	<0.4	<0.4
Chromium	mg/kg	400	<5	<5	<5
Copper	mg/kg	100	<5	<5	<5
Lead	mg/kg	600	<5	<5	<5
Mercury	mg/kg	1	<0.05	<0.05	<0.05
Nickel	mg/kg	60	<4	<4	<4
Zinc	mg/kg	200	<5	<5	<5

GEOTECHNICAL ASSESSMENT – SOIL SAMPLING:

The soils from the Kemerton site were inspected by a suitably qualified environmental geoscientist. The desktop study undertaken for the Kemerton site (MBS, 2010b) predicted the Kemerton soils would comprise Bassendean sands, a siliceous sand with little or no fines or coherence. This was confirmed during the site assessment and no samples were collected.

GEOTECHNICAL ASSESSMENT – ANALYTICAL RESULTS AND DISCUSSION:

Site construction works for the Kemerton site should be preceded by appropriate preparation of the ground surface in the areas of proposed development. Preparation should be undertaken in accordance with Australian Standard AS 3798-2007. In addition to AS 3798-2007, MBS recommends the following:

- Identification and diversion or protection of any buried services within the work areas.
- Clearing of surface objects (including building debris, old structures, footings or refuse).
- Grubbing of any tree roots.
- Removal of topsoil containing notable quantities of organic material (e.g. plant roots).
- Contouring/shaping of the ground surface to ensure any stormwater runoff drains from the site.
- Scarification and compaction of prepared surfaces prior to any engineering fill placement.

Slabs should be designed by a suitably qualified engineer.

CONCLUSIONS – CONTAMINATION ASSESSMENT:

There is no evidence to suggest that the Kemerton site has been contaminated due to historical land use. All samples contained concentrations of potential contaminants that were well below the respective Ecological Investigation Levels.

CONCLUSIONS – ACID SULPHATE SOIL ASSESSMENT:

No ASS materials were identified at the site to a depth of 2.0 metres below the existing ground surface. Disturbance of soil to a depth of 2.0 metres during the proposed construction and operation phases will not release acidity into the environment.

CONCLUSIONS – GEOTECHNICAL ASSESSMENT:

Soils at Kemerton comprise Bassendean sands. These sands are considered appropriate for construction of the proposed generator site.

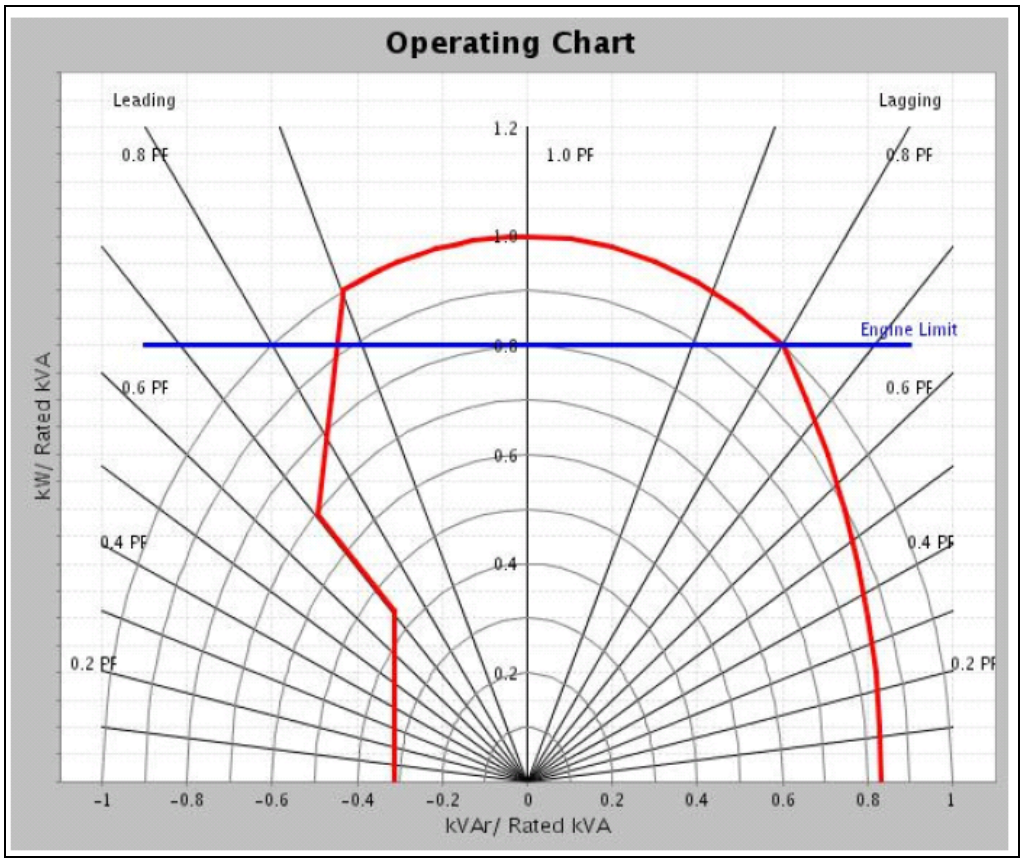
REFERENCES:

Department of Environment and Conservation, May 2009. *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes.*

MBS Environmental, 2010b. Peak Load Power Plant Contaminated Site Liability Assessment, Lot 5107 – Kemerton.

National Environment Protection (Assessment of Site Contamination) Measure (1999). National Environment Protection Council (NEPC), December 1999.

ATTACHMENT K: ALTERNATOR PERFORMANCE CRITERIA



APPENDIX B

Landcorp Letter re: Land Use Agreement

GOVERNMENT OF WESTERN AUSTRALIA

LANDCORP

Enquiries: Jonathan Roach

Western Power
51-71 Ewing Street
BENTLEY WA 6102

Attention: Amy Ward

Dear Amy

TESLA HOLDINGS PTY LTD - LOT 5107 MARRIOTT ROAD, KEMERTON INDUSTRIAL PARK

Reference is made to your email dated 10 June 2011 in which you have sought confirmation of an agreement between LandCorp and the Tesla Holdings Pty Ltd for the purpose of a peak power station on Lot 5107 Marriott Road, Kemerton.

With this regard, I confirm that on 29 July 2010 a Contract of Sale and Licence Agreement was executed between LandCorp and the Tesla Corporation over the subject lot. As the landowners, LandCorp will act reasonably in ensuring that the land be developed for the agreed purposes, including signing the Form 1A as landowner for the purposes of a Development Application.

As requested, I have attached a copy of a recent plan of the approved Marriott Road subdivision.

Yours sincerely

Jonathan Roach
Project Manager
27 June 2011

Western Australian Land Authority ABN 34 868 192 835
Level 3, Wesfarmers House, 40 The Esplanade, Perth Western Australia 6000
Locked Bag 5, Perth Business Centre, Perth Western Australia 6849
T 08 9482 7499 F 08 9481 0861
E landcorp@landcorp.com.au
landcorp.com.au

Kemerton Silica Sands Haul Road

MARRIOTT ROAD

Railway Reserve

Location of crossover subject to Shire of Harvey approval

Simcoa Silicon Smelter

Cristal Global Titanium Dioxide Plant

DEVLIN ROAD

Emergency Access

RESERVE

DRAINAGE

EXISTING POWER TRANSMISSION LINE (132kV)

CONSERVATION 2.77ha

CONSERVATION 2.25ha

Road Widening 2.18ha

5101 10.00ha 7.00ha

5102 19.70ha 17.30ha

5103 18.81ha 12.50ha

5104 11.17ha 3.77ha

5105 19.90ha 8.71ha

5106 5.09ha 3.34ha

5107 5.00ha 2.93ha

5108 9.38ha 6.87ha

5109 8.52ha 4ha

310 510 5549 5548 92 20 42

SCALE AT A2 1:6000

0 50 100 150 200 250 300

ALL DISTANCES ARE IN METRES

harley global

APPENDIX C

MBS Environmental Soil Assessment

TESLA CORPORATION
KEMERTON, NORTHAM AND GERALDTON
SOIL ASSESSMENTS

OCTOBER 2010

PREPARED FOR

TESLA CORPORATION PTY LTD

BY

MBS ENVIRONMENTAL

4 Cook Street
West Perth WA 6005
Australia

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MARTINICK BOSCH SELL PTY LTD
ABN 60 102 614 479
MBS ENVIRONMENTAL
environmental and water resource consultants

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1. INTRODUCTION

1.1 BACKGROUND

Tesla Corporation Pty Ltd (Tesla) propose to construct diesel-fired, peak load power stations at three locations within Western Australia. The stations will each comprise four, 2.5 megawatt diesel power generation units for a combined output of 9.9 megawatts. The stations will generate peak load power which will be fed into the South-West Interconnected System (SWIS). These installations are intended to provide reserve capacity based on anticipated future power demands, as forecasted by the Independent Market Operator (IMO).

SWIS is the major interconnected electricity network in Western Australia. It supplies the bulk of the south-west region, extending to Geraldton in the north, Albany in the south, and the Kalgoorlie mining communities to the east.

1.2 SITE DETAILS

The three proposed sites are located in Kemerton, Northam and Geraldton, Western Australia. Their details are provided below.

Geraldton
The site is located on farm land to the immediate west of Geraldton airport, approximately eight kilometres east of the Geraldton township, Western Australia (Figure 1). The site forms part of the Geraldton Airport Landholding and is accessed from Deepdale Road. A legal description of the site is provided in Table 1.

Table 1: Geraldton Site Details

Identification	Details
Coordinates (MGA94, Zone 50)	Metres east, metres south
Street Address	Unknown
Property Description	Vacant lot
Property Size	Approximately 1.9 hectares
Local Government	City of Geraldton-Greenough
Current Land Use	Civic/Cultural
Proposed Land Use	Unknown

Kemerton
The Kemerton site is located on Marriot Road within the Kemerton Industrial Park, approximately 17 kilometres northeast of Bunbury, Western Australia (Figure 2). A legal description of the site is provided in Table 2.

Table 2: Kemerton Site Details

Identification	Details
Coordinates (MGA94, Zone 50)	384617 metres east, 6324475 metres south
Street Address	Lot 5107 Marriot Road, Kemerton Industrial Park.
Property Description	Vacant lot
Property Size	9.01 hectares
Local Government	Shire of Harvey
Current Land Use	Heavy Industrial
Proposed Land Use	Heavy Industrial

Northam

The site is located on Leeming Road within the Avon Industrial Park, approximately 18 kilometres east of the Northam township, Western Australia (Figure 3). The site is accessed from the Great Eastern Highway. A legal description of the site is provided in Table 3.

Table 3: Northam Site Details

Identification	Details
Coordinates (MGA94, Zone 50)	485504 metres east, 6499108 metres south
Street Address	Lot 5, Leeming Road, Avon Industrial Park
Property Description	Vacant lot
Property Size	1.1396 hectares
Current Certificate of Title	Volume 2211, Folio 738
Local Government	Shire of Northam
Ownership	Western Australian Land Authority
Current Land Use	Civic/Cultural
Proposed Land Use	Industrial

1.3 SITE HISTORY

Geraldton

The proposed site is located on civic/cultural zoned land between the Geraldton airport and the Narngulu Industrial Area. The industrial area was established in the early 1970's as a general industry area to meet the needs of industries servicing a range of mineral and animal produce industries, as well as other smaller light and general industries located within the Mid-west Region. The Narngulu Industrial Area covers a surface area of 741 hectares of which 541 hectares is used to cater for general industry, with the remaining 200 hectares used for the development of noxious and hazardous industries. Prior to establishment of the Narngulu Industrial Area, most of the land was used for general farming practices.

The airport was established as a landing field in pre-World War II and has progressively been developed over time. Current fuel facilities are above ground, however the presence or historical use of underground storage tanks cannot be precluded.

Industries established within the vicinity of the Geraldton site are detailed in Table 4. Some of these industries have caused large scale contamination. The Iluka Resources rutile processing plant, located approximately four kilometres southwest of the site, has caused large scale contamination of the groundwater, which extends off the site. Contaminants comprise chloride, sodium, boron, sulphate, manganese, radon, and thorium. However, as the plume extends west from the site, it is not anticipated to affect the proposed Tesla generator site.

A fertiliser manufacturing plant located approximately eight kilometres northwest of the proposed generator site has caused soil and groundwater contamination. Contaminants comprise various heavy metals within the soils and fluorine, cadmium and nutrients within the groundwater. This contamination is not anticipated to impact the proposed Tesla generator site.

Other nearby known contaminated sites include a major fuel storage facility and two service stations. These are not anticipated to have impacted the proposed Tesla generator site.

Table 4: Geraldton Surrounding Industries

Name	Type/Description
Summit Fertilizers	Production, testing, distribution, consultation and storage of a unique range of branded fertilizers.
Hudson Resources	Processing operations for attapulgite and diatomite based products.
GMA Garnet Pty Ltd	Processing facilities for blast cleaning and water jet cutting abrasive products.
Atlantic Civil Products	General manufacturing facilities.
Iluka Resources	Mineral separation plant, zircon finishing plant, mobile Kelsey Jig plant, synthetic rutile plant with two reducing kilns, port operations and storage facilities.
AA & a Scrap	Scrap metal merchant.
CSBP Ltd	Fertiliser manufacturer.
BP Australia	Bulk fuel storage.

Kemerton

The Kemerton Industrial Park was established in 1985 as a strategic industrial area to provide appropriate buffered land for heavy industry. It covers an area of 7,543 hectares, comprising an industrial core of 2,100 hectares and a support industry area of 300 hectare. The area of the buffer zone is 5,437 hectares of bushland, wetland, protection zones and recreational area.

Prior to establishment of the Kemerton Industrial Park, most of the land was undeveloped. The area was not considered suitable for agriculture because of poor soils and inadequate drainage, although some land was used by pastoralists for seasonal grazing.

A family owned abattoir has operated in the area since the late 1970's. A commercial piggery also operated in the area.

Lot 5105 had been historically cleared and its current bushland description is described as 'the structure of the vegetation is no longer intact and the area is completely or almost completely without native species' (SKM 2008).

Industries established at Kemerton are detailed in Table 5.

Table 5: Kemerton Surrounding Industries

Name	Type/Description
Millennium Inorganic Chemicals	Titanium dioxide pigment plant.
BOC Limited	Air separation plant that provides industrial grade oxygen and nitrogen gases.
Nufarm-Coogee Pty Ltd	Produces chlorine gas and caustic soda.
Simcoa Operations	Silicon smelter.
Kemerton Silica Sand	Silica sand mine to the north of Kemerton Industrial Park.
Transfield Services	Gas-fired (with diesel backup) power station.
Water Corporation	Wastewater treatment plant. Some of the wastewater is used to irrigate nearby tree farms.

Northam

The Avon Industrial Park was established in 2001 as a strategic industrial area to meet the needs of industries servicing the rural construction, resources and minerals processing markets located within the Wheatbelt. It covers an area of 473 hectares, of which 203 hectares is zoned for industry.

Historical aerial imagery indicates the site was previously used for agricultural activities such as grazing and cropping. There is no indication that the site has been used historically for anything else other than these activities. The site's bushland description can be described as highly disturbed.

Industries established within the Avon Industrial Park are detailed in Table 6.

Table 6: Northam Surrounding Industries

Name	Type/Description
OzTek	Kit home manufacturer.
Interquip	Storage, maintenance and repairs of large scale processing equipment.
Outback Power	Electrical installation and maintenance contractor.
Grass Valley Formulators	Agricultural chemical manufacturer.
Bushy Tanks	Water tank manufacturer.
Swan River Kaolin	Kaolin clay processing plant.
D. E. Engineers	Grain silo manufacturer.
APA Property Group	Container home manufacturer.

1.4 OBJECTIVES

The objectives of this soil assessment are:

- To determine whether or not the sites have been contaminated by common organic and inorganic (metals) pollutants as a result of previous land use activities.
- To determine whether or not Acid Sulphate Soil (ASS) materials are present on the sites to a depth of up to two metres below the existing ground surface.
- To determine basic engineering properties of the Northam and Geraldton soils.

Figure 1: Geraldton

Figure 2: Kemerton

Figure 3: Northam

2. PREVIOUS INVESTIGATIONS

2.1 CONTAMINATION LIABILITY ASSESSMENTS

A desktop study to determine the potential for contamination or acid sulphate soils was prepared for Tesla by MBS Environmental for both the Kemerton and Northam sites (MBS, 2010a, MBS 2010b). No previous investigations have been undertaken for the Geraldton site. Key findings of the Kemerton and Northam reports are detailed below:

Kemerton
On the basis of a previous land use history of mainly rural activity, it was found that the only likely potential contaminants are very small amounts of nutrients and trace amounts of heavy metal contaminants present in fertilisers and animal manure.

Contamination of the site by fallout from atmospheric emissions from existing industries within the Kemerton Industrial Park was considered possible, although significant contamination is highly unlikely. The most likely contaminants emitted by these industries were found to be petroleum hydrocarbons and polycyclic aromatic hydrocarbons.

Acid sulphate soil risk maps for the Swan Coastal Plan indicate that the site is located in an area of low to moderate ASS risk. The nearest area of moderate to high risk was found to be located in an area of lower topographical elevation approximately 500 metres northeast of the site. GHD undertook an ASS investigation in 2008 for the Transfield Services Limited along the route of the proposed water pipeline corridor, approximately 10 kilometres northeast of the site. ASS were only encountered at depth in low lying areas adjacent to the Wellesley River.

Northam
The risk of significant soil contamination from previous land use activities on the Northam site was rated as unlikely. There is potential for low level contamination of groundwater as a result of activities by established industries in the Avon Industrial Park and from agricultural practices.

Examination of the ASS risk mapping indicated that the site is located in an area with a low probability of ASS occurrence. The level of confidence associated with this classification was rated as very low.

3. SOIL ASSESSMENTS

3.1 ACID SULPHATE SOIL ASSESSMENT

3.1.1 Soil Sampling

A total of 18 soil samples were collected during the site ASS assessments. A single sampling location was selected at each site and samples were collected in 250 millimetre intervals to a depth of up to two metres using a hand auger. Due to early refusal with the hand auger at the Northam site, a post hole digger was used to obtain samples from depth.

Samples were stored in sealed plastic bags and refrigerated prior to being transported to the laboratory in an esky filled with ice bricks. Each sample was tested for pH_F and pH_{FOX} at the laboratory.

Descriptions of each sample and results for the pH_F and pH_{FOX} tests are presented in Table 7. No visible indications of physical contamination were observed in any of the sampled material.

