

DRAFT Environmental and Social Impact Assessment Report

Project Number: 50182-001
November 2018

INO: Riau Natural Gas Power Project ESIA Vol.5_Technical Appendices Part A

Prepared by ESC for the Asian Development Bank

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Riau 275 MW Gas Combined Cycle Power Plant IPP - ESIA

Medco Ratch Power Riau

ESIA Volume 5: Technical Appendices

AM039100-400-GN-RPT-1014 | V5

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1. Introduction

ESIA Volume 5 provides Technical Appendices relevant to this ESIA and as referenced within ESIA Volume 1: Introduction, ESIA Volume 2: EIA, ESIA Volume 3: SIA and ESIA Volume 4: ESMP and Framework ESMS. Table 1.1 below provides an overview of the Technical Appendices provided in this Volume and indicates which Volume they are associated with. It should be noted that Appendices may be associated with other more than one Volume of the ESIA and this will be noted within the respective Volume text.

Table 1.1 : ESIA Technical Appendices

ESIA Volume	Technical Appendix	Document Title
ESIA Volume 1: Introduction	Appendix A	Technical Report – Scoping Report
	Appendix B	Technical Report – Detailed Process Description
	Appendix C	ESIA Baseline Survey Terms of Reference (Dry)
	Appendix D	ESIA Baseline Survey Terms of Reference (Wet)
	Appendix E	KA-ANDAL Approval Letter
	Appendix F	The Ministry of Agraria and Spatial Planning issued Recommendation Letter
	Appendix G	Comparison of WBG EHS Guidelines with Indonesian Regulations
ESIA Volume 2: EIA	Appendix H	Technical Report – Air Quality Impact Assessment
	Appendix I	Technical Report – Noise Impact Assessment
	Appendix J	Technical Report – Water Quality and Freshwater Ecology Assessment
	Appendix K	Technical Report - Occupational Health and Safety & Working Conditions
	Appendix L	Empirical Calculations used for Thermal Mixing Zone
	Appendix M	Biodiversity Specialists CV
	Appendix N	NBC Dry Season Baseline Survey
	Appendix O	NBC Wet Season Baseline Survey
	Appendix P	Biodiversity Action Plan
ESIA Volume 3: SIA	Appendix Q	Stakeholder Engagement Plan Including Community Grievance Mechanism
	Appendix R	Chance Find Procedure
	Appendix S	Okura Village Fisher Folk Survey
	Appendix T	Minutes of Meetings from Community Consultations

Appendix A. Scoping Report



Riau 275 MW Gas Combine Cycle Power Plant IPP Project - ESIA

Medco Ratch Power Riau

Technical Report – Scoping Report

AM039100-400-GN-RPT-1004 | V3

October 2017



Riau 275 MW Gas Combine Cycle Power Plant IPP Project - ESIA

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Important note about your report

The sole purpose of this report and the associated services performed by Jacobs New Zealand Limited (Jacobs) is to provide a Scoping Report which identifies the key issues that need to be addressed in the preparation of the Environmental and Social Impact Assessment (ESIA) in respect to the Riau IPP Project, in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

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Glossary

AMDAL	Analisis Mengenai Dampak Lingkungan
ADB	Asian Development Bank
CEMP	Construction Environmental Management Plan
CEMS	Continuous Environmental Monitoring Station
CCGT	Combined cycle gas turbine
CFPS	Coal fired power station
CPI	Corrugated plate interceptor
EHS	Environmental, Health and Safety
EPFI	Equator Principle Financial Institution
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
GFPP	Gas fired power plant
GT	Gas turbine
H&SP	Health and Safety Plant
ha	Hectare
HHV	High Heating Value
HP	High pressure
HRSG	Heat recovery steam generator
IP	Intermediate pressure
km	Kilometres
m	Metres
aMSL	Above mean sea level
MRPR	Medco Ratch Power Riau
MW	Megawatt
NO _x	Oxides of Nitrogen
OHL	Overhead Line
OPGW	Optical Ground Wire
PPA	Power Purchase Agreement
RoW	Right of way
SAP	Survey Action Plan
SEP	Stakeholder Engagement Plan
ST	Steam turbine
T	Tonnes

1. Introduction

1.1 Background

This Scoping Report supports an Environmental and Social Impact Assessment (ESIA) for the construction and operation of the Riau 275 MW Combined Cycle Gas Fired Power Plant IPP Project (Riau 275 MW GFPP). The Project consists of a 275 MW combined cycle power plant and ancillary facilities, a 40 km long 12-inch gas pipeline, and a switchyard and a 750 m 150 kV transmission line - collectively referred to hereafter as the 'Project'. The Project Sponsors being PT Medco Power Indonesia (MEDCO) and Ratchaburi Electricity Generating Holding PCL (RATCH), have formed PT Medco Ratch Power Riau (MRPR) to build, own and operate the plant under the terms of the Power Purchase Agreement (PPA) which has been agreed with PT Perusahaan Listrik Negara (Persero) ("PLN").

1.2 Project Location

The power plant and ancillary features, switchyard and transmission line is located in the Tenayan Industrial Village (previously known as Sail Village), Tenayan Sub District, Pekanbaru City, Province of Riau.

The power plant is located approximately;

- 10km due east of the city of Pekanbaru in central Sumatra, Indonesia;
- 5km south of the Siak River; and
- 3km south of PLN's existing 2 x 110 MW RIAU Coal Fired Power Station (CFPS).

The power plant and switchyard will be located within the 9 ha of privately owned land currently being used as a palm oil plantation. The site is bounded by palm oil plantations to the west, south and east and Road 45 on the North.

MRPR also proposes to seek gas supply from TGI Perawang Station located north of the power plant in the Siak Regency. The gas will be delivered to the power plant by approximately 40 km of pipeline which will be located within the reserve of existing road.

An outline of the Project area is detailed in Figure 1.1 and an overview of the general area and proposed connections to services is outlined in Figure 1.2.

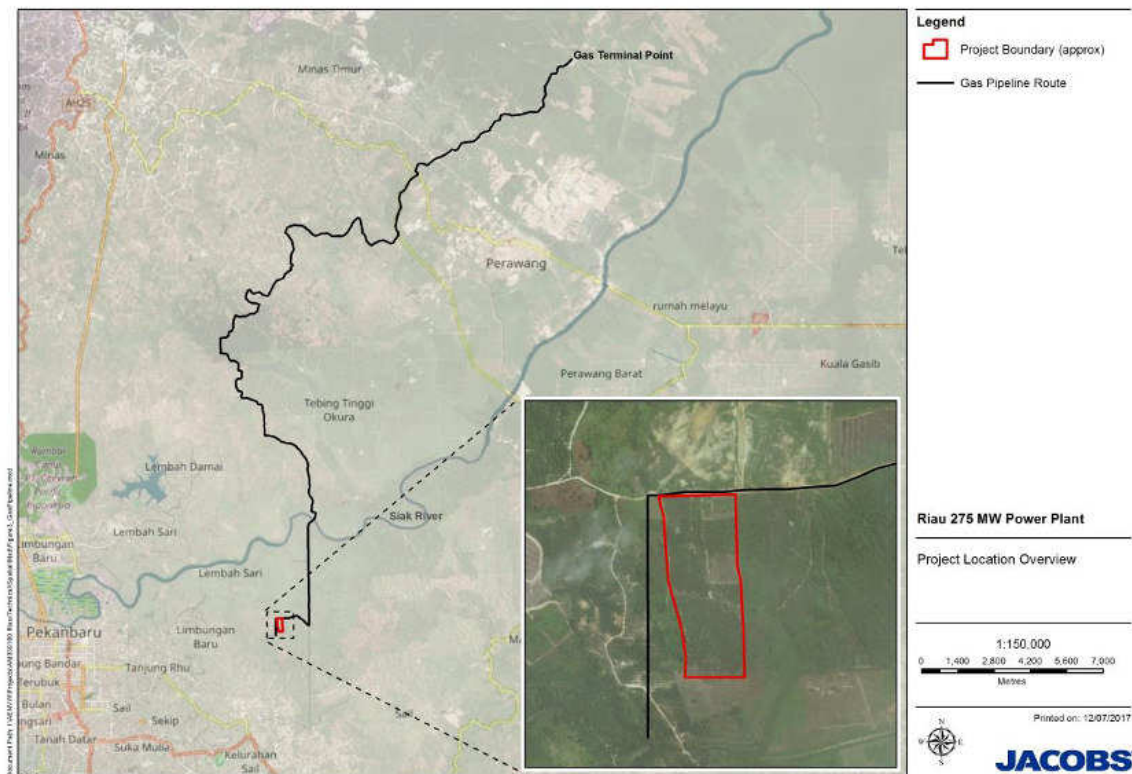


Figure 1.1: Outline of the Project Area

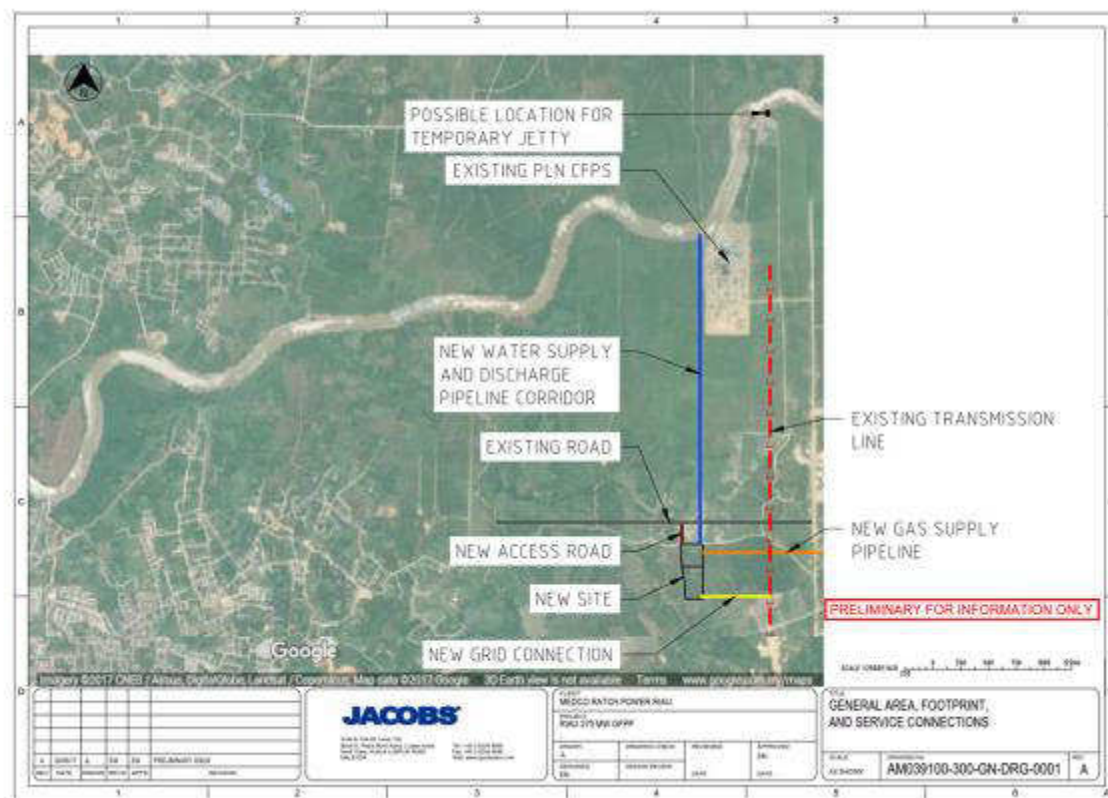


Figure 1.2: Power Plant General Area and Service Connections

1.3 Purpose

This Scoping Report will review existing environmental and social-related studies and information available for the site development and identify key risks to be considered in the ESIA including identifying information gaps for baseline environmental and social studies. The ESIA Scoping Study includes the following:

- Relevant International and National requirements relevant to the proposed development including:
 - Asian Development Bank (ADB) Safeguard Policy Statement 2009¹;
 - Equator Principles
 - International Finance Corporation (IFC) Performance Standards;
 - World Bank Group (WBG) Environmental, Health and Social (EHS) General and Industry Specific Guidelines and
 - Indonesian Regulatory Framework.
- key risks to be addressed by the ESIA investigations;
- information and data gaps to be addressed through the ESIA baseline studies;
- extent and level of further survey required;
- Environmental and Social Impact Scoping Matrix
- a draft Terms of Reference (ToR) for the ESIA baseline studies, including confirming the scale, timing and number of specialist ESIA surveys to be conducted (Appendix B);
- the outcomes of the initial site visit undertaken for the ESIA in June 2017; and
- proposed ESIA assessment methods (and comment on if any changes are proposed to the outline methodology in the SoW).

It should be noted that this Scoping Report has been written with limited information regarding the design of the Project.

1.4 Structure of Report

This Scoping Report is structured as follows:

- Section 2 – Project Overview and Progress
- Section 3 – General Approach to ESIA
- Section 4 – Existing Environment
- Section 5 – Key Environmental and Social Risks

¹ ADB Safeguard Policy Statement 2009 accessed in October 2017 at [<https://www.adb.org/site/safeguards/policy-statement>]

2. Project Overview and Progress

2.1 Project Description

The Project comprises a 275 MW combined cycle power plant (CCPP), a 40 km long gas supply pipeline which will bring fuel to the site, a 150 kV switchyard and 750 m long transmission line to connect the power plant to the PLN grid. Once constructed, ownership of the switchyard and transmission line will be transferred to PLN. (The switchyard and transmission line connection are collectively known as the Special Facilities.) At the end of the 20 year term of the PPA, PLN will take ownership of the power plant and gas supply pipeline.