Table 7: ASS Sample Descriptions

Site	Depth (metres)	Description	pHF	pHFOX
Kemerton	0.00 – 0.25	Dark grey sand turning lighter down the profile. Organic matter in top 100 mm. Moist.	5.3	5.1
	0.25 – 0.50	Grey sand turning lighter down the profile. Moist.	5.3	5.3
	0.50 – 0.75	Dark to black sand with high organic matter content. Moist.	5.2	5.5
	0.75 – 1.00	Light grey to very light brown sand.	5.5	5.6
	1.00 – 1.25	Light grey to very light brown sand.	5.6	5.7
	1.25 – 1.50	Light grey to grey sand. Wet.	5.5	5.7
	1.50 – 1.75	Light grey to grey sand. Wet.	5.6	5.7
	1.75 – 2.00	Light grey to grey sand. Wet.	5.6	5.7
Northam	0.00 – 0.25	Light brown clayey silty sand with trace gravel. Dry.	6.3	8.4
	0.25 – 0.50	Light brown clayey silty sand with trace gravel. Dry.	7.6	6.0
	0.50 – 0.75	Light brown clayey silty sand with trace gravel. Moist.	8.5	6.3
	0.75 – 1.00	Light brown clayey silty sand with trace gravel. Moist.	9.0	6.4
Geraldton	0.00 – 0.25	Brown clayey silty sand. Dry.	6.8	5.0
	0.25 – 0.50	Brown clayey silty sand. Dry.	9.0	9.0
	0.50 – 0.75	Brown clayey silty sand. Moist.	9.0	8.5
	0.75 – 1.00	Brown clayey silty sand. Moist.	8.7	7.1
	1.00 – 1.25	Brown clayey silty sand. Moist.	8.7	8.7

3.1.2 Laboratory Results and Discussion

On the basis of screening tests for pH_F, which ranged from pH 5.2 to 9.0, and pH_{FOX} which ranged from pH 5.1 to 9.0, it was concluded that no Actual Acid Sulphate Soil (AASS) or Potential Acid Sulphate Soil (PASS) materials were encountered in any of the samples collected from any of the sites. Due to early refusal at both the Geraldton and Northam sites, MBS was unable to obtain deeper samples for assessment. Despite this, based on the ASS risk maps for both sites, as well as the results from the shallow soil samples, MBS does not anticipate the presence of ASS materials at either site.

3.2 CONTAMINATION ASSESSMENT

3.2.1 Soil Sampling

Three to four soil samples were collected from each of the proposed power station sites. Each sample was collected from the surface to a sampling depth of up to 100 millimetres below existing ground levels.

The samples were placed in pre-washed, laboratory-provided, 250 millilitre glass containers. The samples were then refrigerated prior to being placed in an esky with ice/cooling blocks and delivered to the laboratory.

3.2.2 Laboratory Results and Discussion

All samples were analysed by SGS Laboratories, which is accredited by NATA for all tests performed. The samples were tested for a range of potential organic and inorganic contaminants. A summary of results for major organic and inorganic contaminants are presented in Table 8 and Table 9 respectively. Measured concentrations are compared to Ecological Investigation Levels (EIL) listed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC 1999). The original laboratory reports are presented in Appendix 1.

With the exception of a sample collected from the Kemerton site, all results for all of the potential organic contaminants tested were below the reporting limits for the specific methods. A sample collected from Kemerton contained very low concentrations of the heavier hydrocarbon fractions (C_{15}-C_{28} and C_{29}-C_{35}). These are expected to be attributable to naturally occurring aliphatic organic compounds within the soil. All results were well below the Ecological Investigation Level (EIL). Based on these results, the site is considered free of contamination by common organic pollutants such as aromatic hydrocarbons, PCBs, organochlorine pesticides and organophosphate pesticides.

Table 8: Organic Contaminant Analytical Results

Parameter	Units	EIL	Geraldton			Kemerton			Northam			
			G1	G2	G3	KEC1	KEC2	KEC3	N1	N2	N3	N4
Total Recoverable Hydrocarbons												
C_6-C_9	mg/kg	100	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C_{10}-C_{14}	mg/kg	500	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C_{15}-C_{28}	mg/kg	-	<45	<45	<45	<45	<45	59	<45	<45	<45	100
C_{29}-C_{35}	mg/kg	-	<45	<45	<45	<45	<45	57	<45	<45	<45	100
Monocyclic Aromatic Hydrocarbons												
Benzene	mg/kg	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	3	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Ethyl benzene	mg/kg	5	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Xylenes	mg/kg	5	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Organochlorine Pesticides (OC)												
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlordane	mg/kg	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total OCs	mg/kg	1	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls (PCBs)												
PCB Congener C28	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB Congener C52	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB Congener C101	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB Congener C118	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB Congener C138	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB Congener C153	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB Congener C180	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCBs	mg/kg	1	-	-	-	-	-	-	-	-	-	-

Table 9 shows the analytical results for metals at all three sites. All concentrations for the Kemerton site were found to be below the limit of reporting. Samples from Geraldton generally contained metal concentrations below the limit of reporting, with the exception of chromium, copper, lead and zinc. These metals were present in very low concentrations, well below the respective EIL. Samples from Northam also contained very low metal concentrations, with the exception of chromium which ranged in concentration from 24 to 49 mg/kg. This is well within the natural background range for chromium and is well within the EIL of 400 mg/kg. These results confirm that heavy metal contamination from previous land use activities has not occurred on any of the sites.

Table 9: Inorganic Contaminant Analytical Results

Parameter	Units	EIL	Geraldton			Kemerton			Northam			
			G1	G2	G3	KE-C1	KE-C2	KE-C3	N1	N2	N3	N4
Arsenic	mg/kg	20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Cadmium	mg/kg	3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	400	13	14	10	<5	<5	<5	24	36	27	49
Copper	mg/kg	100	6	9	<5	<5	<5	<5	6	7	7	13
Lead	mg/kg	600	10	8	8	<5	<5	<5	6	9	8	9
Mercury	mg/kg	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	mg/kg	60	<4	<4	<4	<4	<4	<4	7	7	5	14
Zinc	mg/kg	200	10	8	8	<5	<5	<5	<5	6	<5	9

3.3 GEOTECHNICAL ASSESSMENT

3.3.1 Soil Sampling

The soils from all three sites were inspected by a suitably qualified environmental geoscientist. The desktop study undertaken for the Kemerton site (MBS, 2010b) predicted the Kemerton soils would comprise Bassendean sands, a siliceous sand with little or no fines or coherence. This was confirmed during the site assessment and no samples were collected.

Due to the identification of potentially plastic clays at both the Geraldton and Northam sites, soil samples were collected for geotechnical testing. Sampling comprised a single 20 kilogram bulk sample for each site, collected from between 0 and 200 millimetres below existing ground levels. Testing was undertaken in accordance with the relevant Australian Standard 1289 procedures and comprised:

- Particle size distribution (PSD) – AS 1289.3.6.1.
- Atterberg limits.
  - Liquid limit – AS 1289.3.9.2.
  - Plastic limit – AS 1289.3.2.1.
  - Plasticity index – AS 1289.3.3.2.
  - Linear shrinkage – AS 1289.3.4.1.

3.3.2 Analytical Results and Discussion

Both 20 kilogram samples were analysed by SGS Laboratories, which is accredited by NATA for all tests performed. A summary of results is provided in Table 10. The original laboratory report is provided in Appendix 2.

Table 10: Geotechnical Properties

		Geraldton	Northam	Kemerton
PSD	Gravel	2	12	Not tested
	Sand	73	70	
	Fines	25	18	
Atterburg Limits	Liquid Limit	36	18	Not tested
	Plastic Limit	30	13	
	Plasticity Index	6	5	
	Linear Shrinkage	1.5	1.5	

Based on these results and in accordance with Australian Standard 1726-1993, the soils can be described as follows:

Geraldton
CLAYEY SILTY SAND (SM/SC). Brown, moderately plastic, clayey silty sand with trace gravel. Dry, well graded. COLLUVIUM.

Northam
CLAYEY SILTY SAND (SM/SC). Grey, low plasticity, clayey silty sand with gravel. Dry, well graded. RESIDUAL SOIL.

Site construction works for all sites should be preceded by appropriate preparation of the ground surface in the areas of proposed development. Preparation should be undertaken in accordance with Australian Standard AS 3798-2007. In addition to AS 3798-2007, MBS recommends the following:

- Identification and diversion or protection of any buried services within the work areas.
- Clearing of surface objects (including building debris, old structures, footings or refuse).
- Grubbing of any tree roots.
- Removal of topsoil containing notable quantities of organic material (e.g. plant roots).
- Contouring/shaping of the ground surface to ensure any stormwater runoff drains from the site.

- Scarification and compaction of prepared surfaces prior to any engineering fill placement.

Slabs should be designed by a suitably qualified engineer, particularly for the Geraldton site which may experience low to moderate ground movement with changes in moisture content.

4. CONCLUSIONS

4.1 GERALDTON

4.1.1 Contamination Assessment

There is no evidence to suggest that the Geraldton site has been contaminated due to historical land use. All samples contained concentrations of potential contaminants that were well below the respective Ecological Investigation Levels.

4.1.2 Acid Sulphate Soil Assessment

No ASS materials were identified at the site to a depth of 1.25 metres below the existing ground surface. Disturbance of soil to a depth of 1.25 metres during the proposed construction and operation phases will not release acidity into the environment. Samples from below 1.25 metres were not collected due to early refusal with the hand auger. It is therefore unknown whether ASS materials exist below this depth. However, based on the samples collected from between 0 and 1.25 metres depth, and in association with the ASS risk maps, MBS does not anticipate the presence of ASS at the site.

4.1.3 Geotechnical Assessment

Soils at the Geraldton site comprise silty clayey sands of moderate plasticity. These soils may be subject to low to moderate ground movement with changes in soil moisture content (shrink/swell). The soil properties (Appendix 2) should be reviewed by a suitably qualified engineer to determine the appropriate slab construction requirements.

4.2 KEMERTON

4.2.1 Contamination Assessment

There is no evidence to suggest that the Kemerton site has been contaminated due to historical land use. All samples contained concentrations of potential contaminants that were well below the respective Ecological Investigation Levels.

4.2.2 Acid Sulphate Soil Assessment

No ASS materials were identified at the site to a depth of 2.0 metres below the existing ground surface. Disturbance of soil to a depth of 2.0 metres during the proposed construction and operation phases will not release acidity into the environment.

4.2.3 Geotechnical Assessment

Soils at Kemerton comprise Bassendean sands. These sands are considered appropriate for construction of the proposed generator site.

4.3 NORTHAM

4.3.1 Contamination Assessment

There is no evidence to suggest that the Northam site has been contaminated due to historical land use. All samples contained concentrations of potential contaminants that were well below the respective Ecological Investigation Levels.

4.3.2 Acid Sulphate Soil Assessment

No ASS materials were identified at the site to a depth of one metre below existing ground levels. Disturbance of soil to a depth of one metre during the proposed construction and operation phases will not release acidity into the environment. Samples from below one metre were not collected due to early refusal with the hand auger. It is therefore unknown whether ASS materials exist below this depth. However, based on the samples collected from between 0 and 1.00 metre depth, and in association with the ASS risk maps, MBS does not anticipate the presence of ASS at the site.

4.3.3 Geotechnical Assessment

Soils at the Northam site comprise silty clayey sands of low plasticity and are considered appropriate for the construction of the proposed peak-load generator. The soil properties (Appendix 2) should be reviewed by a suitably qualified engineer to determine the appropriate slab construction requirements.

5. REFERENCES

Department of Environment and Conservation, May 2009. *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes.*

MBS Environmental, 2010a. Peak Load Power Plant Contaminated Site Liability Assessment, Lot 5 on Deposited Plan 25370, Northam.

MBS Environmental, 2010b. Peak Load Power Plant Contaminated Site Liability Assessment, Lot 5107 – Kemerton.

National Environment Protection (Assessment of Site Contamination) Measure (1999). National Environment Protection Council (NEPC), December 1999.

APPENDICES

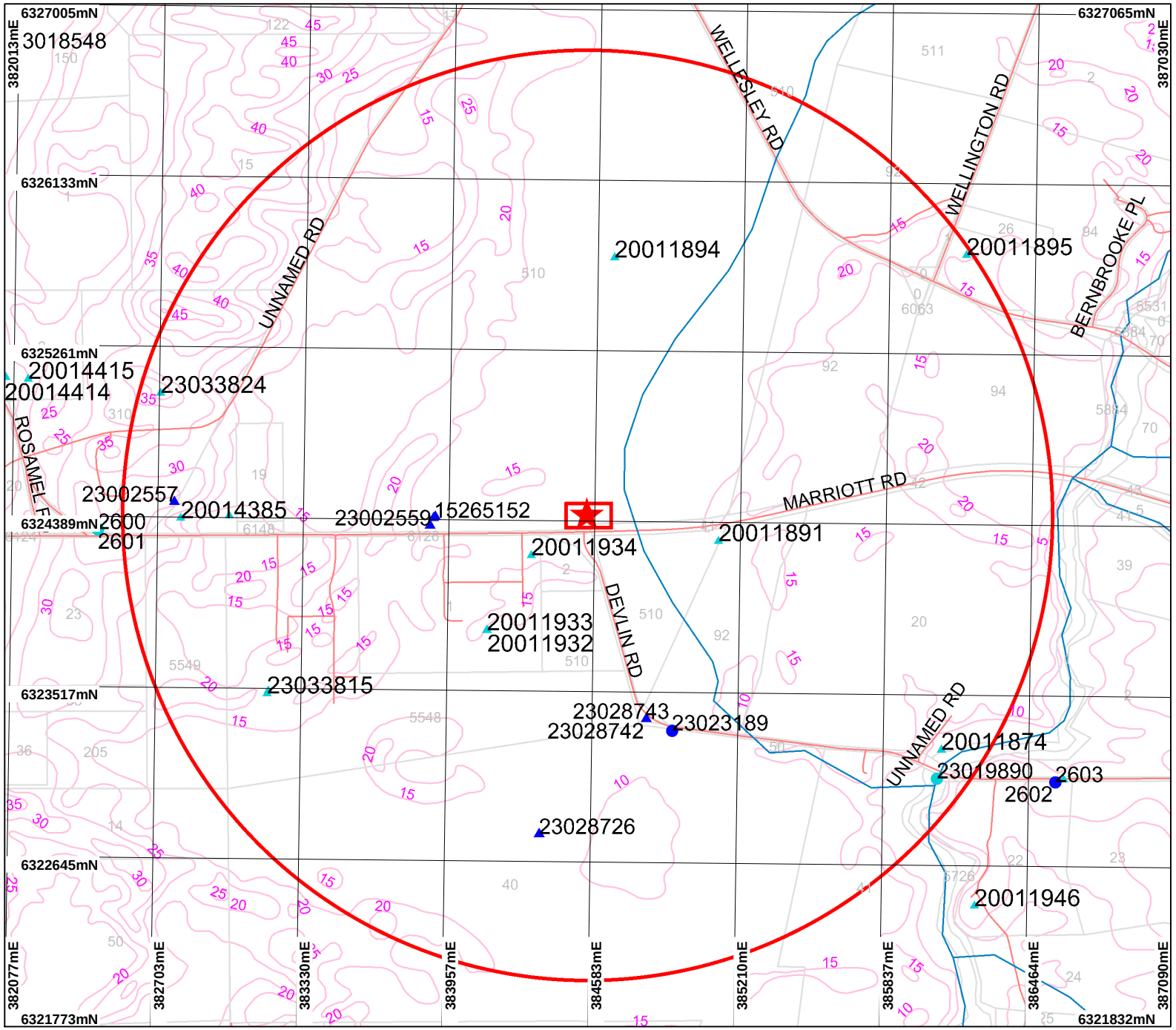
APPENDIX 1:
LABORATORY REPORT
CONTAMINATION AND ACID SULPHATE SOILS
GERALDTON, KEMERTON, NORTHAM

APPENDIX 2:
LABORATORY REPORT
GEOTECHNICAL SOIL ASSESSMENTS
GERALDTON AND NORTHAM

APPENDIX D

Water Information Network (WIN) Database Search Results

Lot 5107 Marriott Rd, Wellesley - 2km radius



LEGEND

- Topographic Contours, Statewide - Landgate
- Cadastre for labelling - DLI
- Road Centrelines - Landgate
- Hydrography, linear (medium scale, 250k GA)
- WIN Groundwater Sites, Monitoring - non DoW
- WIN Groundwater Sites, Other - DoW
- WIN Groundwater Sites, Other - non DoW_1
- WIN Groundwater Sites, Monitoring - DoW
- WA Coastline - DoE

N

0 ~750 m

Scale 1:26207
(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: lerchr
Prepared for:
Date: 9/06/2011 12:06:23 PM

Information derived from this map should be confirmed with the data custodian acknowleged by the agency acronym in the legend.

Government of **Western Australia**
Department of **Water**

APPENDIX E

Protected Matters Database Search Results

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

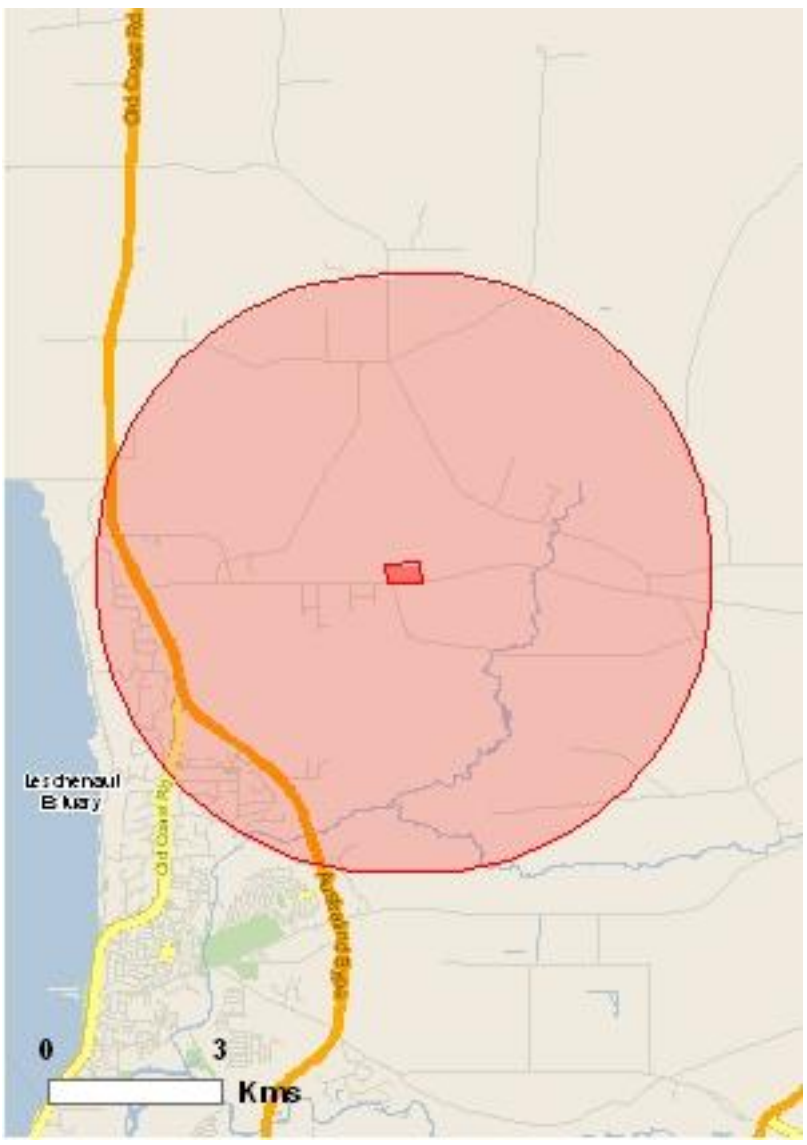
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

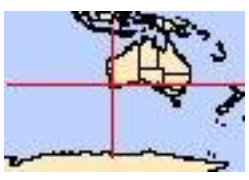
Report created: 12/04/13 12:10:41



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	21
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	7
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	2
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	30
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (RAMSAR)	[Resource Information]
Name	Proximity
Peel-yalgorup system	Within 10km of Ramsar

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding likely to occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Insects		
Synemon gratiosa Graceful Sun Moth [66757]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Pseudocheirus occidentalis Western Ringtail Possum [25911]	Vulnerable	Species or species habitat likely to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat may occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Centrolepis caespitosa [6393]	Endangered	Species or species habitat likely to occur within area
Darwinia foetida Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Synaphea stenoloba Dwellingup Synaphea [66311]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Lower Brunswick, Collie and Wellesley Rivers	WA	Indicative Place
South West Irrigation Area	WA	Indicative Place

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Sus scrofa		
Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus declinatus		
Bridal Veil, Bridal Veil Creeper, Pale Berry Asparagus Fern, Asparagus Fern, South African Creeper [66908]		Species or species habitat likely to occur within area
Asparagus plumosus		
Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica		
Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris		
Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista linifolia		
Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana		
Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea		
Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata		
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus		
Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium		
Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle,		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		

Coordinates

-33.211056 115.760142,-33.211018 115.760142,-33.210561 115.765624,-33.213683 115.7657,
-33.213683 115.760446,-33.211056 115.760142

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of Sustainability, Environment, Water, Population and Communities
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Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX F

Aboriginal Heritage Database Search Results

Search Criteria

5 surveys in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6323427	383419
6325688	385700

Disclaimer

Heritage Surveys have been mapped using information from the reports and / or other relevant data sources. Heritage Surveys consisting of small discrete areas may not be visible except at large scales. Reports shown may not be held at DIA. Please consult report holder for more information. Refer to www.dia.wa.gov.au/heritage for information on requesting reports held by DIA.