The power plant will use gas fuel only and is a 2 x 1 combined cycle plant, designed to deliver up to 275 MW over the 20 year term of the PPA.

Key components of the project will comprise the following:

- Power generated by 2 x 1 combined cycle plant, delivering up to 275 MW;
- River water intake and outlet;
- 2 x 45 m tall, 3.8 m diameter chimneys;
- Wet mechanical draft cooling tower;
- Earthworks to level and raise the power plant platform from approximately 25m above mean sea level (MSL) to 28 m;
- 500 m access road;
- Gas supplied from TGI Gas Station 40 km from the power plant via a 12 inch gas pipeline; and
- a 150 kV switchyard at the plant, with a 750 m double-phi connection to intercept the existing Tenayan – Pasir Putih 150 kV transmission line.

The gas pipeline will be mostly trenched and buried within existing road reserve. Horizontal directional drilling (HDD) will be used to cross the Siak River, with the pipeline anticipated to pass approximately 2 m beneath the river bed. For other small watercourses and crossing of roads, industry standard methodology determined during detailed design will be used.

2.1.1 Water Requirements

The water balance diagram detailed in Appendix E provides an overview of water requirements for the Project including: raw water, treated water and waste water. Raw water is anticipated to be abstracted from the Siak River and treated water discharged back into the river, estimated daily flow rates are as follows:

- Raw Water Abstraction – 368.5 m³ per hour.
- Treated Water Discharge – 82.5 m³ per hour.

Following treatment, the combined water discharge from the power plant site is anticipated to have an elevated temperature of between 3-5°C above background. When it reaches the Siak river via the 3 km buried discharge pipeline, the discharged water temperature is likely to be much closer to ambient.

2.2 Project Land Requirements

MRPR plan to construct the power plant and switchyard on a 9 ha plot of land owned by up to eight owners and is currently in procurement process. According to Pekanbaru City's Spatial Plan, the land is in a zone allocated for industrial and warehousing use. There are no dwellings located at the power plant site or along the transmission line so no physical relocation or resettlement of inhabitants will be necessary.

At the time of writing MRPR is still in the process of identifying proposed lands for acquisition, required in relation to the gas pipeline route however no physical relocation or resettlement of inhabitants is anticipated as

the gas and water pipelines will run along the road reserve or within easements which will be agreed with the affected landowners.

The total land requirements for the power plant and switchyard (including temporary laydown areas and offices for the construction workforce) are estimated at approximately 9.1 ha as outlined Table 2.1. Preliminary Site layout plans are provided in the Appendices.

Table 2.1: Riau 275MW GFPP land requirements

Riau 275MW GFPP power plant land area requirements	Approximate Area, ha
Power plant and main plant buildings	1.2
Cooling tower	0.2
Balance of plant area	2.5
Switchyard (150 kV) (part of the Special Facilities to be owned by PLN)	1.5
Total	5.4

During construction, there will be further land requirements for the construction workforce including temporary laydown areas and offices. The additional area, estimated at a further 3.7 hectares will be within the site area (total of 9.1 ha).

There will also likely be a need for a temporary jetty to be built on the Siak River, expected to be located close to PLN's 2 x 110 MW CFPS. This will be used for transportation of materials and equipment during the construction phase of the power plant.

In addition, the Project will also have land requirements for a water abstraction point at the Siak River, water supply pipelines to and from the power plant site, the gas supply pipeline, and the 150 kV transmission line, as outlined in Table 2.2 below.

Table 2.2 : Riau 275MW GFPP Land Requirements

Riau 275MW GFPP power plant – Other infrastructure land requirements	Approximate dimensions, m x m	Approximate Area, ha
Water abstraction point	20 x 20	0.006
Water supply and discharge pipeline corridor	2 x 3,000	0.6
Gas supply pipeline	2 x 40,000	8
Transmission Line (including 4 towers)	20 x 750	3
Access road	10 x 500	0.32
Total		11.926

2.3 Initial Site Visit

An initial site visit of the Project area was undertaken in June 2017. The Figures outlined below provide an overview of the project area and the current conditions of the power plant site and along the gas pipeline route.

The initial site visit identified that the majority of the area within and surrounding the power plant is made up of plantation area and open scrub land. The road network comprises unmade dirt road and tarmac.



Figure 2.1 : Road and Surrounding Area Across Power Plant Site Area



Figure 2.2 : South of the Siak River, gas pipeline to be installed on left side of the road



Figure 2.3 : North of Siak River, overlooking gas pipeline crossing point



Figure 2.4 : Road entering power plant area



Figure 2.5 : Road along gas pipeline route. Pipeline to be located on right side of the road



Figure 2.6 : Road along gas pipeline route. Pipeline to be located on left side of the road



Figure 2.7 : Perawang TGI Station, fuel supply for Riau power plant

2.4 Project Stages

The Project will span three primary stages, being pre-construction, construction and operation, generally as follows:

- **Pre-construction:** The pre-construction stage involves project development activities, including selection of contractors, field surveys and permitting, and land acquisition works.
- **Construction:** The construction stage will involve land preparation (including site clearance, backfilling and land drainage) followed by construction and commissioning of the power plant, gas pipeline and grid connection.

- **Operation:** The operation stage will involve the full operation of the power plant – first of all over the 20 year term of the PPA and then, as determined by PLN after ownership transfers to PLN.

2.5 Project Timescales

The proposed project timescales for major construction activities are provided in Table 2.3.

Table 2.3: Estimated duration (in months) of activities required for Project construction

Activity	Estimated Duration (months)
Site clearance and levelling	6 months
Gas pipeline construction	12 months
Power plant and switchyard engineering, procurement and construction	24 months
Construction of water pipelines (to and from site)	8 months
Transmission line construction	8 months
Commissioning	8 months

Based on current schedule (see Appendix D) the ESIA and Analisis Mengenai Dampak Lingkungan (AMDAL) will take approximately 10 months. The dates for key commencement and completion of the ESIA and AMDAL are outlined below:

ESIA

- Scoping – In progress
- Baseline Sampling – In progress – 14th November 2017
- Draft ESIA and Technical Studies – 2nd November 2017 – 5th January 2018
- Framework ESMS and ESMP – 30th November 2017 – 2nd February 2018
- ESIA Exhibit / Approval – 8th January – 27th April 2018

AMDAL & UKL-UPL

- UKL-UPL (gas pipeline and transmission line) – 11th September – 16th January 2018
- KA-ANDAL (power plant) – 4th September – 1st November 2017
- AMDAL Sampling – 12th October – 6th December 2017
- AMDAL and Technical Studies – 2nd November 2017 – 5th January 2018
- ANDAL and RKL-RPL for Power Plant – 30th November 2017 – 2nd April 2018

3. Existing Environment

3.1 Introduction

This section provides an overview of the environmental and social conditions at the proposed site of the Project, using existing information sources and key findings from the initial site visit in June 2017. The findings are listed in Table 3.1 below. A number of information gaps currently exist which will be addressed through the ESIA process.

Table 3.1 : Riau 275MW GFPP Existing Environment

Receptor	Baseline	
	Power Plant and Transmission Line	Gas Pipeline
Climate	<p>Pekanbaru has a tropical climate. The general site climate conditions are provided below.</p> <ul style="list-style-type: none"> • Ambient air temperature range – 20 °C-37 °C • Design ambient air temperature – 28 °C • Relative humidity range – 40 %-100 % • Design Relative humidity – 80 % • Average annual rainfall - Approximately 3,000 mm - rainy season between November and April • Maximum rainfall - Approximately [136 mm/h] • Average wind speed - Less than 3 m/s, from the north and south • Site elevation - Approximately 25 m aMSL 	
Air Quality	<p>The proposed power plant is located 10 km east of Pekanbaru City in a rural area with a number of nearby landowners, the nearest from the power plant site being approximately 450 m to the South. A screening level modelling assessment has been undertaken for the proposed CCGT power station using the AERMOD dispersion model. The intent of the modelling is to predict likely locations of maximum impacts resulting from the discharges in order to select locations for baseline ambient air monitoring of oxides of nitrogen for the project. Figure 3.1 and 3.2 provides results of the screening level modelling assessment.</p> <p>The meteorological data set was developed using the prognostic model TAPM (Version 4.0.4), CSIRO, Australia. This model predicts meteorological parameters for the region based on large-scale synoptic information provided by the Australian Bureau of Meteorology. Meteorological data for the project location was extracted from the model simulation for use with AERMOD. A windrose of the data is detailed in the Figure 3.3 below.</p> <p>Discharge parameters for the power station, including contaminant emission rates, were obtained from the Jacobs Riau 275 MW GFPP Project - Process Description (June 2017). Building downwash effects were not considered under the assumption that the stack heights relative to nearby buildings are such that downwash is not an issue.</p>	

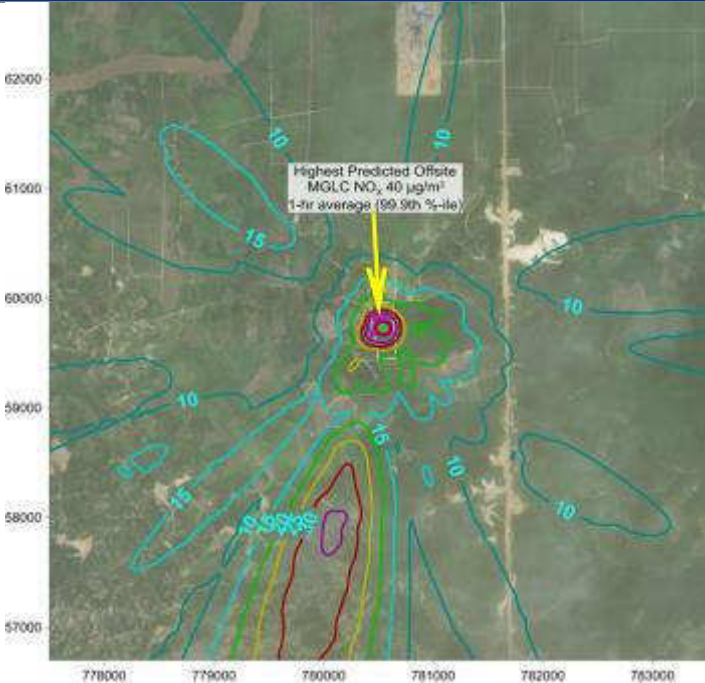
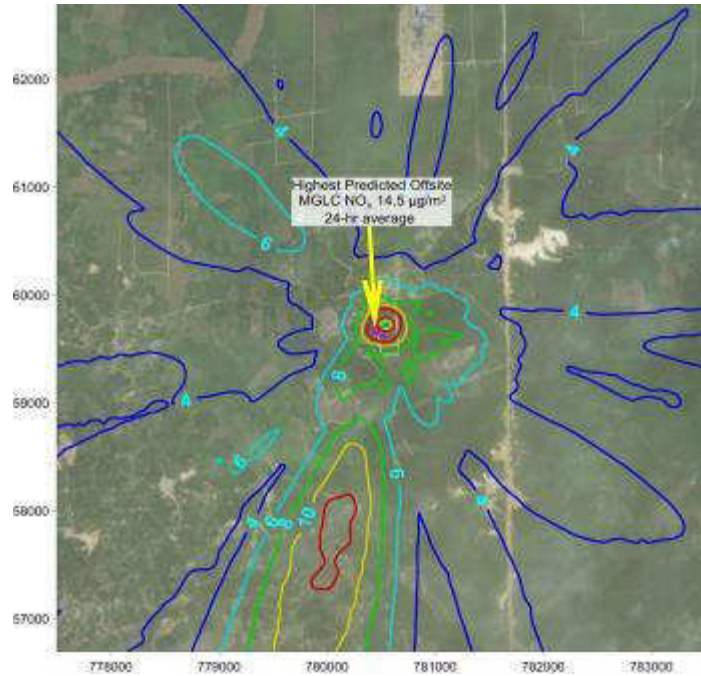
Receptor	Baseline	
	Power Plant and Transmission Line	Gas Pipeline
	 <p>Highest Predicted Offsite MGLC NO_x 40 µg/m³ 1-hr average (99.9th %ile)</p>	

Figure 3.1 : Maximum Predicted NOX Concentrations (1-hour average, 99.9th percentile)

Receptor	Baseline	
	Power Plant and Transmission Line	Gas Pipeline
	 <p>Figure 3.2 : Maximum Predicted NOx Concentrations (24-hour average)</p>	

Receptor	Baseline	
	Power Plant and Transmission Line	Gas Pipeline
	<div><div><div><div>WIND ROSE PLOT:</div><div>Windrose for AERMOD Meteorological dataset</div><div>Riau 2015-2016</div></div><div><div>DISPLAY:</div><div>Wind Speed</div><div>Direction (blowing from)</div></div></div><div><div><div>WIND SPEED (m/s)</div><div>>= 11.1</div><div>8.8 - 11.1</div><div>5.7 - 8.8</div><div>3.6 - 5.7</div><div>2.1 - 3.6</div><div>0.5 - 2.1</div><div>Calm: 0.00%</div></div></div><div><div>COMMENTS:</div><div><div>DATA PERIOD:</div><div>Start Date: 1/01/2010 - 00:00</div><div>End Date: 31/12/2011 - 23:00</div></div><div><div>COMPANY NAME:</div><div>MODELER:</div><div>CALM WINDS:</div><div>0.00%</div><div>TOTAL COUNT:</div><div>17520 hrs.</div><div>Avg. WIND SPEED:</div><div>3.15 m/s</div><div>DATE:</div><div>19/07/2017</div><div>PROJECT NO.:</div></div></div><div><div>WINDROSE View - Lark Environmental Software</div></div></div>	
	<p>Figure 3.3 : Windrose for AERMOD meteorological dataset</p>	
Noise	<p>The proposed power plant is located 10 km east of Pekanbaru City in a rural area with a number of nearby landowners, the nearest from the power plant site being approximately 450m to the South. At the time of writing there was no data available for the existing environment for noise in the region for the power plant / transmission line and the gas pipeline. Ambient noise monitoring will be conducted as part of the ESIA baseline data collection process in accordance with the WBG EHS General Guidelines.</p>	

Receptor	Baseline	
	Power Plant and Transmission Line	Gas Pipeline
Cultural Heritage	There are no sites of cultural significance in the vicinity of the power plant or transmission line.	The gas pipeline will follow existing road that pass approximately four mosques, one school and one community graveyard.
Freshwater Quality and Aquatic Ecology	The Siak River is located an estimated 5k m north of the power plant site and there is another unnamed creek 500 m south of the site. The Siak River to the north is estimated to be 150 m wide and is relatively deep given it is used for the barge transportation of goods for communities and industries.	The gas pipeline route crosses an estimated four minor watercourses and the Siak River.
Landscape and Visual	The topography of the region is fairly uniform at the power plant site and along the gas pipeline route.	
Soils and Geology	The power plant area is situated on minas formation with soils comprising gravel, pebble spreads, sands and clays. The geology on the border of the project area towards the Siak River is made up of young alluvium formation comprising gravels, sands and clays. The gas pipeline route is predominately situated on minas formation with soils comprising gravel, pebble spreads, sands and clays.	
Terrestrial Ecology	There are no protected areas of conservation concern within a 5 km radius of the project area. The majority of the land surrounding the power plant and transmission line comprises palm oil plantations and scrub land.	The majority of the land around the proposed gas pipeline route comprises palm oil plantations and scrub land.
Natural Hazards and Vulnerability to Climate Change	At the time of writing there was no data available for the existing environment for natural hazards and vulnerability to climate change in the region for the power plant / transmission line and the gas pipeline. Ground adjacent to the Siak River is at 10 m aMSL and at the power plant location 20 m aMSL therefore the power plant is not subject to flooding from the river.	
Land Ownership	The power plant is privately owned land and by up to eight owners.	As the gas pipeline is located within the road reserve the land is likely to be state owned however this will be confirmed through the ESIA process.
Land Use	The power plant Project area is currently being used as a palm oil plantation and is privately owned.	The majority of the gas pipeline route will be located within the reserve of existing road.
Social Environment	The nearest community to the power plant is Rejosari and Sail Sub-District, located approximately 2 km south-west from the power plant site. There is no direct route/road from the village to site.	The pipeline route passes through / adjacent to a number of communities. Communities that have been identified within the Stakeholder Engagement Plan (SEP) as likely to be affected by the gas pipeline include; Pinang Sebatang Barat Village (Tualang District), Perawang Barat Villages (Tualang District); Sail Sub-District (Tenayan Raya District) and Tebing Tinggi Okura Sub-District (Rumbai Pesisir District).
Ecosystem Services	At the time of writing data there was no data available for the existing environment for ecosystems services in the region for the power plant / transmission line and the gas pipeline.	
Traffic	Existing traffic is limited due to the rural nature of the surrounding land and limited road connectivity.	Traffic use along the pipeline route is likely to be moderate due to the route running within the reserve of an existing road network that connects nearby rural communities.

4. Stakeholder Engagement and Grievance Mechanism

4.1 Progress to Date

Jacobs have prepared a Stakeholder Engagement Plan (SEP) for the project. The SEP has the following key objectives:

- describes the proposed methods and processes by which local communities, stakeholders and interested parties will be consulted in relation to the Project;
- outlines the means and locations of information disclosure; and
- outlines the grievance mechanism by which stakeholders and/or interested parties can raise their concerns and observations.

4.2 Ongoing Work

As part of the stakeholder process, consultation will be undertaken with members of communities located near to the proposed development area to gather information on existing socio-economic conditions and community and cultural values. This will assist in the development of a socio-economic baseline for communities near to the Project describing key social and economic characteristics, including:

- population and demography, such as age and gender, households and families;
- existing livelihoods, including crops being grown, number of people involved in farming activities;
- existing economic activities undertaken by communities near the project, such as agriculture and palm oil plantation;
- existing land use and tenure arrangements;
- local community values and views on such things as visual and amenity values, cultural/ spiritual values, health, use of existing natural resources; and
- community facilities and features, including historic and cultural sites and existing community facilities.

The Project Sponsor's Senior Manager and/or Community Liaison Officer will both advise the community and key stakeholders that the surveys are to undertaken ahead of time and participate in their oversight with the Jacobs representative that will be on site during all community consultation activities.

5. Key Environmental and Social Risks

5.1 Introduction

An Environmental and Social Impact Scoping Matrix has been developed by Jacobs, which identifies items and activities in the construction and operation of the power plant, transmission line and gas pipeline that could have environmental and social impacts or pose environmental and social risks.

The Environmental and Social Impact Scoping Matrix should be revised following completion of the preparation of the ESIA to take into account any changes to the proposed development site layout or the design as a result of additional mitigating measures identified in the assessment of environmental and social impacts and risks. Any improved level of knowledge on the sensitivity of key elements of the receiving environment based on the baseline surveys should also be incorporated into the revised Environmental and Social Impact Scoping Matrix.

The level of 'Significance' for each of the environmental impacts identified in the Environmental and Social Scoping Matrix was determined by Jacobs' personnel experienced in environmental and social impact assessments of industrial developments using a qualitative approach. The following issues were considered for each discharge or activity (hazard) when determining the level of 'significance' of the impact.

Environmental and social concerns:

- the scale of the resulting impact;
- the severity of the impact;
- the frequency of occurrence of the impact;
- duration of the impact;
- offensiveness of the impact; and
- cumulative impact.

Business concerns included:

- regulatory/legal exposure;
- cost of changing the impact;
- difficulty in changing the impact;
- effect of damage on other processes and activities; and
- effect on public image of the organisation/reputational risk.

The impacts were ranked from low to high significance in terms of their potential for environmental and social impact using the criteria set out below.

Table 5.1: Impact Significance Criteria

Significance Category	Impact Criteria
High	<ul style="list-style-type: none">• Significant off-site impact;• Occurs on a relatively frequent basis;• Breaches environmental permits, licences or national standards;• Results in public complaint; and• Is expensive to mitigate.

Significance Category	Impact Criteria
Medium	<ul style="list-style-type: none"> • has off-site effects minor in nature; • could result in public complaint; • at times may slightly exceed legal consents or standards; and • is regarded as not a good practice.
Low	<ul style="list-style-type: none"> • may have an off-site effect; • occurs very infrequently; • is within legal requirements, but could still be improved; and • is cheap/relatively easy to mitigate.

5.2 Summary of Key Environmental and Social Risks

The scoping study has identified two potentially ‘High’ environmental and social impacts that may occur (are detailed below in Table 5.2) and these will be assessed in more detail in the ESIA. The ESIA will also consider environmental and social topics that are of medium and low risk. It should be noted that these potential impacts are based on limited information available at the time of writing and do not consider mitigation/controls that will be developed through ongoing detailed design and the ESIA process, see Section 6.2.4.1.

Table 5.2: Summary of Key Potential Environment and Social Risks

Environmental/Social Topic	Key Impacts
Land Ownership and Land Use	Land ownership investigations for the Project are ongoing at the time of writing for the power plant and along the gas pipeline route
Community Health and Safety	Potential adverse impacts to local communities through miss-use / illegal siphoning of gas from the pipeline. Miss-use / illegal siphoning could lead to uncontrolled releases of gas from the pipeline that may combust and therefore harm any individuals/settlements within the nearby area. This is unlikely to occur given the pipeline will be buried for the majority of the route but is a risk that should be considered further during the ESIA and be factored in to community engagement and education programs including emergency response planning.

6. Terms of Reference for ESIA

6.1 Introduction

This section describes the Terms of Reference (TOR) for the general approach to the ESIA. The baseline environmental surveys that are required for the ESIA, and are additional to what is required under the AMDAL process is provided in Appendix B.

6.2 General Approach to ESIA

6.2.1 Introduction

This section provides an overview of the impact assessment methodology applied to the assessment of potential environmental and social impacts arising from the Project. The impact assessment methodology has been developed in accordance with good industry practice, and the potential impacts will be identified in the context of the Project's area of influence, in accordance with Asian Development Bank (ADB) Safeguards and IFC Performance Standard 1 (Assessment and Management of Environmental and Social Risks and Impacts).

6.2.2 Scoping

The Project kick-off meeting was held on 4th May 2017 between representatives of Jacobs and MRPR. Jacobs completed a site visit in June 2017, the results of which will be used in producing a scoping matrix outlining key environmental and social hazards that have High significance.

6.2.3 Establishment of Baseline Conditions

In general, baseline information will be collected from secondary desk-based studies and literature reviews and supplemented with primary data identified in the scoping phase and obtained from site surveys and monitoring, along with consultation with affected communities and correspondence with local stakeholders. For more details reference should be made to Appendix B – Baseline Environmental and Social Data Collection Terms of Reference. At this stage only baseline sampling will be undertaken during the dry season as the proposed power plant site and gas pipeline route is highly modified habitat with low ecological value. If wet season data is deemed necessary this will be discussed and agreed with MRPR and ADB.

6.2.4 Impact Assessment

The prediction of the scale and significance of environmental impacts will be assessed against the established baseline conditions. The assessment criteria will be based on international requirements and good practice involving quantitative analysis and qualitative analysis with professional judgement supported by an impact ranking system to classify the magnitude and significance of the impacts. All activities for the Project will be assessed in terms of the significance of the impact on the receiving environment, for example, air quality, noise, ecology, and the significance of the impact of local society, including livelihoods, health, culture and employment. For more details reference should be made to Table 6.1.

Due to the elevation of the project area in relation to the Siak River and minimal raising of ground level at the Project area, quantitative flood risk assessments as set out in the proposal are not deemed necessary however screening of thermal dispersion modelling of water being discharged back into the Siak River will be undertaken.

6.2.4.1 Mitigation

The impact assessment will consider mitigation that is inherently within the design of the Project in order to determine the significance of impacts. If the residual impact including the design mitigation is found to be not acceptable further mitigation measures will then be recommended as necessary to ensure good practices are implemented and in order to reduce any significant potential impacts to an acceptable level, in accordance with ADB Safeguards and IFC Performance Standards. The mitigation hierarchy will be used: avoid, minimise,

restore or remedy, offset, compensate and mitigation measures will be clearly identified and linked to environmental and social management plans.

6.2.4.2 Monitoring

Monitoring is not linked to the impact evaluation but is an important component of the ESIA. Monitoring follow-up actions will be outlined in order to:

- Continue the collection of baseline data throughout construction, operation and later decommissioning.
- Evaluate the success of mitigation measures, or compliance with project standards or requirements.
- Assess whether there are impacts occurring that were not previously predicted.
- In some cases, it may be appropriate to involve local communities in monitoring efforts through participatory monitoring. In all cases, the collection of monitoring data and the dissemination of monitoring results should be transparent and made available to interested project stakeholders.

6.3 Outline of ESIA

The ESIA is anticipated to following the format and layout outlined in Table 6.1 below.