Copyright

Legend

Access

Some reports are restricted. The type of restriction is shown as a code in brackets following the catalogue number. No code indicates an unrestricted report.

[CLOSED]	Closed
[OWE]	Open with exception
[TBD]	To be determined
[RESTRICTED PENDING]	Restricted pending

Survey 2115

Project	Addendum to a desktop preliminary aboriginal heritage survey, Yarragadee Aquifer extending to the BLackwood groundwater area
Start Date	01 Jan 2003
Proponents	Department of Environmental Protection
Consultants	Brad Goode
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	No

Related Reports

Report ID	Catalogue Number	Title	Recorders	Held At
20283	HSR SW 2003 GOO	An addendum to a desktop preliminary Aboriginal heritage Survey for Water Corporations proposed development of the Yarragadee Aquifer extending to the Blackwood Groundwater area	Brad Goode	DIA

Survey 3551

Project	Dampier to Bunbury Natural Gas Pipeline, Kwinana to Bunbury
Start Date	11 Nov 2002
Proponents	Department of Industry and Resources Hames Consultancy Group
Consultants	Australian Interaction Consultants
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	Yes

Related Reports

Report ID	Catalogue Number	Title	Recorders	Held At
106916	HSR MW 2003 HAM	Report of Aboriginal Heritage aspects of the proposed widening of the Dampier to Bunbury natural gas pipeline corridor between Kwinana and Bunbury	Donald Lantzke Donald Sauman Ron Parker Susan Parker	

Survey 1864

Project	Kemerton Industrial Park
Start Date	01 Apr 1993
Proponents	BSD Consultants
Consultants	McDonald, Hales and Associates Pty Ltd
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	Yes

Related Reports

Report ID	Catalogue Number	Title	Recorders	Held At
104316	HSR SW 1993 MUR	Report of an Aboriginal Heritage Survey Proposed Support Industry Area Kemerton Industrial Park, Western Australia. Apr 1993.	A. Murphy Edward McDonald Kevin Edwards Scott Campbell-Smith	DIA

Survey 1849

Project	Working Paper No. 6: Bunbury-Wellington Planning Study
Start Date	24 Aug 1990
Proponents	Department of Planning and Urban Development
Consultants	McDonald, Hales and Associates Pty Ltd
Survey Types	Ethnographic
Aboriginal People Consulted?	Yes

Related Reports

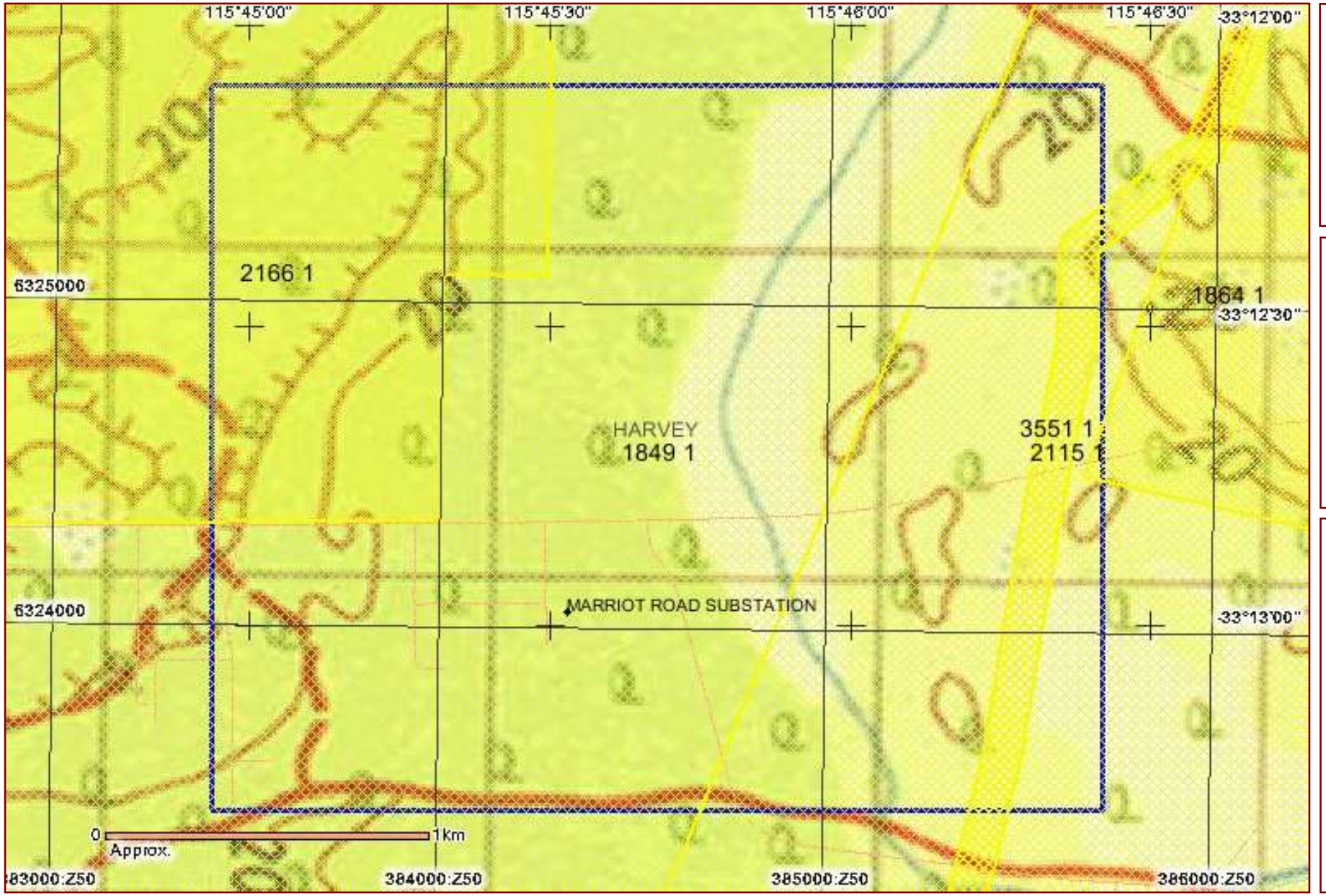
Report ID	Catalogue Number	Title	Recorders	Held At
104079	HSR SW 1992 PUD	Bunbury-Wellington Regional Planning Study: Working Paper no.6, Aboriginal Heritage and Planning Survey. [Open] Released for Public Comment July 1992.	McDonald, Hales and Associates Pty Ltd	DIA
104608	HSR SW 1990 MCD	Bunbury-Wellington Regional Planning Study: Aboriginal Heritage & Planning Survey : working paper no. 6	McDonald, Hales and Associates Pty Ltd	DIA

Survey 2166

Project	Kemerton
Start Date	22 Feb 1983
Proponents	Kinhill Stearns
Consultants	K. J. Mulvaney R. H. Pearce
Survey Types	Archaeological
Aboriginal People Consulted?	No

Related Reports

Report ID	Catalogue Number	Title	Recorders	Held At
104196	HSR MW 1983 PEA	Report on an Archaeological Survey at Kemerton for Kinhill Stearns, Perth, W.A.	K. Mulvaney R. H. Pearce	DIA



Legend

Selected Heritage Surveys

- Heritage Survey
- Town
- Map Area
- Search Area

Aboriginal Heritage Inquiry System

Aboriginal Sites Database

Search Criteria

0 sites in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6323437	383428
6325678	385708

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

Legend

Restriction

N	No restriction
M	Male access only
F	Female access

Access

C	Closed
O	Open
V	Vulnerable

Coordinate Accuracy

Accuracy is shown as a code in brackets following the site coordinates.

[Reliable]	The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
[Unreliable]	The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Status

L - Lodged	→	IA - Information Assessed	→	ACMC Decision Made
Information lodged, awaiting assessment		Information Awaiting ACMC Decision Assessment Only		R - Registered Site I - Insufficient information S - Stored Data

*Explanation of Assessment

Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not the final assessment.

Final assessment and decisions will be determined by the Aboriginal Cultural Material Committee (ACMC).

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”. Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.

Sites Shown on Maps

Site boundaries may not appear on maps at low zoom levels

List of Registered Aboriginal Sites with Map

No results

Aboriginal Heritage Inquiry System

Aboriginal Sites Database

Legend

Selected Heritage Sites

Registered Sites

Town

Map Area

Search Area

List of Other Heritage Places with Map

No results

Legend

Selected Heritage Sites

Other Heritage Places

Town

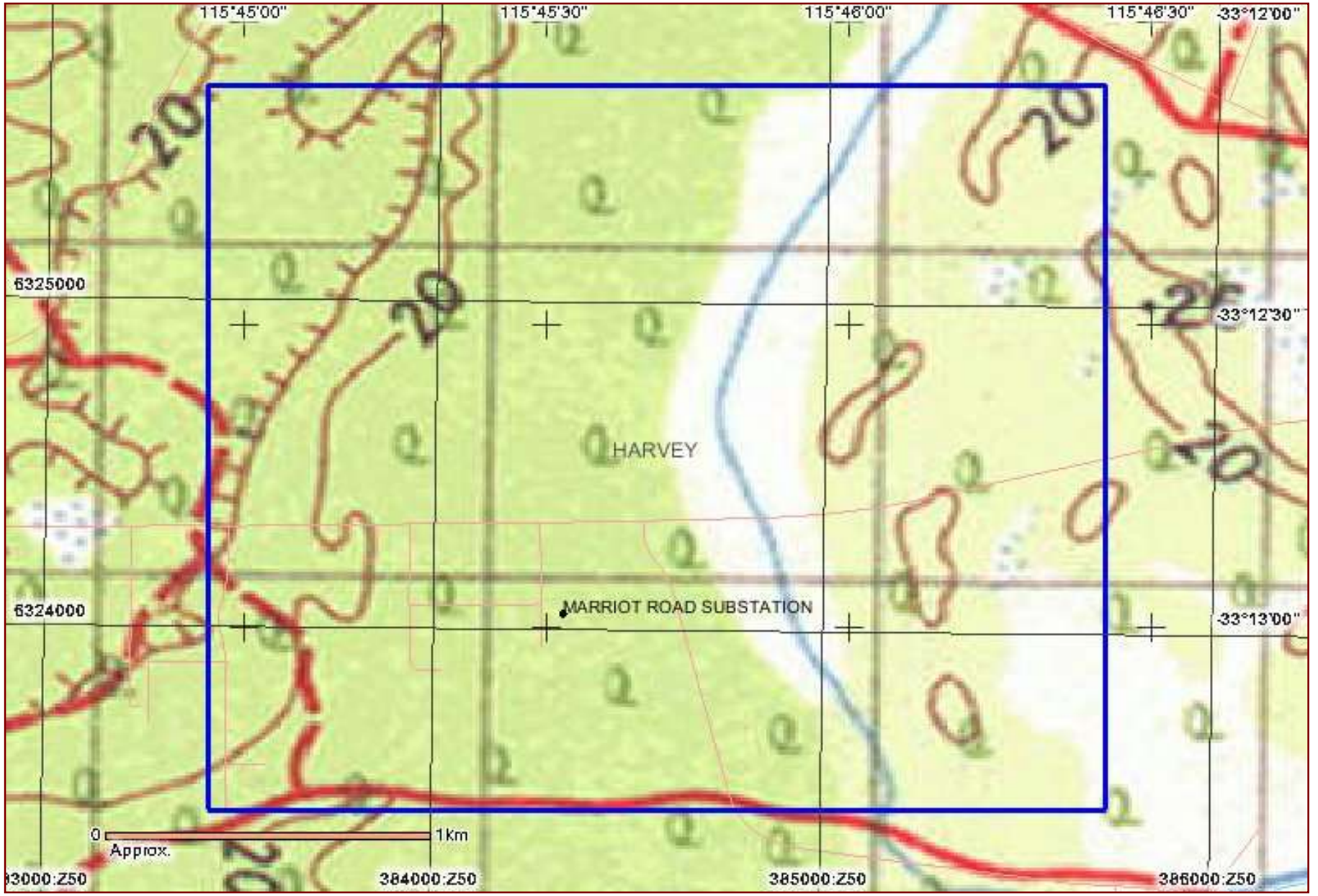
Map Area

Search Area

Map Showing Registered Aboriginal Sites and Other Heritage Places

Aboriginal Heritage Inquiry System

Aboriginal Sites Database



Legend

Selected Heritage Sites

- Registered Sites
- Other Heritage Places
- Town
- Map Area
- Search Area

APPENDIX G

Air Quality Modelling Report

SYNERGETICS

ENVIRONMENTAL ENGINEERING

Final report: Air quality modelling for the power stations in Kemerton and Albany, Western Australia

for

Tesla Holdings Pty Ltd

4 April 2013

SYNERGETICS
ENVIRONMENTAL ENGINEERING

Final report: Air quality modelling for the power stations in Kemerton and Albany, Western Australia

For

Tesla Holdings Pty Ltd

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Executive Summary

Tesla Holdings (Tesla), has requested that Synergetics Environmental Engineering (Synergetics) undertake an air quality assessment of emissions from two peak load power stations which are to be constructed in Kemerton and Albany, Western Australia.

Each power stations consist of 40 electrical generators powered by diesel engines with a nominal electrical power output of 60MW-e. The power stations are expected to be operated at no more than 500 hours in any calendar year.

Individual generators are to have their individual exhaust ducts combined into a single ten ducted flanged stack above the central generator unit in each engine group.

An air quality assessment of emissions from the four ten-duct exhaust stacks of the power station was undertaken using the regulatory approved model, Ausplume v6.0.

Worst case conditions and conservative assumptions were used in the assessment of the cumulative impact from the emissions from the power stations. All emitted substances were found to be below the relevant assessment criteria.

1 Introduction

Tesla Holdings Pty Ltd (Tesla) has retained Synergetics to undertake an air quality assessment of emissions from two proposed power stations which are to be constructed on two sites in Kemerton and Albany, WA.

- Kemerton site: Lot 5107 Marriott Road, Wellesley.
- Albany site: Lot 5 Down Road, Albany.

This document provides details and the results of the air quality assessment undertaken. The results are based on information supplied by the Tesla Holdings through email and personal communications with Synergetics (Tesla, 2010a).

2 Assessment criteria

2.1 National air quality regulations

In Australia, the National body that generates regulations applying to air quality is the National Environment Protection Council (NEPC). The NEPC's primary task is to create National Environment Protection Measures (NEPMs). Standards, advisory reporting standards, goals and monitoring investigation levels specified in the NEPMs do not apply directly in the various States and Territories. Rather, it is the responsibility of each State to implement the NEPM by means of local regulation.

The Air Quality NEPM (AQ NEPM) was originally produced in 1998 and provided a list of standards and goals for carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide, Lead and PM_{10} (refer to Table 1). The AQ NEPM was subsequently amended in 2003 to also include advisory reporting standards for $PM_{2.5}$ (refer to Table 2). In the AQ NEPM, standards and goals are defined as follows;

- Standard - quantifiable characteristics of the air against which ambient air quality can be assessed.
- Advisory reporting standard - a health-based standard to assess the results of monitoring for particles such as $PM_{2.5}$. A timeframe for compliance is not stipulated.
- Goal - a goal that relates to desired environmental outcomes, and guides the formulation of strategies for the management of human activities that may affect the environment.

Table 1 - Standards and goals for the key ambient air pollutants (excluding $PM_{2.5}$) as specified in NEPC (1998)

Pollutant	Averaging period	Standard	Goal within 10 years Maximum allowable exceedances
Carbon monoxide (CO)	8-hour	9.0 ppm	1 day a year
Nitrogen dioxide (NO_2)	1-hour	0.12 ppm	1 day a year
	1-year	0.03 ppm	none
Photochemical oxidants (as ozone)	1-hour	0.10 ppm	1 day a year
	4-hour	0.08 ppm	1 day a year
Sulphur dioxide (SO_2)	1-hour	0.20 ppm	1 day a year
	1-day	0.08 ppm	1 day a year
	1-year	0.02 ppm	None
Lead (Pb)	1-year	0.50 µg/m^3	None
Particulate less than 10 µm diameter (PM_{10})	1-day	50 µg/m^3	5 days a year

Table 2 - Standards and goals for $PM_{2.5}$ as specified in the variation to the original NEPM (NEPC 2003)

Pollutant	Averaging period	Advisory reporting standard	Goal
Particulate less than 2.5 µm diameter ($PM_{2.5}$)	1 day	25 µg/m^3	Goal is to gather sufficient data nationally to facilitate a review of the standard as part of the review of this Measure scheduled to commence in 2005
	1 year	8 µg/m^3	

A recent discussion paper has also been released by NEPC (2010), providing the outcomes of a thorough review of the AQ NEPM. The review may lead to a modification of air quality regulation in Australia in the next few years, as summarised below.

- The literature consistently demonstrates that PM_{10} and $PM_{2.5}$ in particular, but also NO_2, CO and SO_2, exert consistent, measureable adverse health effects on humans even below the current limits. The NEPM discussion paper states that for these pollutants "the standards have been adopted with the acknowledgement that there is a level of residual risk associated with those standards".
- There appears to be a linear relationship between exposure to NEPM pollutants and adverse health effects, and any increase in air pollution levels (even within the standards) will lead to an increase in risk to the health of the population. It is very likely that the allowable exceedances specified in Table 1 will be gradually phased out.
- Benzene and polyaromatic hydrocarbons (PAHs) were also included in this discussion paper, along with a thorough review of their health impacts. They are currently covered in Australia by the Air Toxics NEPM. Benzene and PAHs have not yet been moved from the Air toxics NEPM to AAQ NEPM, but it seems likely in the future. This does not have implications for States such as Victoria, where benzene and PAHs are already regulated.