Table 6.1 : Outline Structure of the ESIA

Non-Technical Summary		
Volume 1: Introduction	Introduction	A brief description of the Project, the location and the environmental setting
	Policy, Legal and Administrative Framework	<ul style="list-style-type: none"> • ADB Safeguard Policy Statement (2009), Equator Principles IFC Performance Standards, WBG General and Industry Specific EHS Guidelines • Indonesian Regulatory Framework • Permits/Licences
	Project Description	<ul style="list-style-type: none"> • Overview • Site location • Project land requirements • Project schedule • Description of construction, operation and decommissioning activities
	Project Justification and Assessment of Alternatives	<ul style="list-style-type: none"> • Project justification and site / route selection • Assessments of alternatives including the 'do-nothing' scenario
Volume 2 : Environmental Impact Assessment	Introduction	<ul style="list-style-type: none"> • Overview
	Impact Assessment Methodology	<ul style="list-style-type: none"> • Baseline Environmental Conditions and Previous Studies • Spatial and Temporary Scope • Impact Assessment Methodology • Impact Identification • Cumulative Impacts
	Environmental Impact Assessment	<p>Environmental baseline for the following topics:</p> <ul style="list-style-type: none"> • Climate • Air Quality • Greenhouse Gas Emissions • Noise • Natural Hazards • Hydrology • Water Quality and Freshwater Ecology • Landscape and Visual • Terrestrial Ecology

		<ul style="list-style-type: none"> • Soils, Geology and Groundwater • Hazardous Substances and Waste • Traffic and Access
		Each of the topics will contain the following: <ul style="list-style-type: none"> • Assessment of Impacts • Mitigation and Monitoring measures • Assessment of Residual Impacts
		Occupational Health and Safety & Working Conditions
		Cumulative Impacts
		Summary of Environmental Impacts
Volume 3 : Social Impact Assessment	Introduction	Overview
	Legal and Regulatory Framework	<ul style="list-style-type: none"> • National and International Requirements
	Impact Assessment Methodology	<ul style="list-style-type: none"> • Data sources • Spatial and Temporary Scope • Impact Assessment Methodology
	Social Impact Assessment	Social baseline for the following topics: <ul style="list-style-type: none"> • Demographic Overview • Ethnicity and Culture • Religion • Gender • Indigenous People • Ecosystem Services • Economic Profile • Educational Profile • Land Use and Tenure • Poverty, Deprivation and Vulnerable Groups
		Stakeholder Engagement
		Impact Assessment for the following: <ul style="list-style-type: none"> • Employment • Land Acquisition • Cultural Heritage • Community Health, Safety and Security Impacts • Cumulative Impacts
		Mitigation, Enhancement Measures and Residual Impacts
		Assessment of Residual Impacts
	Environmental and Social Management Plan (ESMP)	<ul style="list-style-type: none"> • Construction Mitigation and Monitoring • Operation Mitigation and Monitoring
	Framework Environmental and Social Management System (ESMS)	<ul style="list-style-type: none"> • Structure of Framework ESMS • Alignment with IFC Performance Standards and ADB Safeguard Policy Statement (2009) • Policies • Roles and Responsibilities • Legal and Other Requirements • Identification of Risks and Impacts • Management Programmes
Volume 4 : ESMP, ESMS and Compliance Assessment		

		<ul style="list-style-type: none"> • Monitoring and Review • Stakeholder Engagement • Training • Administration
	Compliance Assessment	<ul style="list-style-type: none"> • Compliance with ADB Safeguard Policy Statement (2009), Equator Principles and IFC Performance Standards
Volume 5: Technical Appendices		

Table 6.2: ESIA Terms of Reference

Environmental Topic	Impact Assessment Methodology
Air Quality and Greenhouse Gas Assessment	<p>The ESIA will assess the direct and indirect impacts to air quality from construction and operation including potential dust generation during construction. The assessment will also include greenhouse gases generated by the development and operation of the power plant. The assessment will include:</p> <ul style="list-style-type: none"> • Evaluation of the current ambient air quality of the area based on baseline sampling results (see Section 8 of Appendix B for details of baseline sampling to be undertaken); • Development of a meteorological data set based on prognostic meteorological data and site specific data from the meteorological station. The TAPM model will be used to fully develop the meteorological data set if no specific data is available • Development of an emission inventory data files for air contaminant sources; and • Conducting air dispersion modelling with AERMOD air dispersion models as area is flat terrain • Evaluation of the level or significance of impact based on the predicted contours produced by the modelling for contaminants by comparison against WHO ambient air guidelines.
Noise	<p>The ESIA will assess potential noise impacts during construction and operation. The assessment will be carried out using the following method:</p> <ul style="list-style-type: none"> • Noise monitoring will take place as set out in Section 9 of Appendix B. The noise data collected will then be used to establish project noise criteria. • Development of a meteorological data set based on prognostic meteorological data and historic, site specific data from the meteorological station. If no specific data is available TAPM modelling will be used to fully develop the meteorological data set • Development of a sound level inventory for key noise sources and activities of the development • Development of a noise model, including terrain, buildings and a consideration of meteorological conditions using SOUNDPLAN • Prediction of noise levels during construction and operation of the development • Comparison of results from the modelling against evaluation criteria • Evaluation of the level or significance of impact based on the predicted noise levels produced by the modelling.
Cultural Heritage	The ESIA will assess the direct and indirect impacts on cultural heritage assets.
Biodiversity freshwater aquatic assessment	The ESIA will assess the direct and indirect impacts on aquatic flora and fauna values identified through the baseline investigations

Environmental Topic	Impact Assessment Methodology
(including water quality and sediment)	outlined in Section 4 of Appendix B. The following will also be carried out during the ESIA: <ul style="list-style-type: none"> Determine whether any critical habitats are impacted; Assess the potential impact on water quality from soil erosion, transfer of sediment or movement of contaminant; Conduct screening modelling to determine the dilution rate of contaminants discharged into the river.
Hydrological Assessment	The ESIA will assess the direct and indirect impacts on the hydrological regime using qualitative assessments. The assessment will also include screening of thermal dispersion modelling of water being discharged back into the Siak River.
Groundwater	The ESIA will assess how groundwater will be impacted both during the construction of the Project and operation. Groundwater data collected through baseline sampling outlined in Section 6 of Appendix B will be used to assess any impacts to groundwater quality and the groundwater take on local users.
Landscape and Visual	The ESIA will assess changes to the visual conditions and values of the study area as a result of development infrastructure.
Soils and Geology	The ESIA will assess the potential impacts of soil contamination from the development, including identification of management measures. The baseline sampling will be desk based utilising geotechnical data collected.
Terrestrial Ecology	<p>The ESIA will assess the impacts on the terrestrial flora and fauna values using data collected in the baseline sampling terrestrial ecology fieldwork surveys outlined in Section 5 of Appendix B.</p> <p>The ESIA will compare the proposed footprint of works and associated infrastructure, the duration and nature of construction activities and the lifecycle of the Project and identify the potential impacts on the sensitive characteristics of the habitats and species identified in the baseline study of the surrounding area. Sensitive characteristics include representativeness, intactness, rareness, cohesiveness and other valuable aspects of the habitats (if any), and the rareness or pest status of the species present. The scale of the impact assessment will be determined by the sensitivity of the habitats and species identified in the baseline assessment.</p> <p>The ESIA will determine the scale of impact based on the loss or reduction of habitat, changes to the numbers of species present, changes in community dynamics and the changes to populations of individual species. Impacts may be positive or negative.</p>
Natural Hazards and Vulnerability to Climate Change	<p>The ESIA will undertake a natural hazards assessment will be undertaken which will examine and assess the exposure of the site to natural hazards such as extreme rainfall and drought.</p> <p>The natural hazards assessment will use existing and publically available data within the region in order to define the natural hazards affecting the site under present-day and future climate conditions in order to develop design strategies to appropriately manage the associated risks.</p>
Hazardous Substances and Waste	The ESIA will aim to assess the potential impacts associated with the use of hazardous materials and substances for the development's lifecycle. The ESIA will also assess impacts of waste generated by the development and waste management measures to be

Environmental Topic	Impact Assessment Methodology
	<p>implemented.</p> <p>The ESIA will utilise data currently held on other similar developments to assist in the preparation of a list of potentially hazardous substances used for different phases of the development.</p>
Land Ownership and Land Use	<p>The ESIA will assess changes to and impacts on the use of land (i.e. agricultural uses, community uses) by the development. It will also assess changes to land access arrangements for local people. Data will be collected through consultation which will be undertaken by the social impact assessment team.</p>
Population, Social Environment and Health, Economy	<p>The ESIA will complete an assessment of social impacts on communities near to the development. Matters to be assessed as part of the social impact assessment would be confirmed following the socio and economic surveys outlined in Section 10 of Appendix B.</p> <p>Strategies to avoid, manage or mitigate potential impacts of the development on the existing socio-economic environment and maximise the identified benefits of the development would also be identified.</p>
Traffic	<p>The traffic assessment will be based on traffic survey data collected during baseline investigations of key routes construction vehicles will use to access the site. The ESIA will review the baseline data and assess the impacts associated with the transport of people, materials and equipment to the Project area during construction and operation. The ESIA will also assess any river navigation impacts through construction of temporary jetty and increased river traffic.</p>
Working Conditions and Occupational Health and Safety	<p>The assessment will require review of health and safety procedures that are anticipated to be developed by the EPC (Engineering, Procurement and Construction) Contractor. There will also be review of policies relating to Human Resources and Worker's Rights. The ESIA will assess the adequacy of the proposed controls to prevent major accident scenarios and the level of risk posed on the surrounding development. The proposed health and safety management system will be summarised and the ESIA will outline mitigation, management, and monitoring actions to be included in the ESMP.</p>

6.3.1 Mitigation Measures and Recommendations

Additional mitigation measures to those already included in the design and construction methodology will be recommended to reduce residual impacts to acceptable levels, for example, air quality, ecology or land acquisition. These additional mitigation measures and those included in the design and construction methodology will be summarised and used to develop various management and monitoring procedures (i.e. Environmental and Social Management Plan (ESMP) and Environmental and Social Management System (ESMS)). For clarity, the purpose of each of these key documents is as follows:

- an ESIA identifies and assesses risks and the impacts associated with the Project;
- an ESMP sets out the mitigation and monitoring required to manage the impacts; and
- an ESMS sets out how the mitigation monitoring will be implemented, checked and reviewed.

Appendix A. Environmental and Social Impact Scoping Matrix

Riau 275MW Combined Cycle Gas Fired Power Plant - Environmental and Social Impact Scoping Matrix																													
											Social Impacts												Natural				Approval		
Plant Items and Operations	Fresh Water Quality	Fresh Water Ecology	Terrestrial Ecology	Groundwater	Ground contam	Air Quality	Dust	Traffic	Navigation	Noise & vibration	Visual	River use	Fishing (+ve)	Fishing (-ve)	Loss of access to resources	Employment	Cultural Heritage	Population Movement (-ve)	Population Movement (+ve)	Resettlement (economic or forced displacement)	Loss of production land	Public Health	Aesthetic	Seismic	Flooding	Climate Change	Typhoon	AMDAL	ESIA
Stage 1 Preconstruction Phase																													
Land aquisition for Power Plant															L			L		L	L								M
Land Acquisition for Gas Pipeline																				H	H								
Design information																												M	M
Stage 2 Construction of Power Plant & Gas Pipeline																													
Transportation of fill to site					M		M	M		M						M						M							
Earthworks to increase base height to 28m above MSL	L	L	M	L		L	M			M	L				L	L	L			L	L		L	M	M				
Access roads					L		L	L		L	L				L					L									
Transportation of heavy equipment to site via temporary jetty									L			L		L		L							L						
Transport of people and materials to site on daily basis						L	L	M		L						L						L							
Construction of Power Plant			L	L	L	M	M			M	M	M			L		L					L	M						
Construction of gas pipeline			L	L	L	M	M	M		M	M						M												
Crossing of watercourses by the gas pipeline	L	L								L		L		L															
Construction Camp incuding waste and wastewater disposal	L			L	M					L												M							
Construction of Transmission lines			M		L						M				L	L	L					L							
Stage 3. Operation of Power Plant and gas pipeline																													
Discharge of emissions through exhaust and fans (primary air, ID, FD etc)						M																							
Cooling water system (Closed circuit)						M																							
Extraction of water from freshwater environment	M	M								L				M															
Sewage treatment system					L	M				L																			
Discharge of treated wastewater and stormwater to freshwater environment	M	M												M															
miss-use / illegal siphoning of gas from the pipeline.																						H							
Solid waste disposal				L	L																								
Cumulative impacts with existing Riau IPPs (noise, air)						M				M					L			L			L								M

Appendix B. Baseline Environmental and Social Data Collection Terms of Reference

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Subject	Baseline Environmental Data Collection Terms of Reference (TOR)	Project Name	Riau 275 MW GFPP Project (Medco Ratch Power Riau)
Attention	NBC, Medco Ratch Power Riau	Project No.	AM039100
From	PT Jacobs Indonesia		
Date	05.07.17		

1. Introduction

This Baseline Environmental Data Collection Terms of Reference (TOR) has been developed by PT Jacobs Group Indonesia (PT JGI) to collect sufficient baseline data to quantify the receiving environmental and social baseline status for both the power plant site (including 700m of transmission line) and gas supply pipeline route for the Riau 250 MW CCGT Power Plant Project for the ESIA, and is in addition to the baseline sampling required under Indonesian legislation for the power plant AMDAL and the UKL/UPLs for the gas pipeline and transmission line. The project consists of a 275 MW combined cycle power plant and ancillary facilities, a 40 km long 12-inch gas pipeline, and a switchyard and 150 kV transmission line (750m) - collectively referred to hereafter as the 'Project'.

This TOR should be read in conjunction with the Riau Environmental and Social Impact Assessment (ESIA) – Scoping Report (to be completed), which provides details on the known existing environmental and social site conditions and explains the approach taken to ESIA.

2. Summary Project Description

The Project will be located approximately 10 km due east of Pekanbaru City, approximately 5 km south of the Siak River. The power plant and switchyard will be comfortably accommodated inside the 9 ha of land being procured by the Sponsors. The power plant is a 2 x 1 combined cycle plant, designed to deliver up to 275MW over the 20 year term of the PPA. It will burn gas fuel only. Key components of the project will comprise the following:

- Power generated by 2 x 1 combined cycle plant, delivering up to 275 MW;
- River water intake and outlet;
- Air emissions will be released to the atmosphere via 2 x 45 m tall, 3.8 m diameter chimneys;
- Wet mechanical draft cooling tower;
- Earthworks to level and raise the power plant platform to approximately 28m above mean sea level;
- Gas will be supplied from TGI Gas Station 40 km from the power plant via a 12 inch diameter pipeline; and
- a 150kV switchyard at the plant, with a 750 m double-phi connection to intercept the Tenayan – Pasir Putih 150 kV transmission line (TL).

2.1 Power Plant and Transmission Line

The power plant site is located to the east of Pekanbaru City, in Sail Sub District. The site bounded by palm oil plantation to the west, south and east and Road 45 on the North. The Project Sponsors proposes to construct a 750m long 150kV transmission line to tie in to Tenayan – Pasir Putih 150kV existing transmission line. Four transmission towers will be erected between the power plant and the existing transmission line. The proposed power plant and transmission line sites are shown in Appendix A.