2.2 State air quality regulations

Western Australia effectively implemented the National air quality regulations listed above in the Draft WA State Environment (Ambient Air Policy) (2009) (WAG 2009), where environmental quality criteria were defined as the pollutant concentrations listed in AQ NEPM and AT NEPM.

In addition, a guidance document from the Western Australia Department of Environment (DoE 2004) indicates that additional air quality guidelines may be adopted from other jurisdictions and applied in WA to complement the currently existing regulations where appropriate. Based on this, regulatory values were sourced from NSW DEC (2005) for the various volatile organic compound pollutants.

2.3 Assessment criteria employed in this assessment

The air quality assessment criteria used in this study are detailed in Table 3. These criteria were obtained by taking the most stringent value from appropriate National, State and international criteria. A description of the regulatory context for the various regulations employed, as well as an explanation of why these were selected as the most relevant criteria, is provided in the following sections.

VOCs (volatile organic compounds) do not have a regulatory criterion in any jurisdiction. For the purposes of the present assessment, VOCs were conservatively assumed to consist of benzene, one of the more hazardous VOCs that may be a product of combustion, with the NSW DEC (DEC NSW 2005) impact assessment criteria applied.

Table 3 - List of assessment criteria used in the present assessment and their source.

Pollutant	Averaging time	Percentile	Assessment Criteria Employed (mg/m^3)	Source
CO	15-min	100	100	WHO (2000)
	1-hour	100	30	WHO (2000)
	8-hour	100	10	NEPC (1998)
NO_2	1-hour	100	0.246	NEPC (1998)
	1-year	100	0.062	NEPC (1998)
PM_{10}	24-hour	100	0.05	NEPC (1998)
	1-year	100	0.03	NEPC (1998)
$PM_{2.5}$	24-hours	100	0.025*	NEPC (2003)
	1-year	100	0.008*	NEPC (2003)
SO_2	1-hour	100	0.52	NEPC (1998)
	24-hour	100	0.21	NEPC (1998)
	1-year	100	0.06	NEPC (1998)
Acetaldehyde	1-hour	100	0.042	NSW DEC2005
Benzene	1-hour	100	0.029	NSW DEC2005
Formaldehyde	1-hour	100	0.02	NSW DEC2005
PAHs	1-hour	100	0.0004	NSW DEC2005
Toluene	1-hour	100	0.36	NSW DEC2005
Xylenes	1-hour	100	0.19	NSW DEC2005

* Advisory limit only.

3 Surrounding environment

3.1 Site descriptions

The approximate locations of the two sites are shown in Figure 1. The Kemerton site lies along the flat coastal plain between the Indian Ocean and the Darling ranges. The Albany site is located on the rainbow coast of southern WA approximately 20 km inland of the city of Albany.

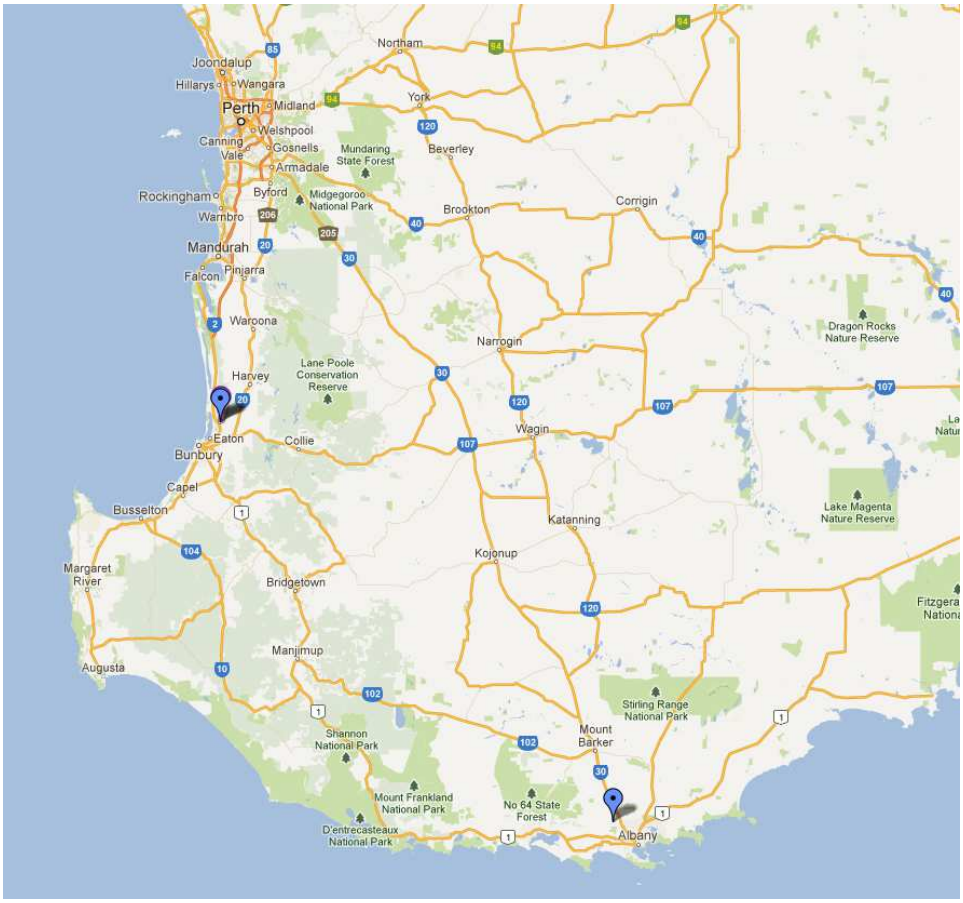


Figure 1 - Locations of the Kemerton and Albany sites with respect to Perth.

An aerial photograph providing some information about the surrounding land use of the Kemerton and Albany sites are provided in Figure 2 and Figure 3 respectively. The Kemerton site is located in semi-rural industrial zone north of Bunbury and the Albany site is located inland and on a pocket of industrial land surrounded by a rural/agricultural setting. None of the sites are close to any significant residential areas.

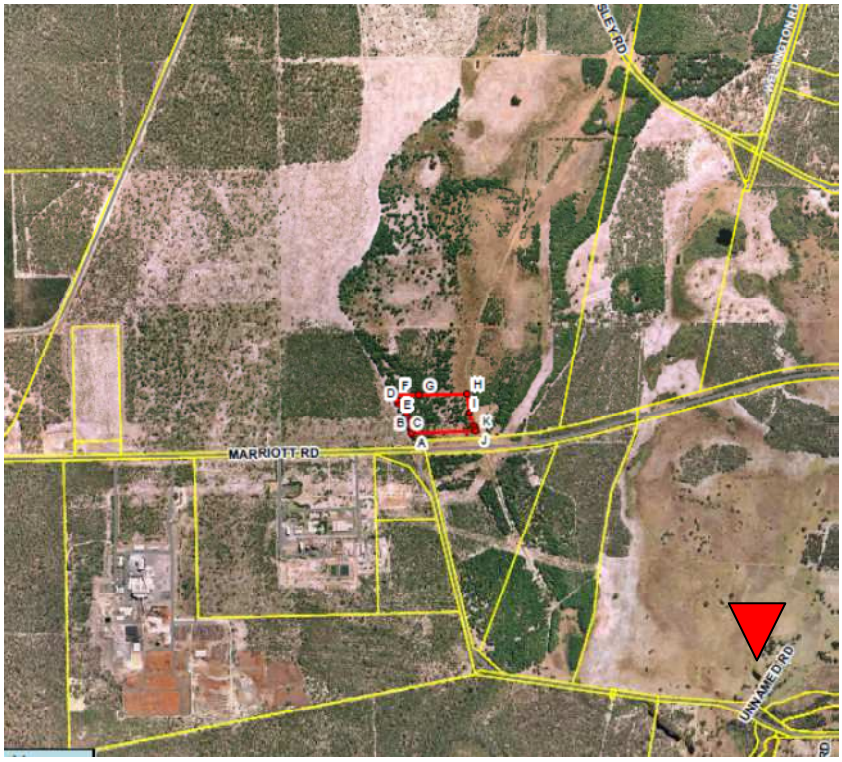


Figure 2 – Aerial photograph of the Kemerton site with nearest receptor indicated by red triangle. Scale is approximately 1:20,000.

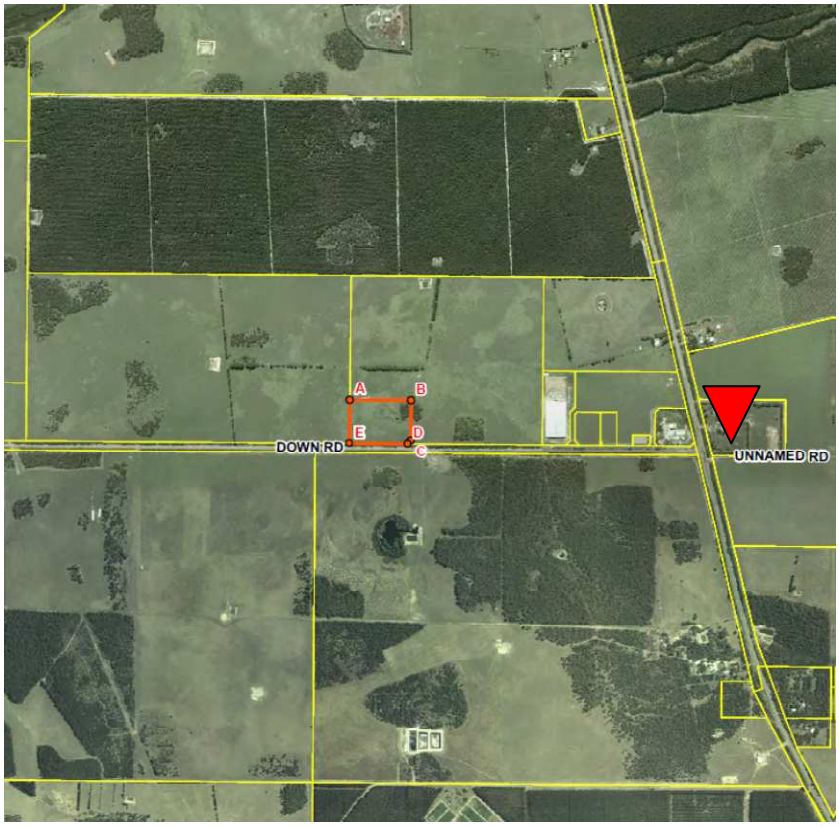


Figure 3 – Aerial photograph of the Albany site with nearest receptor indicated by red triangle. Scale is approximately 1:20,000.

3.2 Background pollutant concentrations

Background pollutant concentrations are required to be included into the concentration estimates for the pollutants CO, NO_2, SO_2, PM_{10} and $PM_{2.5}$. The Western Australia Department of Environment and Conservation collects air quality data from a number of monitoring stations throughout the Perth, Kwinana, Southwest, Kalgoorlie and Midwest regions of the state (DEC 2010). Each monitoring station only monitors a small number of pollutants as summarized in Table 4, so that collating background pollutant information necessarily requires the use of data from various sites.

In the present assessment, a hierarchical approach was used whereby preference was given initially to using available background pollutant information from a nearby site deemed to be representative of each study site. As shown in Table 5, available data for Bunbury was used for the Kemerton site, and Albany airport for the Albany site (displayed as green cells in Table 6). The National Pollutant Inventory (NPI) database was then searched to identify any emitters of pollutants from the area near each study site. These data were used to classify whether the pollutant was likely to be present at significant concentrations at the site (marked as red text in Table 5), or no significant local source was identified (blue text in Table 5).

In the event of a pollutant being deemed to be a significant component of ambient air, ambient concentrations from the worst-case monitoring station was employed (marked as red cells in Table 6). For pollutants unlikely to be significant in the ambient air, concentrations were obtained from the least polluted (best case) monitoring station (blue cells in Table 6).

Table 4 - Air parameters measured at DEC monitoring stations (DEC 2010). A tick represents stations where each pollutant is currently monitored, while a cross indicated sites where historical data is available but measurements are no longer taken.

Monitoring site	CO	O_3	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$
Albany						✓	
Bunbury	×					✓	✓
Busselton							✓
Caversham	✓	✓	✓			✓	✓
Collie						✓	
Duncraig	✓		✓			✓	✓
Geraldton						✓	
Quinns Rock		✓	✓				✓
Rockingham		✓	✓	✓			
Rolling Green		✓	✓				
South Lake	✓	✓	✓	✓		✓	✓
Swanbourne	×	✓	✓				×
Wattleup				✓			

Table 5 - Location of nearest air quality monitoring stations and NPI-reporting emission sources (www.npi.gov.au). Total pollutant emissions from nearby emission sources are also reported and labelled based on whether they are significant (red) or insignificant (blue).

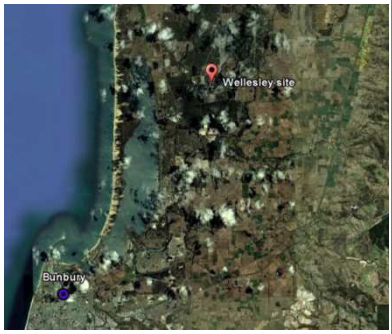
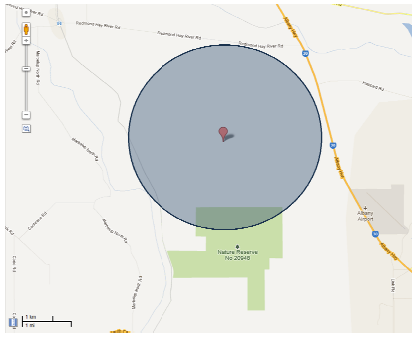
	Kemerton (Wellesley) site	Albany site
Location relative to AQ station	 Nearest AQ station: Bunbury Distance: 16.6 km Data collected: PM_{10}, $PM_{2.5}$	 Nearest AQ station: Albany airport Distance: 4.5 km Data collected: PM_{10}
Nearby emission sources		
Emissions	CO: 10,070 tonnes p.a. SO_2: 132 tonnes p.a. NO_2: 380 tonnes p.a. PM: no local sources Other pollutants include VOCs.	CO: no local sources SO_2: no local sources NO_2: no local sources PM: no local sources
Emission sources	• Meter station. • Chemical manufacturing - Conversion of synthetic rutile into titanium dioxide slurry. • Silicon production. • Manufacture of chlorine, caustic soda, hydrochloric acid and sodium hypochlorite via membrane technology electrolysis of sodium chloride Chlor Alkali Plant.	• Airport is the only industrial site listed on NPI database within 5 km. • Industrial activities include at airport concsist of fuel storage (BPP Australia) Listed as only emmitting VOCs • No industrial activities emitting CO, SO_2 NO_2 or PM.

Table 6 - Background pollutant concentrations (all concentrations are given in mg/m^3).

Pollutant	Averaging time	Kemerton site		Albany site	
		Conc.	Source	Conc.	Source
CO	15-min	0.89	Scaled from 1 hour average	0.43	Scaled from 1 hour average
	1-hour	0.67	Scaled from 8 hour average	0.33	Scaled from 8 hour average
	8-hour	0.47	DEC 2010 for Duncraig	0.23	DEC 2010 for Duncraig
NO_2	1-hour	0.055	DEC 2010 for South Lake	0.030	DEC 2010 for Rolling Green
	1-year	0.004	Scaled from 1 hour average	0.002	Scaled from 1 hour average
PM_{10}	24-hour	0.025	DEC 2010 for Bunbury	0.022	DEC 2010 for Albany
	1-year	0.005	Scaled from 1 hour average	0.0044	Scaled from 1 hour average
$PM_{2.5}$	24-hour	0.013	DEC 2010 for Bunbury	0.010	DEC 2010 for Quinns Rocks
	1-year	0.003	Scaled from 1 hour average	0.002	Scaled from 1 hour average
SO_2	10-min	0.084	Scaled from 1 hour average	0.027	Scaled from 1 hour average
	1-hour	0.059	DEC 2010 for Wattleup	0.019	DEC 2010 for Rockingham
	24-hour	0.013	DEC 2010 for Wattleup	0.008	DEC 2010 for Rockingham
	1-year	0.001	Scaled from 24 hr average	0.002	Scaled from 24 hr average

Please note:

- Scaling from hourly averages to less than hourly averages was done using the relationship $C_1 = C_0[t_0/t_1]^{0.2}$ (Vic EPA, 2000);
- Scaling from hourly averages to 24-hour averages was done using a multiplier of 0.4, from hourly to annual using 0.08 and from 24-hour to annual using 0.2 (OEHHA 2003).
- Cells in **GREEN** represent background concentrations that are directly relevant to the site (i.e. from a nearby applicable monitoring station).
- Cells in **RED** represent background concentrations from the worst-case available monitoring data (selected due to the presence of significant nearby pollution sources).
- Cells in **BLUE** represent background concentrations from the best-case available monitoring data (selected due to the absence of significant nearby pollution sources).

3.3 Meteorology

3.3.1 Kemerton

The south-western regions of Western Australia experience a Mediterranean climate, characterised by hot, dry summers and mild, wet winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons. The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast (the 'West Coast Trough'). For much of the year the ridge is located to the south allowing easterly and south-easterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the north-west and this can increase rainfall.

Kemerton is located less than 10 km from the coast and experiences mainly southerly to south-easterly winds as affected by the West Coast Trough, but also westerly afternoon sea breezes that are associated with the bulk of the rainfall (Figure 4, Table 7 and Table 8).

For the purpose of the present assessment, data from the Bunbury Bureau of Meteorological (BoM) station were used to represent the Kemerton site which is approximately 15 km away and likely to experience very similar weather patterns.

3.3.2 Albany

Albany experiences a Mediterranean-type climate, experiencing mild summers and cool, wet winters. The city is situated on the southern coast of Western Australia and experiences seasonal extremes in weather, from hot summer days when north-easterly winds arrive from the interior of the State, to cold, wet, windy winter days as cold fronts from the Southern Ocean and move through the region (Figure 5, Table 9 and Table 10).

The wind climatology at Albany is strongly dominated by the effects of the land-sea interface where North-Westerly offshore land breezes are common in the morning, whilst afternoon South-Westerly sea breezes are common.

The present assessment used meteorological data from the Albany Airport as representative of the study site, which was located approximately 4 km away.

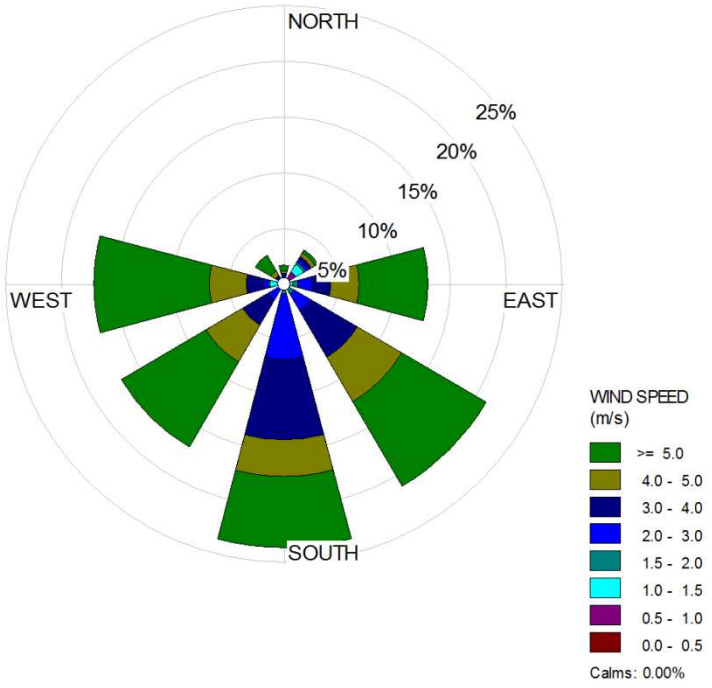


Figure 4 - Annual wind rose for Kemerton.

Table 7 - Frequency distribution of wind speeds by wind direction for Kemerton.

Wind speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	1%	4%	3%	1%	2%	1%	2%	1%
2-4	2%	3%	4%	6%	9%	4%	2%	2%
4-6	2%	1%	4%	5%	3%	5%	6%	3%
6-8	1%	0%	2%	2%	2%	3%	6%	3%
8-10	0%	0%	0%	0%	0%	1%	2%	1%
10-12	0%	0%	0%	0%	0%	0%	1%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 8 - Stability class statistics for the Kemerton meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0%	2.9	25.0	1239.0
B	3%	3.2	22.7	1266.2
C	13%	4.0	20.6	1438.1
D	66%	5.3	17.4	1732.4
E	9%	1.9	12.5	494.1
F	9%	0.8	9.8	143.6

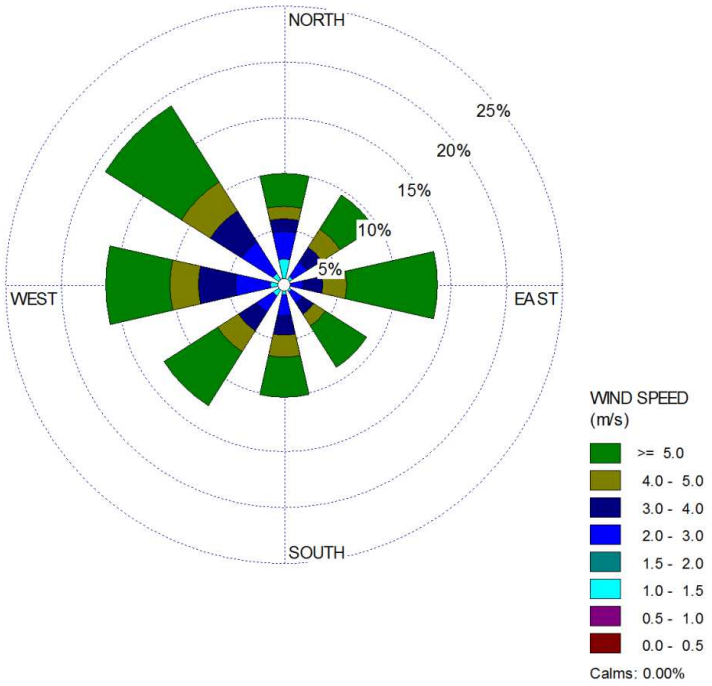


Figure 5 - Annual wind rose for Albany.

Table 9 - Frequency distribution of wind speeds by wind direction for Albany.

Wind Speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	3%	1%	1%	1%	1%	1%	1%	1%
2-4	4%	4%	3%	3%	4%	4%	7%	8%
4-6	2%	4%	5%	3%	4%	5%	6%	6%
6-8	2%	2%	4%	2%	2%	3%	3%	4%
8-10	0%	0%	2%	1%	0%	1%	1%	2%
10-12	0%	0%	0%	0%	0%	0%	0%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 10 - Stability class statistics for the Albany meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0.3%	1.7	20.4	856.4
B	3.6%	3.2	18.9	1065.9
C	15.3%	4.2	16.6	1216.6
D	60.2%	5.5	15.2	1402.4
E	10.6%	3.6	12.9	925.0
F	10.0%	1.8	11.5	505.7

4 Modelling methodology

4.1 Meteorological data

Meteorological data was sourced from: Bunbury to represent the Kemerton site and Albury Airport for the Albany site as described in Section 3.3. Validated data was purchased in a format that was suitable for direct input into Ausplume dispersion model.

4.2 Modelling software

Ausplume v.6.0 was selected as a suitable model to assess the dispersion of pollutants arising from the power station at all sites. Ausplume is a Gaussian-plume dispersion model recommended by most regulatory agencies in Australia. Ausplume is best suited for modelling elevated point source plume dispersion over middle-range scales and in the absence of complex terrain or non-steady-state-type applications, and hence this model was well-suited for this assessment. An example of the Ausplume configuration file used for Albany is provided in Appendix A.

4.3 Modelling inputs and outputs

Given the flat topography of the surroundings at all sites, terrain effects and topographical data were accounted for by adjusting relevant modelling parameters. To help account for enhanced plume dispersion associated with a rolling rural land-use, a roughness factor of 0.4 m was chosen for both Kemerton and Albany (Table 11). The Irwin rural atmospheric stability dependent wind profile exponent was used to representatively characterise the boundary layer profile. Stack tip downwash and building downwash effects were included given the relatively low stack height. Building downwash was explicitly modelled for the generator groups, transformers, work shop, fuel tanks and oil store at each site (Figure 6).Averaging times varied for each pollutant according to the relevant regulation as listed in Table 3. The 100th percentile, i.e., the maximum value, was reported for each calculated ground-level-concentration (GLC). Calculated ground level concentrations (GLCs) were calculated for a number of discrete receptors sited at regular intervals along the boundary of each site in order to verify that regulatory assessment criteria were not exceeded. These discrete receptors are labelled receptors A to K in Figure 6. GLCs were also calculated at gridded receptors spaced evenly at 80 m throughout a 4,000 x 4,000 m modelling domain centred on the stack to verify that no exceedances would occur at any location outside the site boundaries.

Table 11 – Model input parameters.

Parameter	Value
Location classification	Rolling rural
Terrain topology	Flat
Surface roughness	0.4 m
Distance to nearest receptor	Site boundary (≈50 m)
Distance to nearest residential receptor (non-conforming residential dwelling)	1.8 km Kemerton (see Figure 2) and 1.1 km Albany (see Figure 3)

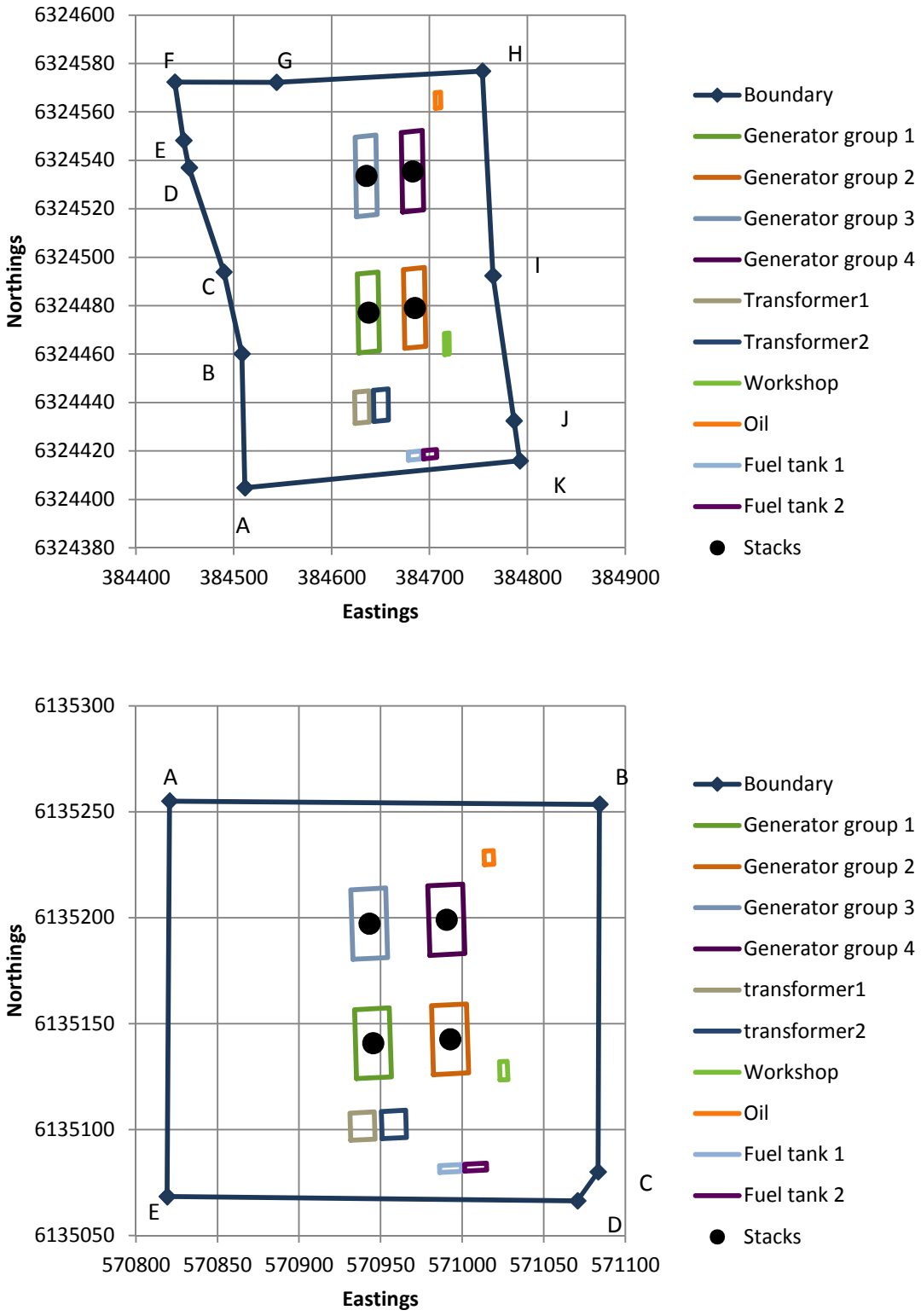


Figure 6 – Site plan for each of the Kemerton (top) and Albany (bottom) sites. The locations are shown for the various buildings as well as of the discrete receptors located along the boundary of the site (denoted by blue diamonds).

4.4 Emission source characteristics

The specifications for the peak load power stations are provided in Table 12 (as supplied by Tesla). The generators used are the same as those from a previous assessment for a smaller power station at Picton (Synergetics 2010). The layout of the proposed power stations is quite similar as indicated in Figure 6. Information regarding the building elevation profile for the power stations was not provided, to guide this air quality assessment the similar plans for a smaller power station at Geraldton (Synergetics 2011) will be used. In order to ensure satisfactory dispersion of pollutants, the forty generator exhausts were modelled as four clusters of ten adjoining stacks, forming what is referred to as a multi-flue stack.

For modeling purposes it was assumed that each multi-flue stack behaves as a single stack with the same discharge temperature and discharge velocity as each exhaust, but with the cross sectional area and pollutant emission rates equal to the combined area of ten exhausts. The resultant modeled stack characteristics are specified in Table 13. Emission rates for SO_2, Acetaldehyde, Benzene, Formaldehyde, Polycyclic Aromatic Hydrocarbons (PAH's), Toluene and Xylenes were obtained from NPI Australia emission estimation techniques (NPI combustion engines, 2008).

Table 12 - Peak load station specification summary.

Parameter	Value
Number of generators	40
Generator type	Caterpillar type 3516BDITA
Fuel	Diesel
Nominal station power output	60 MW (40 generators)
Number of operational hours	Up to 500 hours per year (for the purposes of modelling, assumed continuous emissions).

Table 13 - Stack characteristics and emission rates as used in the modelling.

Variable		Units	Value
Stack height		m	12.5
Stack diameter of individual stacks		m	0.406
Stack diameter used for each multi-flue		m	1.284
Emission temperature		˚C	509
Emission velocity		m/s	54.1
Emission rates (combined emissions from 10 generators, 4 multi-flue stacks of this type on each site)	CO	kg/h	21.01
	NO_x	kg/h	246.03
	PM_{10}	kg/h	1.38
	$PM_{2.5}$	kg/h	1.34
	SO_2	kg/h	0.089
	Acetaldehyde	kg/h	0.0016
	Benzene	kg/h	0.0525
	Formaldehyde	kg/h	0.0052
	PAHs	kg/h	0.0000008
	Toluene	kg/h	0.0185
	Xylenes	kg/h	0.0129

4.1 Derivation of NO_2 from calculated NO_x concentrations

NO_x is a group of oxides of nitrogen including NO and NO_2; however assessment criteria only exist for NO_2 due to its properties as an irritant to the respiratory system. For this reason, it is necessary to estimate NO_2 concentrations based on NO_x levels.

The emission rates presented in Table 13 show that oxides of nitrogen (NO_x) are emitted at high rates compared with other pollutants. This makes sense in light of the fact that the pollutants are sourced from combustion processes. NO_x are a group of pollutants comprising largely NO and NO_2, of which only the latter is directly hazardous to humans and thus is assigned an assessment criterion for comparison (refer to Table 3). Hence, the proportion of NO_X that is NO_2 must be calculated for the assessment.

Given that the present assessment involves NOx emissions in the atmosphere, it is appropriate that NO_2 concentrations are derived from NO_x values by means of the "ozone limiting method" specified by DEC NSW (2005). This methodology relies on the relationship shown below to conservatively predict the conversion of NO into NO_2 in the atmosphere.

$$[NO_2]_{total} = \{0.1 \times [NO_x]_{pred}\} + MIN\left\{0.9 \times [NO_x]_{pred} \; or \; \frac{46}{48} \times [O_3]_{bkgd}\right\}$$

Where:

- $[NO_2]_{total}$ = the calculated concentration of NO_2 in µg/m^3
- $[NO_x]_{pred}$ = the calculated concentration of NOx in µg/m^3
- MIN = the minimum of the two quantities within the braces
- $[O_3]_{bkgd}$ = the background ambient O_3 concentration µg/m^3
- (46/48) = ratio of the molecular weights of NO_2 and O_3

The first component of the sum represents the NO_2 that is expected to be directly emitted by the generators, estimated by the well-established 0.1 proportion (i.e., 10%) of NO_x. This component is added to the second component of the sum, which

estimates the maximum possible concentration of NO_2 that could arise as a result of the oxidation of NO into NO_2 due to ozone. The relationship conservatively assumes that the atmospheric oxidation of NO into NO_2 by ozone is instantaneous, when in practice it takes place over a period of time in the order of minutes and hours. These assumptions combined provide evidence for the conservative nature of the calculated NO_2 concentrations using this methodology.

Background ambient ozone (O_3) concentrations for the sites as described previously in section 3.2 were examined. Ambient levels of O_3 are monitored at Caversham, Quinns Rock, Rockingham, Rolling Green, South Lake and Swanbourne WA (DEC 2010). Data from the most representative location was used.

The New Zealand Good Practice guide for assessing discharges to air from industry (MFE 2008) provide some justification for the use of the ozone-limiting method for estimating NO_2 concentrations. The results of a study comparing measured and estimated NO_2 concentrations showed a consistent and significant level of conservativeness in the estimated values, particularly when NO_x concentrations were high (Figure 7). Based on these results, the estimated NO_2 concentrations are likely to be conservative over-predictions of the likely NO_2 concentrations actually recorded at the receptors.

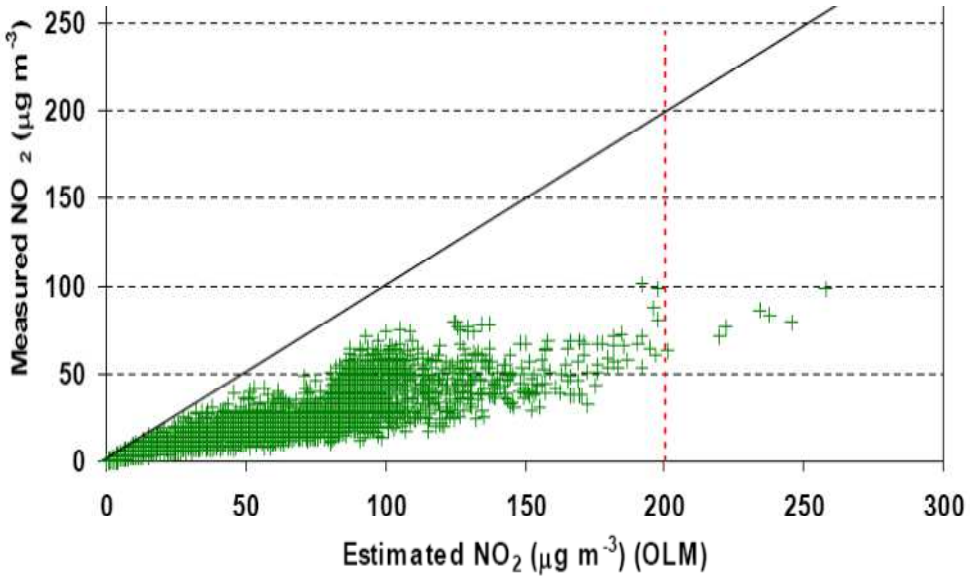


Figure 7 – Comparison between measured and modelled NO_2 1-hour average concentrations at Takapuna in 2001 using the ozone limiting method (MFE 2008).

5 Results

In the following sections of this report, the modelled ground level concentrations (GLCs) at the various receptors are presented and compared against the relevant assessment criteria. A "compliance factor" (CF) is also reported as the ratio of the guideline value and the calculated GLC. A value of CF < 1 indicates the calculated GLC is higher than the guideline value whereas a value ≥ 1 indicates the calculated GLC is equal to or below the guideline value. The CF allows an immediate assessment of the potential for the facility to exceed guideline GLC values.

All modelled GLCs at the discrete modelling receptors are presented in Table 14 and Table 15 for Kemerton and Albany respectively. Also included are the GLCs at the nearest residential receptor shown in Figure 2 and Figure 3. For the sake of clarity and due to the large amount of data presented, all cells with a CF smaller than 10 have been shaded in the tables to help locate all potentially significant GLCs. All GLCs for each of the proposed power stations were below relevant assessment criteria.

At each of the sites, calculated PM_{10} and $PM_{2.5}$ concentrations were quite close to the regulatory limit, with the CF in the range of 1.7 to 6.0. This is largely attributed to the high background particulate concentrations, as the power stations were found to contribute at most 8.3% of daily averaged PM_{10} (at Albany), with the remainder being background PM_{10} pollution.

The worst case GLCs caused by the power station emissions, i.e., background not included, was found to be NO_2, with the lowest compliance factor being 1.17 for hourly NO_2 at the Kemerton site. While the CF is quite small it is a very conservative modelling output. This air quality assessment was conducted under the assumption that the facility operated at full capacity all year round. Synergetics have been advised by Tesla that the actual operational hours of the facility will be less than 500 hours a year. Furthermore, even though there are no registered NO_x emitters with the NPI, Synergetics have taken a conservative approach in estimating the background concentrations. From the predicted GLCs, the background concentrations had represented 26% of the total NO_2 estimate. Contour plots of calculated hourly and annual NO_x concentrations (background not included) are provided in Figure 8 and Figure 9 for Kemerton and Albany respectively.