2.2 Gas Pipeline Route

The gas supply line is approximately 46 km long from the PGN Gas Terminal Port at Perawang (Future Line of KP 457 – SV 1401.1 of the Grissik Duri Pipeline – coordinate: 47N 791885 E81526 (UTM Format)) to the gas receiving facility located within the Riau CCGT Power Plant at Tenayan district, Pekanbaru City, Riau Province. The proposed pipeline route is shown in Appendix C.

3. Baseline Sampling

3.1 Introduction

This TOR sets out the baseline survey environmental data that is required to be collected by NBC (hereafter referred to as 'the subconsultant'). It describes:

- The type of data to be collected by the baseline sampling surveys;
- The sampling locations, number of samples, sampling methodology to be followed and frequency of sampling;
- Analysis methods for ecological samples collected;
- Parameters that samples should be analysed for (water, sediment, soil and groundwater samples); and
- Reporting formats for the data collected.

3.2 Requirements of the Subconsultant

The baseline sampling as set out in this ToR will be conducted for the Environmental and Social Impact Assessment (ESIA) for the overall Project adhering to international Asian Development Bank (ADB) International Safeguards and is in addition to the baseline sampling conducted in accordance with Indonesian environmental regulations for the the power plant AMDAL and UKL/UPLs for the transmission line and gas pipeline. The ESIA baseline sampling will be conducted prior to the sampling required for the AMDAL and UKL/UPL.

The subconsultant is required to report on the progress of the baseline data collection surveys to PT JGI. The subconsultant shall provide informal fortnightly progress reporting (email) to PT JGI and monthly face to face meetings with PT JGI's Project Manager during the baseline data collection phase. The progress meetings between the subconsultant and PT JGI during this phase will confirm progress in the data collection, discuss outcomes of consultation undertaken and identify any issues in the collection of the baseline data, thus avoiding schedule/scope creep. For all surveys the raw data that underpins the statistical analysis undertaken as part of the survey should be provided.

Any issues encountered by the subconsultant that prevent the subconsultant undertaking the baseline survey by the method specified in this TOR or where data is not available or cannot be obtained must be advised to PT JGI as soon as the issue comes to the notice of the

subconsultant. PT JGI will then in discussions with the subconsultant and the Project Sponsors determine whether the data is required or an alternative survey method or modification to the proposed survey can be used.

The subconsultant will provide PT JGI with sampling and monitoring methodologies prior to undertaking the baseline data collection for review to ensure JGI's data requirements for the ESIA will be met.

A maximum of three months has been allowed in the ESIA preparation schedule for the undertaking of baseline studies, as the baseline surveys need to be completed before end of September 2017. At this stage we have only allowed for dry season sampling and based on the findings limited wet season sampling may be required. The TOR may be changed based on environmental and social data currently being collected by the Project Sponsors, which will be made available to PT JGI for this Project.

4. Freshwater Aquatic Survey, including Water Quality

The subconsultant shall conduct a baseline survey to characterise regional freshwater communities and ecology of the Siak River and other water courses in the vicinity of the Project power plant, TL and gas pipeline route that includes:

- Fish;
- Macroinvertebrates;
- Algae and macrophytes;
- Aquatic habitats; and
- Water quality.

Water quality, and ecological (macroinvertebrate and net fishing) sampling of the above water courses is required at locations shown in Appendix B and Appendix D.

4.1 Water Quality Samples

4.1.1 Methodology

Water samples should be collected from the Siak River, an unnamed creek to the south of the proposed power plant site and from four watercourses along the gas pipeline route. Samples will be collected under dry season flow conditions at minimum two sampling locations (one upstream and one downstream). The proposed water quality sample locations are shown in Appendix B (power plant / TL) and Appendix D (gas pipeline route).

Samples will be collected and stored in accordance with the requirements specified in Government Regulation No. 82 Year 2001 regarding Water Quality Management and Pollution Control Class II (as minimum, unless otherwise regulated by local government regulation) and ISO 5667.6:2004 Water quality – Sampling Part: 6 Guidance on sampling of rivers and streams or its equivalent. The sampling will be conducted to determine the physical, chemical and biological parameters of the rivers prior to the power plant development. The parameters that the samples are to be analysed for are set in Table 4.1 below.

For metals the samples jars will be acid preserved. One set of metal samples will be for total metal and the water sample will be placed in the sample container without filtration. Another sample will be collected for soluble metals and the sample will be filtered to remove suspended solids in the field prior to it being placed in the container containing acid preservative. Laboratory analysis of water samples should be carried out in accordance with APHA method.

Organic parameters must be collected in glass jars and that only the first set of samples from each sampling location needs to be analysed for the organic parameters being organochlorine pesticides, Dioxins, Furans, other toxics such as PAH (Polycyclic Aromatic Hydrocarbons), and Polychlorinated Biphenyls (PCB). This would be for the first set of samples collected.

Table 4.1: Analysis Parameters for Water Samples

Parameter		Siak River	Unnamed Creek Connecting power Plant to Siak River	Spot sampling on watercourses crossed by proposed gas pipeline
pH		✓	✓	✓
Total Suspended Solids		✓	✓	✓
BOD		✓	✓	✓
COD		✓	✓	✓
Oil and Grease		✓	✓	✓
Arsenic		✓	✓	✓
Boron		✓	✓	✓
Cadmium		✓	✓	✓
Chromium	Hexavalent	✓	✓	✓
	Total	✓	✓	✓
Copper		✓	✓	✓
Iron		✓	✓	✓
Lead		✓	✓	✓
Mercury		✓	✓	✓
Manganese		✓	✓	✓
Nickel		✓	✓	✓
Zinc		✓	✓	✓
Soluble Heavy Metals (filtered) as per bulleted list above		✓	✓	✓
Ammonia		✓	✓	✓
Fluoride		✓	✓	✓
Total nitrogen		✓	✓	✓
Nitrate		✓	✓	✓
Nitrite		✓	✓	✓
Phosphorus		✓	✓	✓

Parameter	Siak River	Unnamed Creek Connecting power Plant to Siak River	Spot sampling on watercourses crossed by proposed gas pipeline
Total Coliform Bacteria	✓	✓	✓
Organochlorine pesticides	✓	×	×
Dioxins, Furans, other toxics such as PAH (Polyaromatic Hydrocarbons)	✓	×	×
Polychlorinated Biphenyls (PCB)	✓	×	×
Temperature	✓	✓	✓
Conductivity	✓	✓	✓
Turbidity (NTU)	✓	✓	✓

4.1.2 Sampling Frequency and Field Data

As a minimum, water samples should be collected from the identified sampling locations on at least two occasions during the dry season and on one occasion during the wet season (to be confirmed at the end of dry season sampling). Measurements of pH, temperature, dissolved oxygen and conductivity should be recorded in the field at the time the samples are collected. The date and time that the samples were collected and the weather conditions at the time of sampling and for the previous 24 hours should also be noted.

The flow rate of the river at each of the sampling point should be estimated at each sample location. At each sampling point the cross section of the river should be determined along with the velocity of the river at that point. Velocity can be determined by use of flow measuring device or by timing a device floating in the main current of the river between two points marked on the opposite bank. Cross sectional areas will need to be determined, depth and width of the river at the sampling points. Cross sections may be available from the survey of the rivers, which is to be conducted either as part of the baseline data collection by the subconsultant or by the power plant designers. If not they will need to be measured as part of the water sampling programme.

4.2 Freshwater Ecological Sampling

4.2.1 Macro-invertebrate Sampling

Macro-invertebrate sampling will be conducted at one location (unnamed creek near the power plant) and at one location on Siak River, as identified in Section 4.1 and shown in Appendix B. Sediment samples will collected at this location by grab or box corer methods. A total of three samples will collected at this point following a transect across the rivers. The sediment samples will be composited and a sample taken and sent to the laboratory to determine the chemical contaminants present in the sediments.

The benthic fauna will be treated in a standard manner - sieved through 1 mm mesh size, identified to species level and enumerated, weighed and subjected to ABC analyses. Abundance, species diversity and distribution frequency will be determined for each sampling location. The sampling should not be carried out within two weeks of a storm event as this has the potential to flush organisms out of their ecosystems and thereby potentially reducing the number of organisms present.

The sampling should be conducted by a recognised laboratory or university with the facilities to store and count the species. Sampling should be conducted following the guidance provided in the ANZECC Water Quality Guidelines for Fresh and Marine Waters, 2000.

A report will be provided setting out the sampling methodology followed, sample locations, raw data and the analysis of abundance and diversity.

4.2.2 Net Fishing

If appropriate, net fishing will be conducted at the upstream and downstream sampling locations identified for both the Siak River and other watercourses to determine the abundance and diversity of fish species in the rivers prior to the power plant development. Any protected species identified in the survey will need to be clearly identified so that the impact of effluent discharged to rivers from the power plant development can be assessed. The sampling should be conducted by a recognised laboratory or university with experience in conducting similar surveys.

4.3 Reporting

Reports on the baseline data collected by these studies will be prepared by the subconsultant and submitted to PT JGI within one month of the data collection being undertaken.

5. Terrestrial Ecology

The baseline survey will assist in determining the baseline for terrestrial ecosystems and the representative flora and fauna in each of the habitats at the power plant/TL site and the gas pipeline route. As a minimum, flora and fauna samples should be collected from a number of identified sampling locations along the gas pipeline route on at least one occasion during the dry season only. Due to the area being predominantly palm oil plantation and therefore low in biodiversity, it is considered that dry season sampling is only required for terrestrial ecology. Date and time that the samples were collected and the weather conditions at the time of sampling and for the previous 24 hours should be noted.

5.1.1 Site Survey Preparation – All Sites

The task includes review of background information on the locality, field work to survey habitats and species, and reporting of methodologies, results and conclusions. A literature review shall be conducted before carrying out field surveys. This will also include screening of international databases to identify international recognised key biodiversity risks such as designated or protected areas and threatened species. Specific tasks include:

- 1) Describing and mapping the various terrestrial habitats on the sites. This is to include the fish ponds if any.
- 2) Within each habitat, use internationally accepted, standard sampling techniques to identify:
 - Habitat type (wetland / agriculture / forest; intact / degraded / modified; man-made; significance of biodiversity – local, national, international). Include information on hydrology, soils or other habitat characteristics that are relevant.
 - Species - including introduced, indigenous, noxious pest or weed, economic value, significance – local, national, international. The significance of species shall be noted in the report.
 - Note the ecological uses of the site for significant faunal species (i.e. feeding, nesting, migrating)

- 3) Sampling techniques shall be adequate to provide a detailed list of species, abundance, and habitats condition using primarily visual and aural methods. Trapping, handling, specimen collection of species is not expected as part of this study (except for the fish survey, as discussed above).
- 4) Type of survey will include:
 - a) Vegetation / flora;
 - b) Avifauna (birds);
 - c) Herpetofauna (amphibians and reptiles);
 - d) Mammals

5.1.2 Survey methodologies

Vegetation / flora

A preliminary land-use/habitat classification of the study area shall be prepared in GIS by interpretation of satellite imagery and/or aerial photography. This information shall be used to stratify the vegetation and habitat types for further detailed survey. Stratification is necessary to ensure that the full range of potential habitats and vegetation types are systematically sampled. Stratification shall consider land-use, elevation and vegetation type (shrub, cleared agriculture / plantation / off-stream wetlands).

Power Plant / TL

Habitat classification maps will be ground-truthed through a combination of walked transects through habitat-types to provide further detailed information on vegetation boundaries, floristic diversity and the possible presence of rare and threatened plants.

Walked transect surveys shall aim to record all plant species within the vicinity of the Project. There will be 3-4 transects for the power plant / TL site. Particular attention shall be paid to the dominant, rare, endemic, threatened, protected, invasive species, and the species that are of importance to local communities. Locations of rare or threatened plant species shall be identified using a GPS and data on the size and distribution of the population shall be recorded.

The following general data shall be along each route:

- location using handheld GPS to record coordinates;
- photographs showing habitat structure and any notable plant species;
- habitat types and structure.

Additional habitat conditions data shall be recorded per transect, including the level of modification or disturbance of habitat found per transect and this shall be assessed according to the following grading:

- relatively stable or undisturbed communities (e.g. old growth, unlogged forest);
- late successional or lightly disturbance communities (e.g. old growth mangrove swamp that was selectively logged in recent years);
- mid-successional or moderately to heavily disturbed communities (e.g. young to mature secondary forest); and
- early successional or severely disturbed communities.

Gas Pipeline Route

The gas pipeline route will be driven with all habitats recorded in detail on route. In areas of notable floristic diversity, the site will be assessed in more detail with 100m transects running perpendicular to the road. Notable species will be recorded as above for the power plant / TL site.

Avifauna*Power Plant / TL*

The survey shall focus on sampling bird species' richness and abundance located within the range of different habitat strata present. Line transects surveys will be used with a point count method. There will be 3-4 for the power plant / TL site.

Transect surveys and point count surveys involving a 20 minute time-based survey and each transect/point to record all birds seen or heard within a 50 m radius of the census point. Bird surveys shall be conducted within four hours of sunrise to sample peak activity time and surveys shall avoid adverse weather (e.g. high wind or rain). Geographic coordinates shall be recorded at each survey point

Observations on birds shall be done primarily through visual observation and call identification. Nests and important food source/trees for any protected and rare species shall be recorded and captured with GPS. Where possible, surveys will also cover the foreshore area for seabirds.