As described in section 4.1, the NSW DEC (2005) ozone oxidation method was used to estimate NO_2 from modelled NO_x concentrations. To test the validity of this method, the NO_2/NO_x ratios were calculated at the receptors at each site A study on the dispersion of a plume from a turbine driven compressor (Leahey et al. 1983) found that average NO_2/NO_x were not strongly affected by time following the first minute or so, and averaged around 0.37, 0.63 and 0.55 during sampling campaigns in summer, autumn and winter, respectively. These data provide some support to the likely conservativeness of the ozone oxidation method employed in the present assessment.

Table 14 - Direct and cumulative impacts of the ground level concentrations and compliance factors for Kemerton power station. All concentrations are expressed in mg/m^3. Shaded cells denote GLCs that are less 10 times the regulatory limit, i.e. have a compliance factor < 10. The worst-case discrete (boundary) receptor is reported and identified by a label as per Figure 6. For the worst case gridded receptor, the coordinates (in m) relative to the stack location and time are provided.

Pollutant	Aver. time	Assess. criteria	b/g	Worst-case gridded receptor				Worst-case site boundary discrete receptor			
				GLC (-b/g)	GLC (+b/g)	CF	Receptor	GLC (-b/g)	GLC (+b/g)	CF	Receptor
CO	15-min	100	0.89	0.0761	0.9661	>100	(240,0)	0.0562	0.9462	>100	E
	1-hour	30	0.67	0.0602	0.7302	41.0	(240,0)	0.0436	0.7136	42.0	E
	8-hour	10	0.47	0.0421	0.5121	19.5	(320,-80)	0.0221	0.4921	20.3	K
NO_2	1-hour	0.246	0.055	0.1546	0.2096	1.17	(240,0)	0.1351	0.1901	1.29	E
	1-year	0.062	0.004	0.0094	0.0134	4.61	(400,80)	0.0077	0.0117	5.29	F
PM_{10}	24-hour	0.05	0.025	0.0018	0.0268	1.86	(320,00)	0.0009	0.0259	1.92	F
	1-year	0.03	0.005	0.0002	0.0052	5.82	(400,80)	0.0001	0.0051	5.93	F
$PM_{2.5}$	24-hour	0.025	0.013	0.0018	0.0148	1.69	(320,00)	0.0009	0.0139	1.79	F
	1-year	0.008	0.003	0.0001	0.0031	2.54	(400,80)	0.0001	0.0031	2.62	F
SO_2	10-min	0.713	0.084	0.0003	0.0843	8.45	(240,0)	0.0003	0.0843	8.46	E
	1-hour	0.52	0.059	0.0003	0.0593	8.77	(240,0)	0.0002	0.0592	8.78	E
	24-hour	0.21	0.013	0.0001	0.0131	16.0	(320,00)	0.0001	0.0131	16.0	F
	1-year	0.06	0.001	0.0000	1.010E-03	59.4	(400,80)	0.0000	0.0010	59.7	F
Acetaldehyde	1-hour	0.042	-	0.0000	4.585E-06	>100	(240,0)	0.0000	3.317E-06	>100	E
Benzene	1-hour	0.029	-	0.0002	1.504E-04	>100	(240,0)	0.0001	1.088E-04	>100	E
Formaldehyde	1-hour	0.02	-	0.0000	1.490E-05	>100	(240,0)	0.0000	1.078E-05	>100	E
PAHs	1-hour	0.0004	-	0.0000	2.292E-09	>100	(240,0)	0.0000	1.658E-09	>100	E
Toluene	1-hour	0.36	-	0.0001	5.301E-05	>100	(240,0)	0.0000	3.835E-05	>100	E
Xylenes	1-hour	0.19	-	0.0000	3.697E-05	>100	(240,0)	0.0000	2.674E-05	>100	E

Table 15 - Direct and cumulative impacts of ground level concentrations and compliance factors for Albany power station. All concentrations are expressed in mg/m^3. Shaded cells denote GLCs that are less 10 times the regulatory limit, i.e. have a compliance factor < 10. The worst-case discrete (boundary) receptor is reported and identified by a label as per Figure 6. For the worst case gridded receptor, the coordinates (in m) relative to the stack location and time are provided.

Pollutant	Aver. time	Assess. criteria	b/g	Worst-case gridded receptor				Worst-case site boundary discrete receptor			
				GLC (-b/g)	GLC (+b/g)	CF	Receptor	GLC (-b/g)	GLC (+b/g)	CF	Receptor
CO	15-min	100	0.43	0.0931	0.5231	>100	(160,-160)	0.0974	0.5274	>100	C
	1-hour	30	0.33	0.0724	0.4024	74.55	(-160,0)	0.0803	0.4103	73.12	C
	8-hour	10	0.23	0.0449	0.2749	36.37	(-240,0)	0.0305	0.2605	38.39	A
NO_2	1-hour	0.246	0.030	0.1689	0.1989	1.24	(-160,0)	0.1781	0.2081	1.18	C
	1-year	0.062	0.002	0.0088	0.0108	5.76	(320,-160)	0.0096	0.0116	5.36	B
PM_{10}	24-hour	0.05	0.022	0.0019	0.0239	2.09	(-320,0)	0.0008	0.0228	2.19	A
	1-year	0.03	0.004	0.0001	0.0045	6.65	(320,-160)	0.0000	0.0044	6.75	B
$PM_{2.5}$	24-hour	0.025	0.010	0.0018	0.0118	2.11	(-320,0)	0.0008	0.0108	2.32	A
	1-year	0.008	0.002	0.0001	0.0021	3.79	(320,-160)	0.0000	0.0020	3.91	B
SO_2	10-min	0.713	0.027	0.0004	0.0274	26.00	(160,-160)	0.0004	0.0274	25.9	C
	1-hour	0.52	0.019	0.0003	0.0193	26.9	(-160,0)	0.0003	0.0193	26.8	C
	24-hour	0.21	0.008	0.0001	0.0081	25.8	(-320,0)	0.0001	0.0081	26.0	A
	1-year	0.06	0.002	7.380E-06	2.007E-03	29.8	(320,-160)	0.0000	0.0020	29.9	B
Acetaldehyde	1-hour	0.042	-	5.515E-06	5.515E-06	>100	(-160,0)	6.113E-06	6.113E-06	>100	C
Benzene	1-hour	0.029	-	1.810E-04	1.810E-04	>100	(-160,0)	2.006E-04	2.006E-04	>100	C
Formaldehyde	1-hour	0.02	-	1.792E-05	1.792E-05	>100	(-160,0)	1.987E-05	1.987E-05	>100	C
PAHs	1-hour	0.0004	-	2.757E-09	2.757E-09	>100	(-160,0)	3.057E-09	3.057E-09	>100	C
Toluene	1-hour	0.36	-	6.376E-05	6.376E-05	>100	(-160,0)	7.068E-05	7.068E-05	>100	C
Xylenes	1-hour	0.19	-	4.446E-05	4.446E-05	>100	(-160,0)	4.929E-05	4.929E-05	>100	C

Table 16 - Direct and cumulative impacts of ground level concentrations and compliance factors for Albany and Kemerton power stations at the nearest residential receptor shown in Figure 2 and Figure 3. All concentrations are expressed in mg/m^3. Shaded cells denote GLCs that are less 10 times the regulatory limit, i.e. have a compliance factor < 10.

Pollutant	Aver. time	Assess. criteria	Kemerton worst case at residential receptor				Albany worst case at residential receptor			
			b/g	GLC (-b/g)	GLC (+b/g)	CF	b/g	GLC (-b/g)	GLC (+b/g)	CF
CO	15-min	100	0.89	0.0199	0.9099	>100	0.43	0.022	0.452	>100
	1-hour	30	0.67	0.0155	0.6855	43.7664	0.33	0.017	0.347	86.44
	8-hour	10	0.47	0.0094	0.4794	20.8597	0.23	0.013	0.243	41.10
NO_2	1-hour	0.246	0.055	0.1022	0.1572	1.5645	0.030	0.104	0.134	1.83
	1-year	0.062	0.004	0.0077	0.0117	5.3085	0.002	0.009	0.011	5.40
PM_{10}	24-hour	0.05	0.025	0.0004	0.0254	1.9671	0.022	0.001	0.023	2.20
	1-year	0.03	0.005	0.0001	0.0051	5.9369	0.004	0.000	0.004	6.75
$PM_{2.5}$	24-hour	0.025	0.013	0.0004	0.0134	1.8648	0.010	0.001	0.011	2.33
	1-year	0.008	0.003	0.0001	0.0031	2.6215	0.002	0.000	0.002	3.92
SO_2	10-min	0.713	0.084	0.0001	0.0841	8.4789	0.027	0.000	0.027	26.31
	1-hour	0.52	0.059	0.0001	0.0591	8.8038	0.019	0.000	0.019	27.26
	24-hour	0.21	0.013	0.0000	0.0130	16.1204	0.008	0.000	0.008	26.10
	1-year	0.06	0.001	0.0000	0.0010	59.7949	0.002	0.000	0.002	29.96
Acetaldehyde	1-hour	0.042	-	1.177E-06	1.177E-06	>100	-	1.301E-06	1.301E-06	>100
Benzene	1-hour	0.029	-	3.862E-05	3.862E-05	>100	-	4.268E-05	4.268E-05	>100
Formaldehyde	1-hour	0.02	-	3.826E-06	3.826E-06	>100	-	4.227E-06	4.227E-06	>100
PAHs	1-hour	0.0004	-	5.885E-10	5.885E-10	>100	-	6.503E-10	6.503E-10	>100
Toluene	1-hour	0.36	-	1.361E-05	1.361E-05	>100	-	1.504E-05	1.504E-05	>100
Xylenes	1-hour	0.19	-	9.490E-06	9.490E-06	>100	-	1.049E-05	1.049E-05	>100

Abbreviations used in Table 14 and Table 15 include:

- Aver. time = Averaging time (see section 2.3)
- Assess. criteria = Assessment criteria (see section 2.3)
- b/g = background pollutant concentrations (see section 3.2)
- GLC - b/g = calculated ground level concentration arising from the stack alone.
- GLC + b/g = total calculated ground level concentration including stack emissions and background pollutant concentrations.
- CF = Compliance factor.
- Receptor = For discrete receptors along the boundaries of the site, results are only provided for the worst-case receptors.
- Location = For gridded receptors located up to 4,000 m from the stack, results are only provided for the single worst-case receptor. This column provides information as to the location of this gridded receptor (as x,y coordinate relative to the centre of the emissions stacks and measured in metres) where these concentrations were calculated to occur.

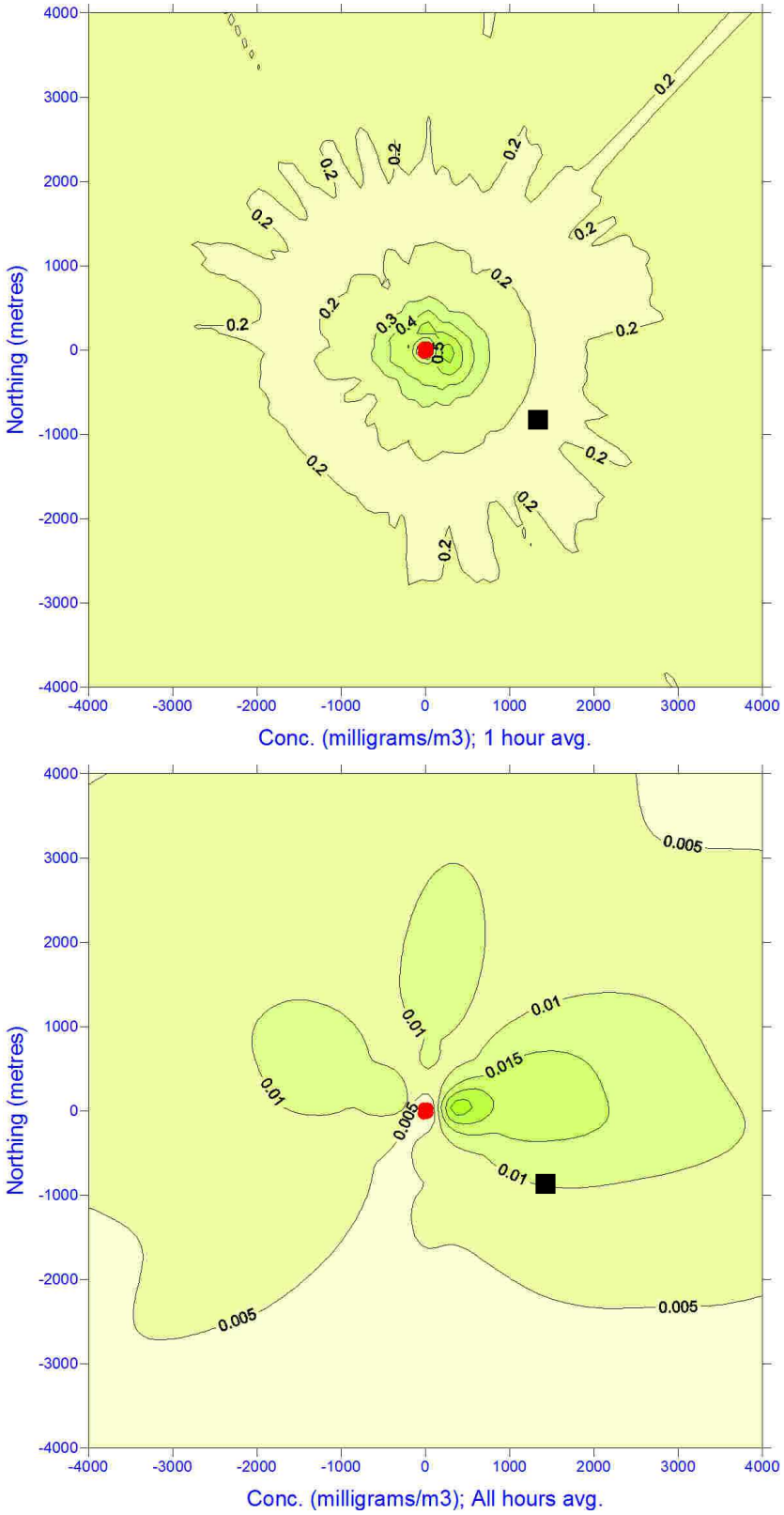


Figure 8 – Contour plots of hourly (above) and annual (below) calculated NOx concentrations in the area surrounding the Kemerton site. The stack is denoted as a red circle, the nearest receptor is located at the black square.

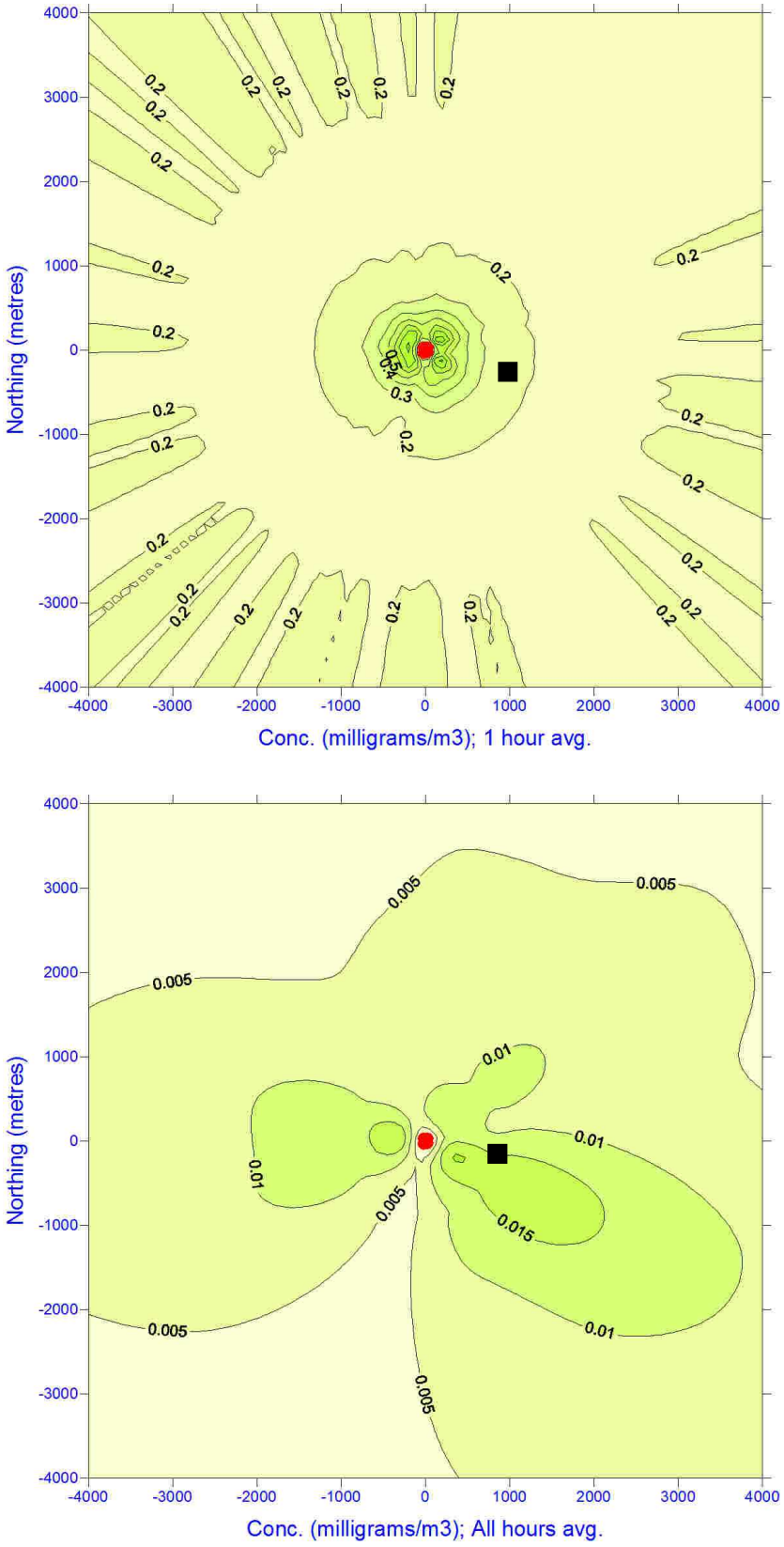


Figure 9 – Contour plots of hourly (above) and annual (below) calculated NOx concentrations in the area surrounding the Albany site. The stack is denoted as a red circle, the nearest receptor is located at the black square.

6 Conclusions

The present air quality impact assessment has investigated the potential direct and cumulative impacts associated with the proposed construction of a power station respectively at the Kemerton and Albany sites in WA. The assessment was carried out using the appropriate regulatory approved dispersion model with very conservative assumptions.

For both sites, the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development are not deemed to exert a negative impact on the surrounding air environment.

7 References

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Appendix A. Sample configuration file for the Albany site Ausplume run

```
  6.0 version
************************************************************
* WARNING - WARNING - WARNING - WARNING - WARNING - WARNING *
*                                                          *
* This is a generated file. Please do not edit it manually. *
* If  editing  is  required, under any circumstances do not *
* edit information enclosed in curly braces.  Corruption of *
* this information or changed order of data blocks enclosed *
* in curly braces may render the file unusable.            *
*                                                          *
************************************************************

Simulation Title
{Tesla_Albany_60MW}
Concentration(1)/Deposition(0),     Emission     rate     units,
Concentration/Deposition     units,Background     Concentration,
Variable Background flag,Variable Emission Flag
{True kg/hour milligrams/m3 0 False False }

Terrain influence tag, 0-ignore, 1 - include
{0}
Egan coefficients
{0.5 0.5 0.5 0.5 0.7 0.7 }
Number of source groups
{1}
Total number of sources (Stack + Area + Volume sources)
{4}

Source Group information
Total Number of Sources in Group 1
{4}
Sources in Source Group 1
{Stack1 Stack2 Stack3 Stack4 }
BPIP Run (1-True, 0-False)
{0 }
Total number of buildings
{10 }
Building name, Base elevation, Number of tiers
{Gen1   0 1 }
Height, Number of sides
{4.525 4 }
X coordinates
{-32.526 -11.203 -12.494 -33.816 }
Y coordinates
{-45.839 -44.993 -12.458 -13.3 }
Building name, Base elevation, Number of tiers
{Gen2   0 1 }
Height, Number of sides
{4.525 4 }
X coordinates
{14.664 36.121 34.831 13.374 }
Y coordinates
{-43.967 -43.116 -10.581 -11.432 }
Building name, Base elevation, Number of tiers
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Height, Number of sides
{4.525 4 }
```

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{-34.758 -13.436 -14.737 -36.059 }
Y coordinates
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Height, Number of sides
{4.525 4 }
X coordinates
{12.432 33.889 32.588 11.131 }
Y coordinates
{12.323 13.174 45.973 45.122 }
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{Trans1 0 1 }
Height, Number of sides
{2.8 4 }
X coordinates
{-36.149 -21.199 -21.708 -36.658 }
Y coordinates
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Y coordinates
{-74.181 -73.588 -60.752 -61.345 }
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{3.75 4 }
X coordinates
{55.402 60.205 59.8624 55.059 }
Y coordinates
{-46.495 -46.304 -37.655 -37.845 }
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{Oil    0 1 }
Height, Number of sides
{3.75 4 }
X coordinates
{45.887 51.555 51.3 45.632 }
Y coordinates
{55.129 55.354 61.795 61.571 }
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Height, Number of sides
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X coordinates
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Y coordinates
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Building name, Base elevation, Number of tiers
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Height, Number of sides
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X coordinates
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Y coordinates
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```
Source Information

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Y, Z coordinates
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Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
{1 0 }
Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
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Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
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Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
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Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
{1 0 }
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Constant emission rate
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Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
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Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
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Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Receptor information

Discrete receptors
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Receptors
{1 5 }
X, Y coordinates and Elevation
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X, Y coordinates and Elevation
{-147.22 85.1416 0 }
X, Y coordinates and Elevation
{116.408 83.6216 0 }
X, Y coordinates and Elevation
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X, Y coordinates and Elevation
{102.848 -103.53 0 }

Gridded receptors
Receptor coordinates type (1-Cartesian, 0-Polar), Number of X
and Y coordinates, Receptor height
{1 101 101 0 }