Gas Pipeline Route

The gas pipeline route will be driven with all habitats recorded in detail on route. In areas of notable potential for avifauna, the site will be assessed in more detail with 100m transects running perpendicular to the road, on the same side as that the pipeline will run. Notable species will be recorded as above for the power plant / TL site.

Herpetofauna*Power Plant / TL*

The type and number of reptile and amphibian species shall be recorded during the walked transect surveys. Areas of high concentrations of individuals shall be captured with GPS. Study area and observations of significance shall be photographed.

Gas Pipeline Route

The gas pipeline route will be driven with all habitats recorded in detail on route. In areas of notable potential for herpetofauna, the site will be assessed in more detail with 100m transects running perpendicular to the road, on the same side as that the pipeline will run. Notable species will be recorded as above for the power plant / TL site.

Mammals*Power Plant / TL*

The type and number of mammal species shall be recorded during the walked transect surveys. Visual identification of animals, refuges, scat or other signs is expected. It is not deemed necessary to use camera traps in this study.

Gas Pipeline Route

The gas pipeline route will be driven with all habitats recorded in detail on route. In areas of notable potential for mammals, the site will be assessed in more detail with 100m transects running perpendicular to the road, on the same side as that the pipeline will run. Notable species will be recorded as above for the power plant / TL site.

5.1.3 Reporting

Reports delivered by subconsultants shall include the follows:

- Background context, from desk top study.
- Sampling methodology including limitations to methodology (weather, season, timeframe, sampling biases, etc.). Cite references for standard sampling methodologies.
- Results, including species lists and abundance (including indigenous and introduced), observations of refuges / nests etc., significant habitats or species (rare, threatened, noxious etc.), ecosystem uses for key species (nesting, migrating, foraging etc.).
- Conclusions on the significant issues or factors that should be addressed in the environmental impact assessment study, including recommendations for further study work if required.

6. Groundwater Resources (Power Plant Only)**6.1 Collect and Review Background Information**

Background information needs to be obtained by the subconsultant on the existing groundwater use and hydrogeological characteristics of the power plant site. Data required to be obtained as part of this assessment includes:

- Determine the location, depth and groundwater levels (both static and pumping levels if available) of existing groundwater /bores and wells within two kilometres of the site.
- Obtain available geological and construction information for bores/wells within two kilometres of the power plant site. Bore construction data may include information on bore casing, well screens, and pump installation, such as depth, diameter, material types, screen slot sizes, and pump specifications.
- Determine the locations of existing groundwater users in nearby villages.
- Advise PT JGI what data is available and whether it is sufficient to prepare hydrogeological maps.
- Prepare hydrogeological maps if there is sufficient data available that show the locations of existing boreholes in relation to the proposed power station and ash disposal site. These maps should clearly identify existing groundwater supply bores, surface geology, groundwater catchment boundary, and hydrogeological features (e.g. springs).
- Determine seasonal fluctuation of the groundwater levels from either existing monitoring data, or undertake regular water level monitoring of accessible bores.
- Arrange and undertake a water sampling programme of three bores/wells within one kilometre of the proposed site to determine baseline water quality of the groundwater system surrounding the project site. Selection of appropriate sampling sites will be undertaken in discussions with PT JGI based on the results of the above review and will target wells which have information on geology, bore construction and yield. It will likely include a borehole drilled on the project site, assuming that this has accessible piezometer installation. A total of three water samples are to be collected once the well volume has

sufficiently purged such that field parameters (pH, total dissolved solids, temperature) have stabilised. The samples are to be analysed for the same parameters as set out in Table 4.1, excluding dioxins.

6.2 Reporting

The subconsultant shall provide the base datasets identified above to PT JGI in appropriate electronic format to enable data manipulation and integration. These data will be used by PT JGI to develop a preliminary conceptual understanding of the hydrogeology of the area surrounding the site. The results of this work will be used to refine the scope and specific requirements for additional investigations and ongoing base data collection to be undertaken.

7. Contaminated Land (Power Plant Only)

Surface soil samples to a depth of 300mm are to be collected at the power plant area and analysed for pesticides being organochlorine, organophosphorous and organo nitrous. A total of 10 soil samples on a grid based system shall be collected and analysed.

8. Air Quality

8.1 Ambient Air Quality

The construction activities for both the power plant/TL and the have the potential to adversely impact on the ambient air quality therefore baseline monitoring should be undertaken by the subconsultant at a selection of potentially sensitive sites that could be affected by the construction activities.

The monitoring sites must be located in suitable areas that comply with the guidelines set out in Australian Standard AS 2922 Ambient Air – Guide for the Siting of Sampling Units 1987. The purpose of AS 2922 is to ensure that the location of the sampling site is such that the collected data is representative of that location. The standard has a number of guidelines to facilitate the site location conformity. The guidelines also outline sites to avoid including those that:

- Restrict airflows in the vicinity of the sampling inlet.
- May alter pollutant concentrations by adsorption or absorption.
- Chemical interference with the pollutant being measured may occur.
- Physical interference may produce atypical results.

Consideration is also given to vandalism, adequate access, services and local activities when selecting a site. In addition, for the data to be applicable to human health the sampling inlet should be located near the breathing zone, i.e. around 1 to 2 m above ground level.

Figure 7.1 of AS 2922 documentation and shows the generalised layout and guidelines for a typical sampling site. It is noted that security is an issue in respect to the sampling equipment and local schools, mosques or other relatively secure sites should be used. Discussions should be entered with village chiefs to find secure sites.

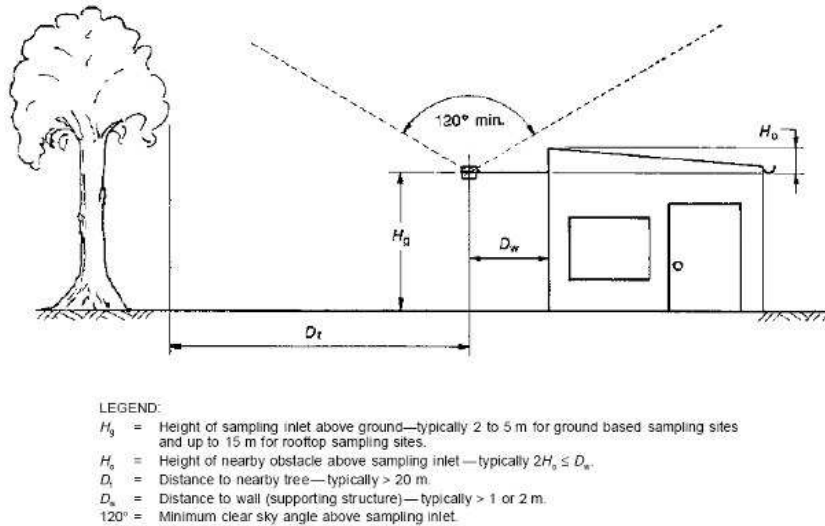


Fig. 1. GENERALIZED GROUND LEVEL SAMPLING SITE

Figure 7.1: Generalised Ground Level Sampling Site

At this initial stage it is proposed that the following monitoring is conducted at the two sites:

- PM10/Total suspended particulate using high volume sampler or low volume method.
- Nitrogen dioxide by either active sampling or by passive diffusion tubes

8.1.1 PM₁₀/PM_{2.5}Total Suspended Particulate

PM10 and PM2.5 will be collected at each of the monitoring sites following Method IO-2.1 Sampling of Ambient Air for PM10 and PM2.5 Using High Volume (HV) Sampler. Ambient air is drawn at a known flow rate through a prepared filter via a PM10 and a PM2.5 inlet, which effectively acts as a hood to prevent precipitation and debris from falling onto the filter. The sample volume is calculated from the average flow rate and sample duration. The material collected on the filter is determined gravimetrically. Sampling duration is for a 24-hour period.

Sampling would be carried out twice a month for a minimum of three months at each of the monitoring sites.

Subconsultant is to advise which method will be followed and when sampling can commence.

8.1.2 Passive Sampling

Table 7-1 lists the gaseous pollutants to be measured using integrated passive samplers. It also lists a brief description of the reaction occurring in each passive sampler, the analytical method used to measure the reacted product, the sensitivity required, and references for the method discussed. Weather shields have been installed at all sites to protect the passive sampler units.

Table 7.1: Passive Sampling Methods

Pollutant	Reaction & Analysis	Detection Limit
NO ₂	Nitrogen (NO ₂) is chemisorbed onto TEA as nitrite. Nitrite is quantified by visible spectrophotometry. Sampling is selective for gaseous molecules. Any airborne nitrite will not cross the diffusive membrane.	± 2 ppb for 14 day mean

The radiello passive samplers will be exposed for 14 day periods for the three months prior to site works commencing at each of the four monitoring sites. For AMDAL requirements the monitoring will be for one 24 hour period per month.

9. Noise

9.1 Methodology

Construction and operational activities have the potential to adversely impact on the noise environment therefore baseline monitoring should be undertaken by the subconsultant at a selection of noise sensitive sites affected by the activities. These locations must be situated away from existing noise sources such as roads or industry and be representative of the ambient noise environment. Samples will be collected in accordance with the requirements specified in the WBG EHS General ..

Long-term measured background noise levels over a minimum period of 48 hours of good weather should be undertaken to provide information on the background noise environment in the absence of industrial or extraneous noise sources. The subconsultant in their Baseline Noise Report should comment on any current activities near the pipeline sites that may cause a background level of noise and ground vibration (e.g. other industry, railway, major roads, etc.).

The daily variation of background noise levels recorded every 15 minutes at nearby noise sensitive sites should be recorded and reported as mean daily noise levels in the Baseline Noise Report with particular regard to the different periods of the day and night. The survey conditions, meteorology, location and results for each location for the baseline monitoring should also be recorded and included in the Baseline Noise Report. Noise measurements were performed by integrating sound level meter which have facilities L_{TMS} , namely L_{eq} recorded every 5 seconds for 60 minutes measurement. Measurements were taken during the 24-hour activity (L_{SM}). Each measurement should be able to represent a certain time interval with a set of at least four time measurements during the day and three at night time measurements, such as the following example:

- L_1 measured at 07:00 to 08:00 to represent at 06:00 to 9:00
- L_2 measured at 10:00 to 11:00 to represent at 09:00 to 11:00
- L_3 measured at 15:00 to 16:00 to represent at 14:00 to 17:00
- L_4 measured at 20:00 to 21:00 to represent at 17:00. to 22:00
- L_5 measured from 23.00 to 24.00 for representing 22.00 to 24.00
- L_6 measured at 1:00 to 2:00 for representing 24.00 - 3:00
- L_7 measured at 4:00 to 5:00 to represent at 03:00 to 6:00

Where possible, sufficient noise data should be collected to account for variations in seasonal and meteorological conditions. This will provide a baseline for comparison of predicted noise levels as well as information to be used in later studies.

9.2 Sampling locations – Power Plant

The noise sample locations should represent all potentially affected receivers. This will typically be residential properties and excludes unoccupied buildings and should be continuous over at least four days. It should also cover seasonal variations (however as the location is equatorial, this may not be relevant). The sites for noise monitoring are as following (also shown in Appendix B):

- 1) Rural property to the north (affected by existing PS noise)

- 2) Rural property to the south (unaffected by existing PS noise)
- 3) Outskirts of Penkanbaru to the west
- 4) Outskirts of Penkanbaru to the south

9.3 Sampling locations – Gas Pipeline Route

Noise monitoring along the gas pipeline should be representative of the main noise environments along the route. This monitoring can be a single 15 minute period at each location, however if night works are proposed, monitoring should also be done at night. The sites for noise monitoring are as following (also shown in Appendix D):

- 1) Outskirts of Penkanbaru close to the proposed pipeline route
- 2) Rural environment
- 3) River crossing
- 4) Outskirts of Jln Koperasi
- 5) Close to main road (Ji Raya Minas Perawang)

9.4 Reporting

A short Baseline Noise Report will be prepared setting out the above data and provided to PT JGI along with the raw noise monitoring data to enable a noise impact assessment to be prepared. The subconsultant will provide technical details (specification) of the proposed sound level meter to be used, so that PT. JGI can check that it will produce the data required.

10. Social and Economic

10.1 General

The subconsultant will collect data on the current farming activities in the vicinity of the power plant site, TL and gas pipeline route. This includes:

- A breakdown of the crops being grown, number of hectares covered and the annual tonnages harvested and the number of local people who farm or are supported by these fields.
- Demographic data on the number of people involved in the farming activities, where they reside, and age profile.