X grid coordinates
```

{-4000 -3920 -3840 -3760 -3680 -3600 -3520 -3440 -3360 -3280 -3200 -3120 -3040 -2960 -2880 -2800 -2720 -2640 -2560 -2480 -2400 -2320 -2240 -2160 -2080 -2000 -1920 -1840 -1760 -1680 -1600 -1520 -1440 -1360 -1280 -1200 -1120 -1040 -960 -880 -800 -720 -640 -560 -480 -400 -320 -240 -160 -80 0 80 160 240 320 400 480 560 640 720 800 880 960 1040 1120 1200 1280 1360 1440 1520 1600 1680 1760 1840 1920 2000 2080 2160 2240 2320 2400 2480 2560 2640 2720 2800 2880 2960 3040 3120 3200 3280 3360 3440 3520 3600 3680 3760 3840 3920 4000 }

Y grid coordinates
{-4000 -3920 -3840 -3760 -3680 -3600 -3520 -3440 -3360 -3280 -3200 -3120 -3040 -2960 -2880 -2800 -2720 -2640 -2560 -2480 -2400 -2320 -2240 -2160 -2080 -2000 -1920 -1840 -1760 -1680 -1600 -1520 -1440 -1360 -1280 -1200 -1120 -1040 -960 -880 -800 -720 -640 -560 -480 -400 -320 -240 -160 -80 0 80 160 240 320 400 480 560 640 720 800 880 960 1040 1120 1200 1280 1360 1440 1520 1600 1680 1760 1840 1920 2000 2080 2160 2240 2320 2400 2480 2560 2640 2720 2800 2880 2960 3040 3120 3200 3280 3360 3440 3520 3600 3680 3760 3840 3920 4000 }

Model settings and parameters
Emission conversion factor, Averaging Time
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Land use (surface roughness)
{0.4}

Averaging time flags (1,2,3,4,6,8,12,24 hrs, 7, 90 days, 3 month, All hrs
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Statistical output options
{0 0 }

Output options (All meteodata, Every concentration/deposition, Highest/2nd highest, 100 worst case table, Save all calculations
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Write concentration (1-yes, 0-no), Concentration rank, Write frequency, Frequency Level
{1 1 0 -1 }

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{0 2 }
Dispersion exponents
{0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.2 0.2 0.2 0.2 0.2 0.2 0.25 0.25 0.25 0.25 0.25 0.25 0.4 0.4 0.4 0.4 0.4 0.4 0.6 0.6 0.6 0.6 0.6 0.6 }

Building wake effects (1-include,0-not) , Default decay coefficient, Anemometr height, Sigma-theta averaging period, Roughness at vane site, Smooth stability changes, ConvectivePDF)
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Deposition options, Depletion options
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Stability class adjustments (0-None, 1-Urban1, 2-Urban2)
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Building wake algorithms (1-Huber-Sneider, 2-Hybrid, 3-Schulman-
Scire)
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Gradual plume rise (1-yes,0-no), Stack tip downwash (1-yes,0-
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Penetration, Temp Gradient,  Adiabatic Entrainment, Stable
Entrainment
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Temperature Gradients for Wind and Stability categories
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0.02 0.02 0.02 0.035 0.035 0.035 0.035 0.035 0.035 }

Dispersion curves (1-Pasquill Gifford, 2- Briggs rural,  3-Sigma
theta) horizontal < 100 m, ditto vertical < 100 m, ditto
horizontal > 100 m, ditto vertical > 100 m
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Adjust PG curves for roughness - Horizontal, Vertical (1-yes,0-
no)
{1 1 }
Enhance plume for buyoancy - Horizontal, Vertical (1-yes,0-no)
{1 1 }
Adjust for wind direction shear
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Shear rates
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Wind Speed categories
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Output file
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Meteorological file
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files\metfiles\Albany.met'}
Concentration file
{'P:\MelbourneProjects\13006\AUSPLUME files\Albany_1hr.dat'}
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APPENDIX H

Noise Modelling Report

SYNERGETICS
ENVIRONMENTAL ENGINEERING

Draft report: Environmental noise assessment of proposed power stations in Kemerton and Albany, Western Australia

for

Tesla Holdings Pty Ltd

3 May 2013

SYNERGETICS
ENVIRONMENTAL ENGINEERING

Draft report: Environmental noise assessment of proposed power stations in Kemerton and Albany, Western Australia

For

Tesla Holdings Pty Ltd

Report version	Date	Authored by	Checked by
CD03	3/05/2013	CM, JM	DC

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Technical Support

Joseph McKee
Technical Support

Reviewed by

Dave Collins BE Hons, PhD, FIEAust, FAIE, COH, CIH
Principal Environmental Engineer

Contents

Nomenclature

- **Influencing factor**, (IF) in relation to noise received at noise sensitive premises, means the influencing factor determined under Schedule 3 under the regulation;
- **L_{A10}** is an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the time.
- **L_{A1}** is an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the time.
- **L_{Amax}** is an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.
- **Noise sensitive premises** are:
    - Premises occupied solely or mainly for residential or accommodation purposes;
    - Rural premises; and
    - Any premises that is not an industrial and utility or commercial premises.

Executive summary

Tesla Holdings Pty Ltd (Tesla) has retained Synergetics to undertake an environmental noise assessment on the operation of two proposed peak load power stations which are to be constructed on sites in Kemerton and Albany, Western Australia.

The total capacity of each of the proposed power stations is 60 MW-e, consisting of forty 1.6 MW Caterpillar diesel engines housed in four engine houses each containing ten engines. Exhaust fumes of each of the engines are designed to be coupled into a single-flanged exhaust associated with each of the four engine houses. The engines are expected to run at no more than 500 hours per year (Synergetics 2013).

The Albany plant's nearest noise-sensitive premise is approximately 1.5 km from the facility's central point. The nearest noise-sensitive premise to the Kemerton plant is 1.8 km south-east from the centre point of the facility.

The purpose of this report is to determine the level of attenuation required to achieve an acceptable level of environmental noise compliant with Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997a) at the plant boundary and at closest sensitive premises.

The power station noise was considered in two parts at each site:

- mechanical noise sourced from the surface of the engines and associated accessories; and
- exhaust noise.

It was determined that both the engine noise and the exhaust noise will both need to be attenuated at both sites to assure compliance with these regulations.

It was calculated that engine enclosures with a transmission loss of 26 dBA or more and exhaust mufflers with an insertion loss of 41 dBA or more would provide sufficient attenuation to remain below the maximum acceptable SPL at Kemerton. The calculated attenuation required at Albany was 33 and 47 dBA for the enclosure and exhaust respectively. The SPL spectra of the unattenuated SPL at the limiting receptors are included in Table 4 and Table 6 to facilitate enclosure and muffler design. In addition the exhaust mufflers and engine enclosure insertion loss and transmission loss properties will need to be designed to remove any tonality, modulation or impulsiveness from the engines and the exhausts.

Following implementation of these engine and exhaust noise controls, the design will comply with boundary noise requirements under the necessary conditions and the requirements of the Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997a) will be satisfied.

1 Introduction

Tesla Holdings Pty Ltd (Tesla) has retained Synergetics to undertake an environmental noise assessment on the operation of two proposed power stations which are to be constructed on sites in Kemerton and Albany, Western Australia.

The purpose of this report is to determine the level of attenuation required to achieve an acceptable level of environmental noise compliant with Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997) at the plant boundary and at sensitive premises.

The assessment is based on information supplied by the Tesla Holdings through email and personal communications (Tesla, 2010a). This environmental noise assessment complements an air quality assessment described in Synergetics (2013).

2 Site description

2.1 Site description

The Kemerton site lies along the flat coastal plain between the Indian Ocean and the Darling ranges. The Albany site is located on the rainbow coast of southern WA approximately 20 km inland of the City of Albany. The approximate locations of the two Tesla Holdings sites are shown in Figure 1.

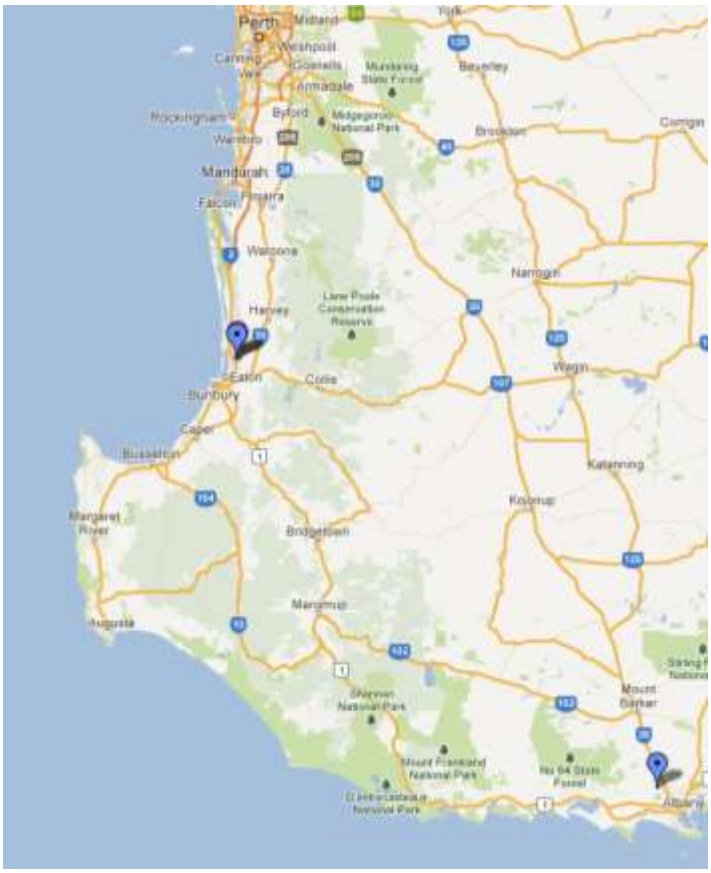

Figure 1 - Locations of the Kemerton and Albany sites with respect to Perth.

The Kemerton site is located in semi-rural industrial zone north of Bunbury, the Albany site is located inland and on a pocket of industrial land surrounded by a rural/agricultural setting. Neither of the sites is close to significant residential areas. The Albany site however, has its western and southern boundaries flush with a rural land use, as it is the south-westernmost lot in the designated industrial area. In contrast the Kemerton area contains a significant buffer area immediately at the perimeter of the industrial block which is not intended for residential purposes.

Aerial photographs showing the rural surrounding land use of the Kemerton and Albany sites are provided in Figure 2 and Figure 3 respectively.

Figure 2 – Aerial photograph of the Kemerton site boundary is denoted by the red lines. Note rural land-use character. Scale is approximately 1:20,000. Numbered Receptors 2, 3 and 6 are referenced in Table 5 of this report. Note rural land-use character.

Figure 3 – Aerial photograph of the Albany site boundary is denoted by the red lines. Scale is approximately 1:20,000. Numbered Receptors 1, 3, 4, and 5 are referenced in Table 5 of this report. Note rural land-use character.

2.2 Background sound pressure levels

The Environmental Protection (Noise) Regulations 1997 state that information should be provided on existing sound pressure levels (SPLs) in order to:

- Identify the impact of noise level increases over low ambient noise levels;
- Identify the likelihood of limit-exceeding noise resulting from the combination of the ambient noise with that of the proposal; and
- Enable the assessment of the likely audibility of any tonal, modulation or impulsive components in the noise from the proposal.

Background noise levels are not available for the site. However given the rural character of the surrounding land-use, it is reasonable to assume that the background noise levels are likely to be very quiet, and hence would not contribute to SPLs.

2.3 Site activity

Both the Kemerton and Albany sites' main sources of noise are forty 1.6MW diesel engines. The engines will emit noise characteristics as specified under the Gen Set Package Performance Data [516DE90] provided to Synergetics by Tesla referenced as Caterpillar (2010).

The diesel engines are expected to meet peak load requirements and hence are likely to operate only during the day period when peak power demand occurs for a maximum of 500 hours per year.

Noise from activities such as maintenance was assumed to be minimal in comparison to the operational noise of the engines and thus would not significantly contribute to the SPL at surrounding receptors. Construction was not addressed in this assessment on the assumption that it would be addressed as part of normal planning approvals processes.

2.4 Site meteorology

Kemerton

The south-western regions of Western Australia experience a Mediterranean climate, characterised by hot, dry summers and mild, wet winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons. The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast (the 'West Coast Trough'). For much of the year the ridge is located to the south allowing easterly and south-easterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the north-west and this can increase rainfall.

Kemerton is located less than 10 km from the coast and experiences mainly southerly to south-easterly winds as affected by the West Coast Trough, but also westerly afternoon sea breezes that are associated with the bulk of the rainfall (Figure 1, Table 1 and Table 2).

For the purpose of the present assessment, data from the Bunbury Bureau of Meteorological (BoM) station were considered to represent the Kemerton site which is approximately 15 km away and likely to experience very similar weather patterns.

Albany

Albany experiences a Mediterranean-type climate, experiencing mild summers and cool, wet winters. The city is situated on the southern coast of Western Australia and experiences seasonal extremes in weather, from hot summer days when north-easterly winds arrive from the interior of the State, to cold, wet, windy winter days as cold fronts from the Southern Ocean and move through the region (Figure 2, Table 3 and Table 4).

The wind climatology at Albany is strongly dominated by the effects of the land-sea interface where North-Westerly offshore land breezes are common in the morning, whilst afternoon South-Westerly sea breezes are common.

The present assessment considered meteorological data from the Albany Airport as representative of the study site, which was located approximately 4 km away.

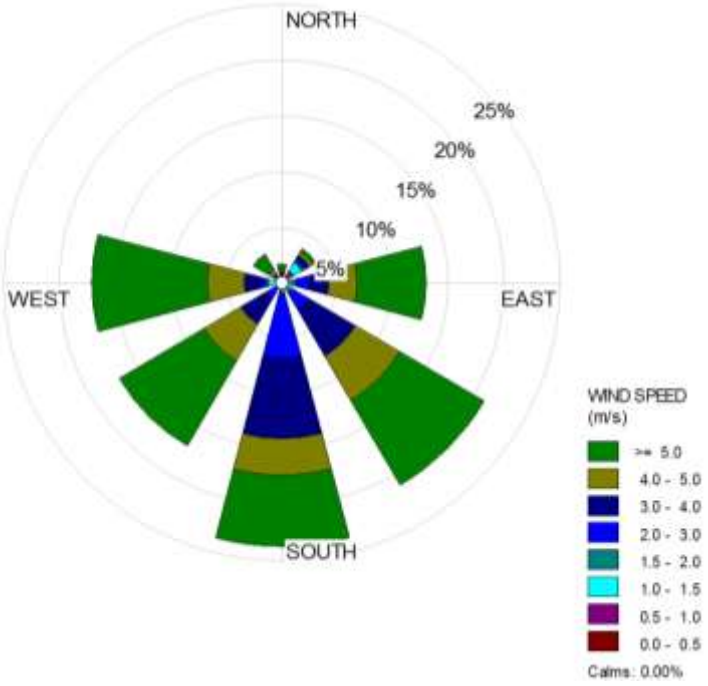

Figure 1 - Annual wind rose for Kemerton.

Table 1 - Frequency distribution of wind speeds by wind direction for Kemerton.

Wind speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	1%	4%	3%	1%	2%	1%	2%	1%
2-4	2%	3%	4%	6%	9%	4%	2%	2%
4-6	2%	1%	4%	5%	3%	5%	6%	3%
6-8	1%	0%	2%	2%	2%	3%	6%	3%
8-10	0%	0%	0%	0%	0%	1%	2%	1%
10-12	0%	0%	0%	0%	0%	0%	1%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 2 - Stability class statistics for the Kemerton meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0%	2.9	25.0	1239.0
B	3%	3.2	22.7	1266.2
C	13%	4.0	20.6	1438.1
D	66%	5.3	17.4	1732.4
E	9%	1.9	12.5	494.1
F	9%	0.8	9.8	143.6

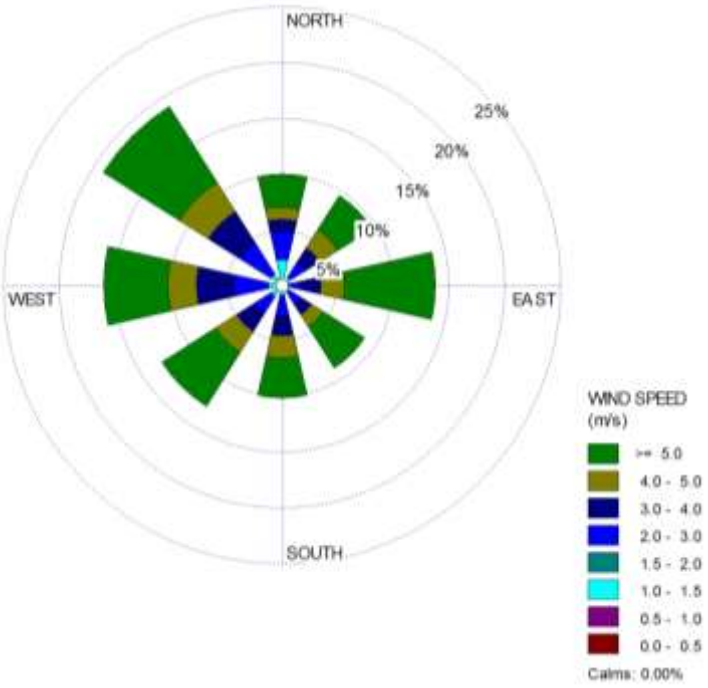

Figure 2 - Annual wind rose for Albany.

Table 3 - Frequency distribution of wind speeds by wind direction for Albany.

Wind Speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	3%	1%	1%	1%	1%	1%	1%	1%
2-4	4%	4%	3%	3%	4%	4%	7%	8%
4-6	2%	4%	5%	3%	4%	5%	6%	6%
6-8	2%	2%	4%	2%	2%	3%	3%	4%
8-10	0%	0%	2%	1%	0%	1%	1%	2%
10-12	0%	0%	0%	0%	0%	0%	0%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 4 - Stability class statistics for the Albany meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0.3%	1.7	20.4	856.4
B	3.6%	3.2	18.9	1065.9
C	15.3%	4.2	16.6	1216.6
D	60.2%	5.5	15.2	1402.4
E	10.6%	3.6	12.9	925.0
F	10.0%	1.8	11.5	505.7

3 Assessment criteria

In Western Australia, the Environmental Protection (Noise) Regulations (EPR) 1997, described in WAEPA (1997a), is the legislation pertaining to the assessment of environmental noise. They are a subsidiary of the Environmental Protection Act 1986.

These Regulations contain "assigned noise levels" which are upper limits - not to be exceeded at any time - to the SPL at any noise sensitive premises. The assigned noise levels vary with the types of noise sensitive premises and time of day as summarised in Table 5.

Table 5 – Applicable[2] assigned noise levels as per the Environmental Protection (Noise) Regulations 1997

Type of premises receiving noise	Receptor/s numbers as shown in Figure 1 or Figure 2	Time of day	Assigned noise level (dBA)[3]		
			$L_{A\,10}$	$L_{A\,1}$	$L_{A\,max}$
Noise sensitive premises at locations within 15 metres of a building associated with a noise sensitive use	1. The closest residential premise 1.5km east of the Albany site inside a 15m radius from the house itself. 2. The closest residential premise 1.8km south-east for the Kemerton site inside a 15m radius from the house itself.	0700 to 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
		0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
		1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
		2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises at locations further than 15 metres from a building associated with a noise sensitive use	3. The area of the residential premises outside a 15m radius from the house itself at both sites. 4. The S and W boundary of the Albany site which abut rural land uses.	All hours	60	75	80
Industrial and utility premises	5. The N and E boundary of the Albany site. 6. All site boundaries at Kemerton.	All hours	65	80	90

[2] Commercial premises were excluded as they are not relevant to this assessment.
[3] IF denotes a calculated influencing factor to adjust the assigned noise level for the types of land use surrounding the noise sensitive premise.

Under WAEPA (1997, Section 7.1a), a noise source should not exceed, or significantly contribute to, a level of noise which exceeds the assigned level. Further in WAEPA (1997, Section 7.2), "…a noise emission is taken to significantly contribute… if the noise emissions… exceeds… 5dB below the assigned level". Assuming that the existing background levels associated with rural activities are not a significant contributor, the "maximum acceptable SPL" (measured as L_{A10}) due to the power station activities is "60 – 5 = 55" dBA at Receptors 3 and 4, and "65 – 5 = 60" dBA at Receptors 5 and 6 respectively.

At Receptors 1 and 2, as the power station is expected to only operate during periods of maximum electricity demand, i.e., 0700 to 1900 hours period as shown in Table 1, the "maximum acceptable SPL" (measured as L_{A10}) due to the power station activities is "40 dBA + IF – 5 = 35 +IF" dBA.

4 Methodology

All SPL calculations are performed in accordance with ISO (2005) and Beranek (1998), the calculated noise levels have an uncertainty of ±3 dB. Calculated SPL at receptors in the near-field where hemispherical divergence cannot be relied on, may have a greater level of uncertainty but is likely to be no more than ±5 dB. Standard methods and techniques for manipulating sound data were sourced from Institute of Noise Control Engineering (Beranek 1988).

The data used to determine the sound power of the mechanical noise and the exhaust noise was provided by Caterpillar (2010), and is contained within the specifications for the engine model 3516BDITA. In order to calculate the sound power level from the supplied data, a hemispherical geometrical divergence, i.e., omni-directional behaviour was assumed.

Attenuation due to physical blocking such as foliage and undulating terrain was assumed to be negligible given the flat rural land use. This is a slightly conservative assumption as the calculated SPL is likely to be slightly greater than the observed value.

The following sources of attenuation were considered:

- Geometric divergence - As the sound wave expands, it forms a larger surface area. Therefore, the sound pressure at any point decreases as the radius of the sphere increases. This is formalised in the law $L_W = L_I + 10\log(S)$, where L_W is the SPL at 1m from the source, L_I is the SPL at a point at radius r from the source and S is the surface area at the radius r. This is the one instance where calculations have deviated from the ISO standards, because that provides a formula which models the area spread as a sphere. Unless the sound source is high above the ground, this is an invalid assumption. As such, a hybrid formula for the surface area has been used that takes into account the height of the source to determine if the area is a sphere or a spherical cap.
- Atmospheric absorption - The air absorbs some of the energy of the sound wave as a linear function of the distance of air travelled.
- Ground effect - The attenuation resulting from interference between the propagating wave and reflections from the earth's surface, and acoustically absorptive soil and ground cover.
- Wind speed – Wind can deflect the sound pressure waves in a downwind direction increasing SPLs at distant downwind receptors.
- Temperature profile – Strong inversion conditions can diffract the sound pressure waves towards the ground increasing SPLs at distant receptors.

A logarithmic transformation is applied to the sound pressure value which gives us the SPL, measured in dB. Sound pressure levels are then A-weighted in units of dBA to take into account that the human ear is more effective at hearing sounds across the frequency range of 500 to 5000 Hz.

Because the level of attenuation is dependent on the frequency the frequency spectra of sound pressure, power station noise emission data were obtained from the supplier which were supplied in octave band centre frequency (OBCF) as shown in Caterpillar (2010). The total A-weighted SPL in dBA was determined by summing logarithmically each octave band contribution. To maximise representativeness and accuracy of the calculated resultant noise level at the noise sensitive receptors, the SPL at the site boundary has been modelled by

treating each of the forty-four sound sources (forty engines and four exhaust stacks) as individual sources, each with unique 3D Cartesian coordinates.

The WAEPA (1997a) requires that the presence of tonality, modularity and impulsiveness is adjusted in the calculated or measured data according to Table 6.

Table 6 - Adjustments to measured value based on the characteristics of the sound as per the WAEPA (1997)

Adjustment4 (dBA)		
Where tonality is present	Where modulation is present	Where impulsiveness is present
+5	+5	+10

It was assumed that the exhaust mufflers and engine enclosures have insertion loss and transmission loss properties respectively such that they remove any tonality, modulation or impulsiveness and that no adjustment was required in this assessment.

Given the short propagation distances to the limiting Receptors 4, 5 and 6, typically less than 150 m from the nearest generator, the effects of wind and atmospheric stability are negligible, and for the purposes of this assessment, were not considered. The distances from the sites to the nearest residential Receptors 1, 2 and 3 of approximately 1.5 km are more significant, however meteorological effects can also be neglected at these receptors if the compliance margin relative to the limiting receptors is greater than 5 dBA which is the maximum likely wind or inversion influence at these distances.

[4] Where noise emission is not music. These adjustments are cumulative to a maximum of 15 dBA.

5 Noise modelling and analysis

The modelled sound data - with no attenuation - at the closest residence (Receptor 2) and the closest boundary (Receptor 6) for the Kemerton site are summarised in Table 7.

Table 7 - Unattenuated data for the Kemerton site

Parameter		Units	Residence (Receptor 2)	Site boundary (Receptor 6)
Sound Pressure Level		dBA	60.93	94.24
Maximum acceptable SPL[5]		dBA	35	60
Control required		dBA	25.93	34.24
Exhaust Sound Intensity		W/m^2	1.17E-06	2.54E-03
Exhaust Sound Pressure Level		dBA	60.69	94.05
Engines Sound Intensity		W/m^2	6.61E-08	1.15E-04
Engines Sound Pressure Level		dBA	48.20	80.62
Exhaust Intensity Fraction		-	0.95	0.96
Average Distance		m	1824.18	101.10
Octave Band Centre Frequency (Hz)	63	dB	40.99	65.86
	125	dB	55.66	85.69
	250	dB	55.18	82.77
	500	dB	52.14	82.33
	1000	dB	54.28	87.46
	2000	dB	49.99	90.01
	4000	dB	30.09	85.67

Exhaust noise dominates the SPL at these receptors. The site boundary (Receptor 6) requires the greatest level of control, with an overall attenuation of approximately 34 dBA (calculated as 34.24 dBA), and is the limiting receptor for Kemerton, i.e., if Receptor 6 is acceptable, then all other receptors will be acceptable. A breakdown of the SPL for exhaust and mechanical noise at Receptor 6 is provided in Table 8 to assist with design of noise controls.

Table 8 - Breakdown of the SPL for exhaust and mechanical noise for Receptor 6 at the Kemerton site

OBCF[6] (Hz)	Exhaust contribution (dB)	Mechanical contribution (dB)	Combined contribution (dB)
63	64.85	59.03	65.86
125	84.79	78.4	85.69
250	82.52	70.37	82.77
500	82.09	69.71	82.33
1000	87.35	71.33	87.46
2000	89.96	71.02	90.01
4000	85.58	68.63	85.67

[5] Neglecting the benefits of the influencing factor.
[6] OBCF is an acronym for “Octave band centre frequency”.

In Table 9 are the modelled sound data for the Albany site with no exhaust mufflers or sound barriers applied.

Table 9 - Unattenuated noise data for the Albany site

Parameter		Units	Residence (Receptor 3)	Rural site boundary (Receptor 4)	Industrial site boundary (Receptor 5)
Sound Pressure Level		dBA	64.8	90.9	100.1
Maximum acceptable SPL[7]		dBA	35	55	60
Control required		dBA	29.8	35.9	40.1
Exhaust Sound Intensity		W/m^2	2.82E-06	1.94E-03	9.87E-03
Exhaust Sound Pressure Level		dBA	64.57	90.77	99.90
Engines Sound Intensity		W/m^2	1.25E-07	5.071E-05	5.557E-04
Engines Sound Pressure Level		dBA	51.29	77.05	87.45
Exhaust Intensity Fraction		-	0.955	0.959	0.946
Average Distance		m	1367.23	147.44	68.11
Octave Band Centre Frequency (Hz)	63	dB	45.17	62.94	71.26
	125	dB	60.11	82.63	91.22
	250	dB	60.04	79.20	89.88
	500	dB	58.17	78.88	88.94
	1000	dB	61.82	84.38	92.93
	2000	dB	60.25	86.77	95.68
	4000	dB	42.36	81.81	92.01

As before, exhaust noise dominates the SPL at the receptors. The site boundary (Receptor 5) requires the greatest level of control, with an overall attenuation of approximately 40 dBA (calculated as 40.1 dBA), and is the limiting receptor for Albany. A breakdown of the SPL for exhaust and mechanical noise is provided in Table 10 to assist with design of noise controls.

Table 10 - Breakdown of the SPL for exhaust and mechanical noise for Receptor 5 at the Albany site

OBCF[8] (Hz)	Exhaust contribution (dB)	Mechanical contribution (dB)	Combined contribution (dB)
63	70.07	65.07	71.26
125	90.06	84.94	91.22
250	89.54	78.68	89.88
500	88.68	76.67	88.94
1000	92.82	77.02	92.93
2000	95.62	76.86	95.68
4000	91.93	74.43	92.01

[7] Neglecting the benefits of the influencing factor.
[8] OBCF is an acronym for "Octave band centre frequency".

6 Noise controls

This section documents the engine and exhaust noise attenuation required to bring the SPL at Receptor 6 at Kemerton and Receptor 5 at Albany below maximum acceptable levels.

At the Kemerton site, the following attenuations must be applied to satisfy maximum acceptable SPLs at Receptor 6.

Table 11 – Attenuation Requirements for the Kemerton site

Type	Mechanical	Exhaust
Required attenuation (dBA)	26	41

Once these treatments have been applied, SPLs similar to those below will be experienced at the Kemerton receptors.

Table 12 – Attenuated Sound data for the Kemerton site

Receptor	Residence (Receptor 2)	Industrial site boundary (Receptor 6)
Calculated SPL after installation of controls (dBA)	24	57
Maximum acceptable SPL (dBA)	35 + IF	60

At the Albany site, the following attenuations must be applied to satisfy maximum acceptable SPLs at Receptor 5.

Table 13 – Attenuation Requirements for the Albany site

Type	Mechanical	Exhaust
Required attenuation (dBA)	33	47

Once these treatments have been applied, SPLs similar to those below will be experienced at the Albany receptors.

Table 14 – Attenuated Sound data for the Albany site

Receptor	Residence (Receptor 3)	Rural site boundary (Receptor 4)	Industrial site boundary (Receptor 5)
Calculated SPL after installation of controls (dBA)	21	47	57
Maximum acceptable SPL (dBA)	35 + IF	55	60

7 Discussion

The background sound levels in the rural surrounding area were assumed to be low relative to the maximum acceptable levels. To assure a conservative safety margin, the recommended muffler insertion loss and engine enclosure transmission loss implicitly incorporate up to 5 dBA safety margin as required under WAEPA (1997a Section 7.2).

The muffler insertion losses and engine mechanical attenuations calculated based on these assumptions are technically feasible. Sound enclosures with attenuations of 60 dBA are available, and an in-line silencer of type SCE/A-LP/A-350 are commercially available (supply only) at a cost of approximately $20k each.

The engine exhausts for engine house are flanged together into a single outlet stack. It was assumed that the sound is transmitted perfectly though the exhaust ducts to the muffler, with no losses from the ducting or interference. Additionally, it was assumed that the ducts are sufficiently thick to prevent noise breakout before the exhaust gas passes through the silencer/s wall.

8 Conclusions

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla Holdings Pty Ltd on the subject sites in Albany and Kemerton. The assessment consisted of:

- the determination of assessment criteria;
- the calculation of noise levels while the engines are running;
- the assessment of the calculated noise levels against the assessment criteria; and
- the evaluation of potential noise control options.

Calculations on the noise resulting from the proposed operations at the Tesla plants quantified the level of muffler insertion loss and engine enclosure transmission loss required to meet the assessment criteria.

It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise. Similarly at Kemerton, an engine house enclosure with a transmission loss of 26 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise. The exhaust mufflers and engine enclosures insertion loss and transmission loss properties respectively will need to be selected to remove any tonality, modulation or impulsiveness from the engines and the exhausts.

Following implementation of the engine and exhaust noise controls, it was calculated that the power stations will comply with boundary noise requirements with a minimum of a 3dBA margin [9], as summarised in Table 15 below, and hence the requirements of the Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997a) will be satisfied.

Table 15 – Summary of calculated receptor SPLs following controls

Receptor		Calculated SPL after installation of controls (dBA)	Maximum acceptable SPL (dBA)
No.	**Description**		
1	The closest residential premise 1.5km east of the Albany site inside a 15m radius from the house itself.	21	35 + IF
2	The closest residential premise 1.8km south-east for the Kemerton site inside a 15m radius from the house itself.	24	35 + IF
3	The area of the residential premises outside a 15m radius from the house itself at both sites.	21	35 + IF
4	The S and W boundary of the Albany site which abut rural land uses.	47	55
5	The N and E boundary of the Albany site.	57	60
6	All site boundaries at Kemerton.	57	60

[9] 3dBA is the level of uncertainty associated with the calculation methodology.

APPENDIX I

Stakeholder Consultation Letters

Our Ref: INF060AE

24 August 2011

B & J Catalano Pty Ltd
Lot 42 South West Highway
Brunswick WA 6224

To whom it may concern

Proposed Power Station at Lot 5107 Marriot Road, Wellesley

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5107 Marriot Road, Wellesley. Tesla Corporation are also proposing to construct a separate 9.9 megawatt diesel-fired, peak load Power Station (the proposed facility) on the same lot. The two power stations will be built to run independently. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill covered self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by a suitably qualified professional and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

We invite you to comment on the proposed project. Comments may be submitted in writing to 360 Environmental by post to PO BOX 14, West Perth 6872 or by email to admin@360environmental.com.au, by 6 September 2011. Should you have any queries or require further information please do not hesitate to contact Gemma Whitfield or the undersigned on (08) 9388 8360. We look forward to hearing from you.

For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

Team Leader – Infrastructure

Enc *Table 1 Key Characteristics Table*
Site Location

10 Bermondsey Street, West Leederville WA 6007 • PO Box 14, West Perth WA 6872
t (+618) 9388 8360 **f** (+618) 9381 2360 **e** admin@360environmental.com.au **w** 360environmental.com.au **abn** 50 109 499 041

Table 1. Key Characteristics Table

ELEMENT	DESCRIPTION
Project Location	Lot 5107 Marriott Road, Wellesley.
Life of Project	30 years.
Power Station Footprint	Approximately 7,000 square metres.
Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 L per hour
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF060AE

24 August 2011

Corby Nominees Pty Ltd
49 Marriott Road
Brunswick 6224

To whom it may concern

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The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill covered self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by a suitably qualified professional and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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Our Ref: INF060AE

24 August 2011

DBNGP (WA) Nominees Pty Ltd
PO Box Z5267
Perth WA 6831

To whom it may concern

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The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill covered self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by a suitably qualified professional and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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Our Ref: INF060AE

24 August 2011

Kevein John Heenan
179 Perren Road
Brunswick WA 6224

To Mr Hennan

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The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill covered self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by a suitably qualified professional and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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Our Ref: INF060AE

24 August 2011

Emma Jane Kirk
252 Devlin Road
Brunswick 6224

Dear Emma

Proposed Power Station at Lot 5107 Marriot Road, Wellesley

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24 August 2011

Milne Agrigroup Pty Ltd
Locked Bag 19
Welshpool WA 6986

To whom it may concern

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Our Ref: INF060AE

24 August 2011

Mr Kenneth Albert Reading
1090 Wellesley Road
Benger 6223

Dear Mr Reading

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9 References

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