The subconsultant is required to collect information on:

- Historical settlement of the area and traditional activities;
- Known archaeological sites within two kilometre radius of the gas supply pipeline;
- Traditional and present-day social and tribal structures in the proposed sites;
- Identify and describe of sites of cultural and heritage importance within two kilometre radius of the power plant site, TL and gas pipeline route;
- Determine the values(importance) placed on these sites in terms of local, regional and national significance;
- Identify and record existing activities of cultural and heritage value within two kilometre radius of the power plant site, TL and gas pipeline route;
- Identify potential effects of the proposed power plant site, TL and gas pipeline route on the cultural and heritage sites and values;

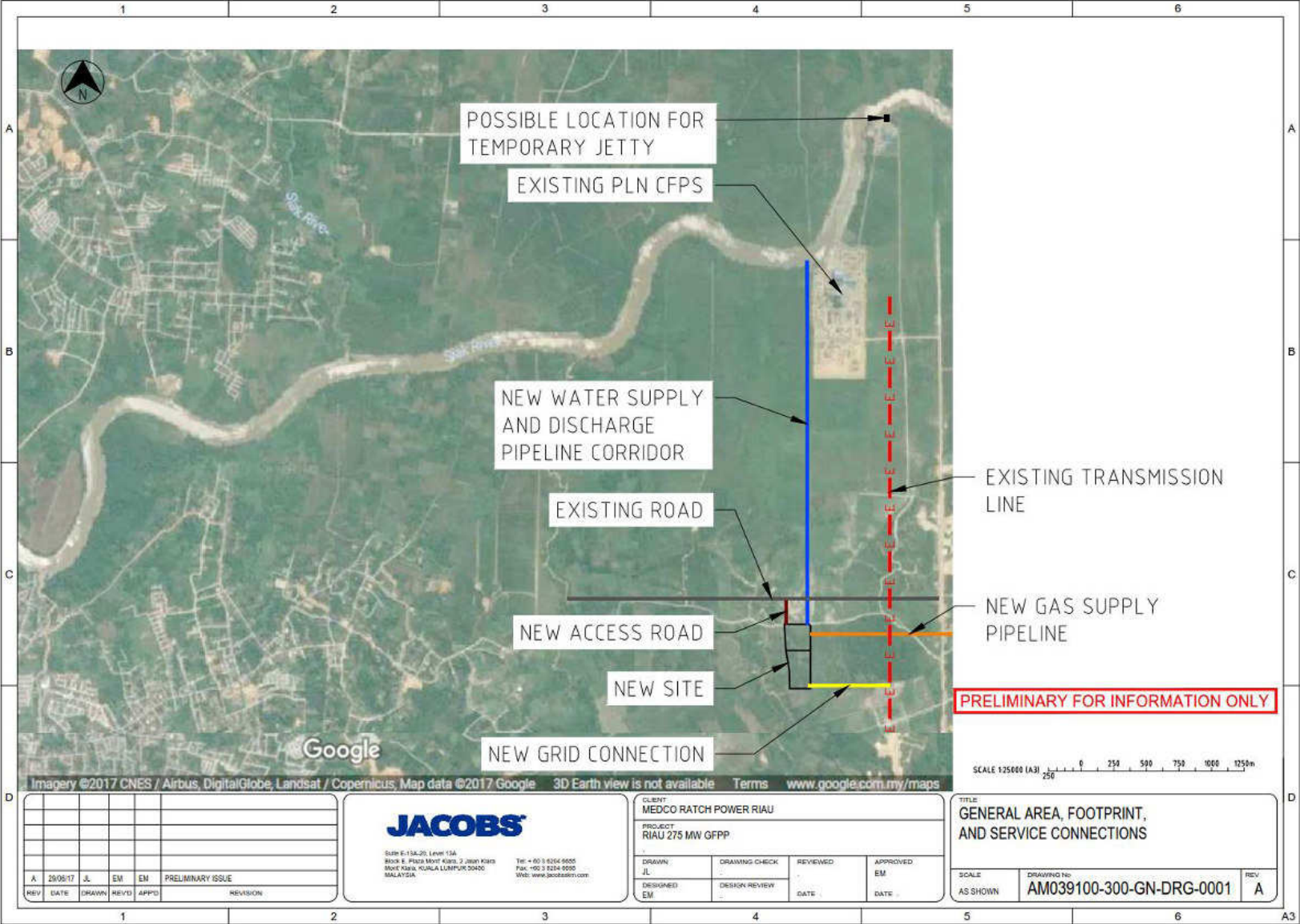
- The views of the key local, regional and national groups, as relevant on the heritage and cultural sites near the site; and
- Provide a report that sets out the methodology used to collect the baseline data and the data collect in respect to cultural activities and heritage sites in the surrounding area.

10.2 Public Health

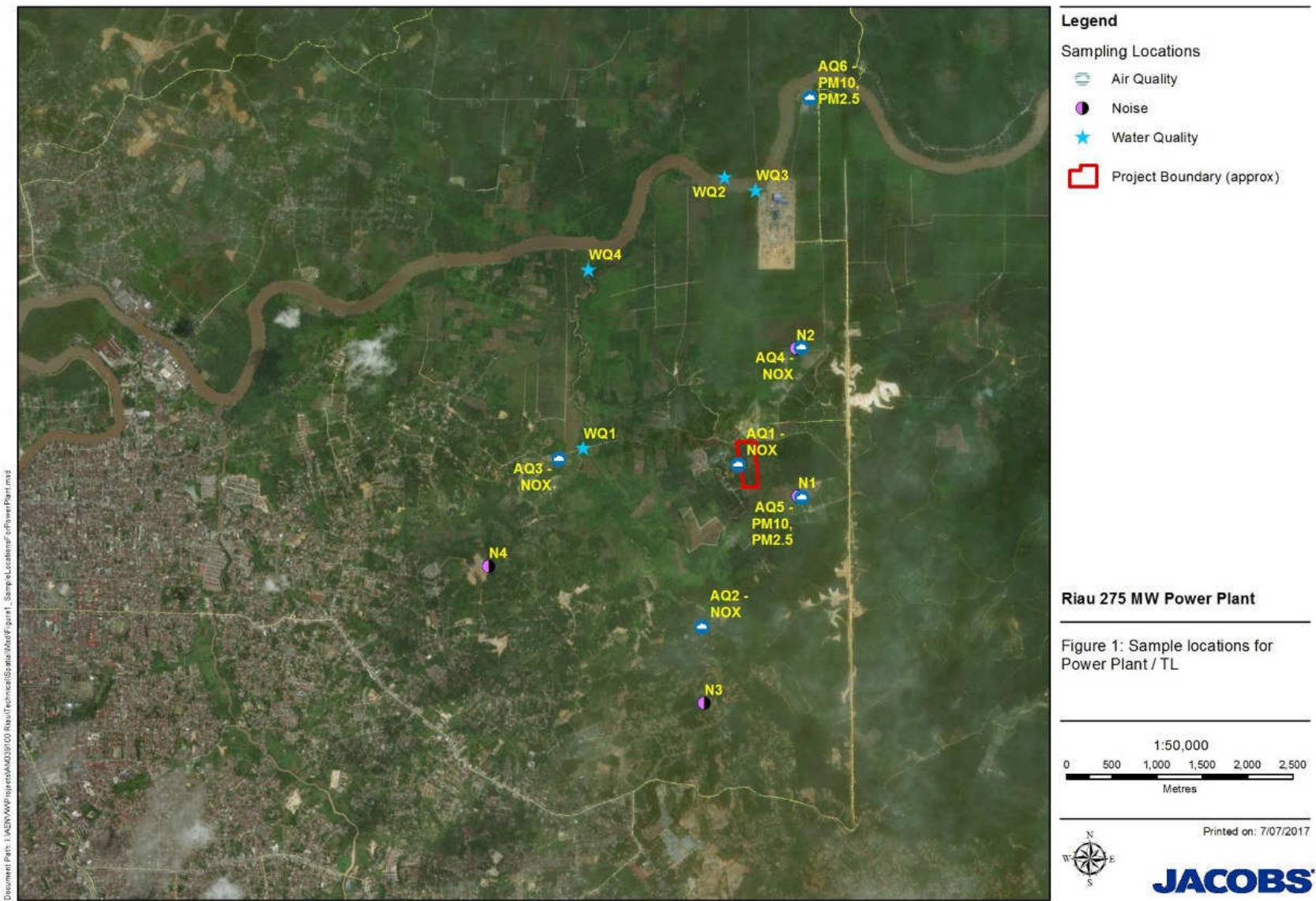
The subconsultant is required to collect information on:

- Historical information of public health in the vicinity of the power plant site, TL and gas pipeline route, to include:
 - Identify and describe of type of public disease on the area;
 - Determine the values (dominance) of the disease on the area;
 - Identify public health facilities to include availability of health worker on the area;
 - Identify potential effects of the proposed transmission line on community public health; and
- Provide a report that sets out the methodology used to collect the baseline data and the data collect in respect to public health in the surrounding area.

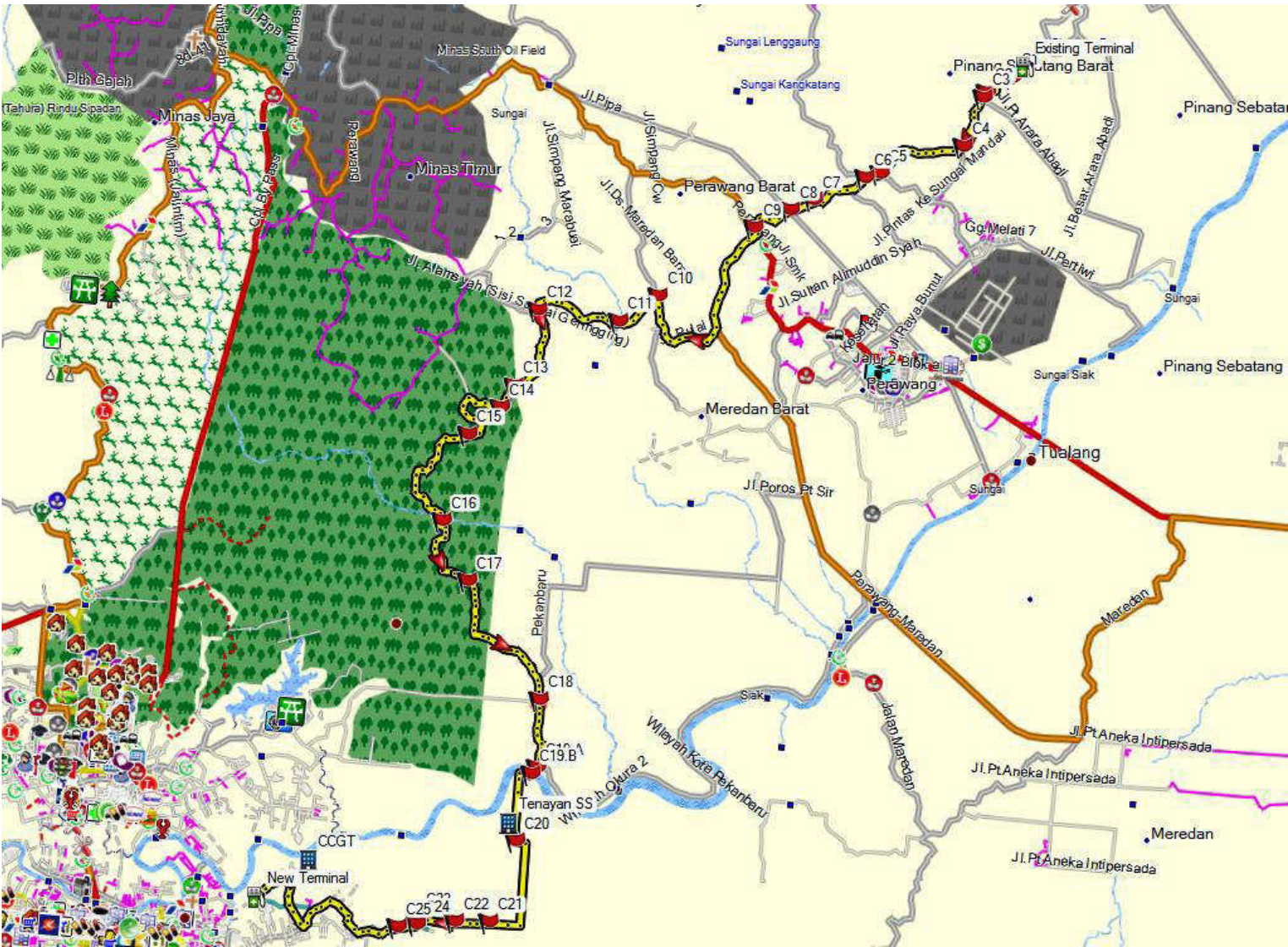
Appendix 1 Proposed Location of Power Plant and Transmission Line



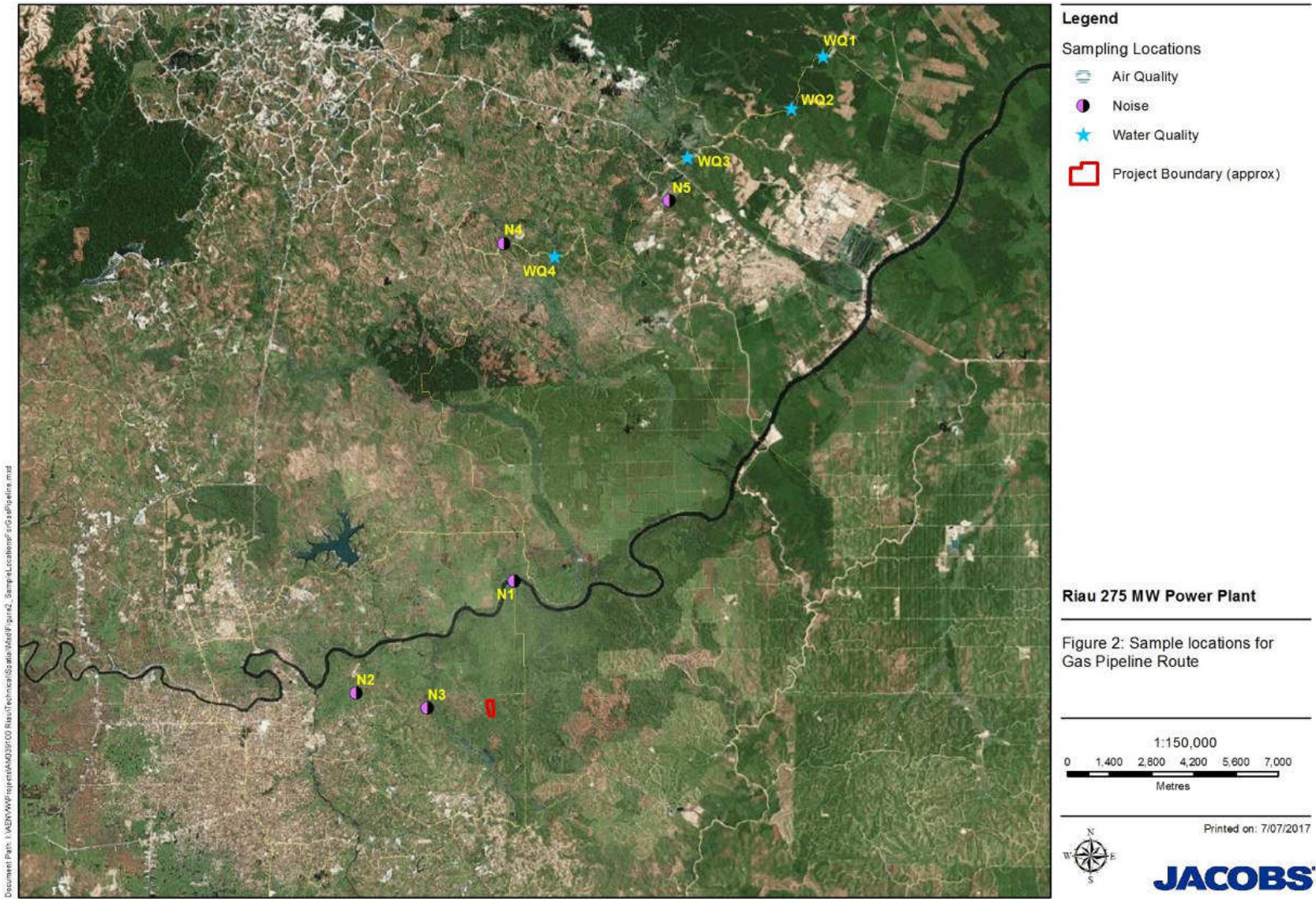
Appendix 2 Proposed Sampling Locations – Power Plant



Appendix 3 Proposed Location of Gas Pipeline Route



Appendix 4 Proposed Sampling Locations – Gas Pipeline



Appendix C. Applicable Legislation, Standards and Guidelines

This section is to set out the requirements that apply to stakeholder engagement for the Project. These are driven by:

- Asian Development Bank (ADB) Safeguard Policy Statement (2009) (Section C.1)
- Principles and procedures specified by the Equator Principles, which integrate the IFC's Social and Environmental Policy and Performance Standards (Section C.2)
- IFC Performance Standards (Section C.3)
- World Bank General and Industry Specific Environmental, Health and Safety Guidelines (Section C.4)
- The Indonesian Regulatory Framework (Section C.5)

C.1 ADB Safeguard Policy Statement (2009)

The ADB Safeguard Policy Statement covers safeguard policies on the following:

- **Environmental** - To ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.
- **Involuntary Resettlement** - To avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups.
- **Indigenous Peoples Safeguards** - To design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them.

ADB Safeguard Requirements

All three ADB Safeguards require the following in relation to the ESIA:

- **Information disclosure** – i.e. displaying the ESIA or IEE on the Project Sponsor/ADB website.
- **Consultation and participation** - The Project Sponsor will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
- **Grievance redress mechanism** - borrower/client will establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance.

C.2 Equator Principles

The Equator Principles are guidelines for financial institutions on managing environmental and social risk in project financing. The key points of the Principles for the purposes of this Project are presented below. The Principles apply to new project financing globally where the total project capital cost exceeds US\$10m, and to project finance advisory activities.

Equator Principle Financial Institutions (EPFI) will only provide loans to projects that conform to Principles 1 to 9 as outlined below.

Principle 1 (Review and Categorisation)

"When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise it based on the magnitude of its potential environmental and social

risks and impacts. Such screening is based on the environmental and social categorisation process of the International Finance Corporation (IFC). (Exhibit I)”

Principle 2 (Social and Environmental Assessment)

“For all Category A and Category B Projects, the EPFI will require the client to conduct an Assessment process to address, to the EPFI’s satisfaction, the relevant environmental and social risks and impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the proposed Project.”

Principle 3 (Applicable Social and Environmental Standards)

“For projects located in non-designated countries, the assessment process evaluates compliance with the then applicable IFC Performance Standards on Environmental and Social Sustainability (Performance Standards) and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) (Exhibit III).

The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to social and environmental issues.”

Principle 4 (Environmental and Social Management System and Equator Principles Action Plan)

“For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS).

Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI’s satisfaction, the client and the EPFI will agree an Equator Principles Action Plan (AP). The Equator Principles AP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.”

Principle 5 (Consultation and Disclosure)

“For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project’s phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.

To facilitate Stakeholder Engagement, the client will, commensurate to the Project’s risks and impacts, make the appropriate Assessment Documentation readily available to the Affected Communities, and where relevant Other Stakeholders, in the local language and in a culturally appropriate manner.

The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For Projects with environmental or social risks and adverse impacts, disclosure should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis.

EPFIs recognise that indigenous peoples may represent vulnerable segments of project-affected communities. Projects affecting indigenous peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for indigenous peoples contained in relevant national law, including those laws implementing host country obligations under international law. Consistent with the special circumstances described in IFC Performance Standard 7 (when relevant as

defined in Principle 3), Projects with adverse impacts on indigenous people will require their Free, Prior and Informed Consent (FPIC)."

Principle 6 (Grievance Mechanism)

"For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.

The grievance mechanism is required to be scaled to the risks and impacts of the Project and have Affected Communities as its primary user. It will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the Stakeholder Engagement process. "

Principle 7 (Independent Review)

"For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance."

Principle 8 (Covenant)

"For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects.

Furthermore for all Category A and Category B Projects, the client will covenant the financial documentation:

- a) to comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects; and*
- b) to provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third party experts, that
 - i) document compliance with the ESMPs and Equator Principles AP (where applicable), and*
 - ii) provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and**
- c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.*

Where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance to the extent feasible. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, as considered appropriate."

Principle 9 (Independent Monitoring and Reporting)

"To assess Project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI."

Principle 10 (EPFI Reporting)

“For all Category A and, as appropriate, Category B Projects:

- *The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online.*
- *The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tonnes of CO2 equivalent annually. Refer to Annex A for detailed requirements on GHG emissions reporting.*

The EPFI will report publicly, at least annually, on transactions that have reached Financial Close and on its Equator Principles implementation processes and experience, taking into account appropriate.”

C.3 IFC Performance Standards

The International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, as of January 2012, define the client's roles and responsibilities for managing their projects and the requirements for receiving and retaining IFC support. They are also relevant to other institutions applying the Equator Principles when making project financing decisions.

The Performance Standards represent the “policy framework” for the ESIA and sustainable social and environmental management for the Project, whereas the IFC EHS Guidelines provide guidance on general and industry good practice as well as recommended numerical limits for emissions to the atmosphere, noise, liquid and solid wastes, hazardous wastes, health and safety, and other aspects of development projects.

Performance Standard 1, Assessment and Management of Environmental and Social Risks and Impacts, establishes the importance of:

- integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects;
- effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
- the client's management of social and environmental performance throughout the life of the project.

Performance Standards 2 through 8, listed below, establish requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate.

- Performance Standard 2: Labor and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage.

While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, Performance Standards 2 through 8 describe potential social and environmental impacts that require particular attention in emerging markets. Where social or environmental impacts are anticipated, the client is required to manage them through its Social and Environmental Management System consistent with Performance Standard 1.

C.4 General and Industry Specific EHS Guidelines

In addition to the performance standards, the World Bank Group (WBG) has developed Environmental, Health and Safety (EHS) Guidelines covering both general and industry specific issues. The EHS Guidelines contain the performance levels and measures that are normally acceptable to WBG and are generally considered to be achievable in new facilities at reasonable costs by existing technology. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to the financiers, become project or site-specific requirements.

In general, when host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

C.5 Indonesian Regulatory Framework

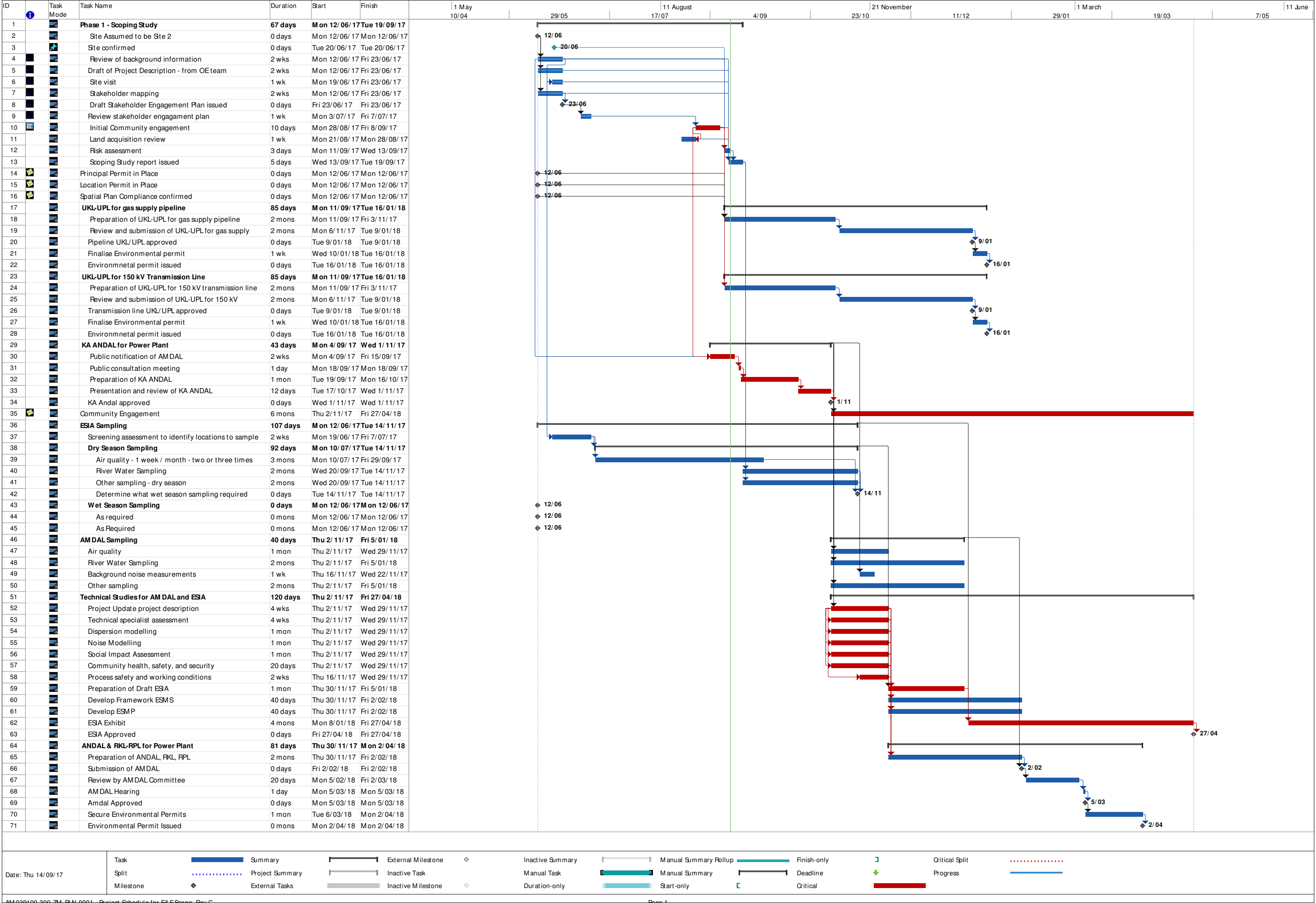
The Indonesian legal system is a hierarchal system, where National Regulations (Acts and National Government Regulations) act as the governing regulation, which are translated into implementing regulations and technical standards at lower levels of the government system (as stated on Law No. 12 of 2011 regarding formation of legislation). The requirements and standards in each regulation must be kept consistent at different levels of the government system, but should there be conflicting standards, the higher level regulation takes precedence.

At provincial level, Governor and provincial government can set up local government standards in the form of Governor Decrees and Provincial Local Government Regulations. These regulations apply only within the subject provincial jurisdiction. The Governor and/or provincial local government can set stricter environmental standards than those set at a National level. In such cases, the stricter standards shall be followed.

The various levels of government of Indonesia, including the provincial and local government agencies, that have some jurisdiction or control over the power plant activities, transmission line and gas pipeline include:

- National Level: Ministry of Environment and Forestry (MOEFO);
- Province Level: The Province of Riau; and
- Regency and City Level: Power plant and transmission line - Environmental Agency of Pekanbaru City (DLH – Kota Pekanbaru) and gas pipeline the Siak Regency and Pekanbaru City.

Appendix D. ESIA and AMDAL Schedule



Appendix E. Water Balance Diagram

