



**GEOTHERMAL ENERGY UPSTREAM
DEVELOPMENT PROGRAM (GEUDP)**
Waesano Geothermal Project
Environmental and Social Management Plan (ESMP)
Wae Sano Village, Sano Nggoang District
West Manggarai Regency, East Nusa Tenggara Province



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1. Introduction

A key element in any environmental impact assessment process is to outline the project response plans to implement mitigation measures that have been developed as part of the assessment process. In the context of World Bank Operational Policy 4.01, Annex C defines that the *project's environmental management plan (EMP) consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures.*

Through the life of any project, environmental management is a dynamic process reacting to the stage of the project, the evolution of the project activities and lessons that may be learned along the way and applied to refining management strategies. Thus, at this stage of the planning process it is important to capture the commitments that have been outlined to mitigation strategies of the Environmental and Social Impact Assessment (ESIA) through the Environmental and Social Management Plan (ESMP), and indicate how they will be implemented including roles and responsibilities of various parties in the project and timing and implementation issues. Downstream from the ESMP will be the development of specific management plans to deal with various stages of the project which will need to be put in place to drive the implementation of those phases of the project, including the Construction Environmental and Social Management Plan (CEMP) to manage contractors.

This ESMP outlines the mitigation measures proposed following the development of the ESIA for the Waesano Geothermal Exploration Project at Wae Sano Village in Flores Island – East Nusa Tenggara Province, Indonesia (hereafter referred as ‘the Project’).

2. Scope and Objectives of this ESMP

This ESMP covers the implementation/execution of environmental and social management and monitoring during the Project exploration phase. It includes all activities as described in Section 3.2 Project Activities for Exploration phase of the main ESIA, and ensures continual compliance with the relevant national legislation, World Bank Safeguard Policy, and GEUDP ESMF.

This ESMP is the means by which the findings of the environmental and social assessment are implemented during the project activity, and observes the following:

- The list of obligations and responsibilities of each party involved in the project;
- Stipulates methods and procedures that will be followed; and
- Outlines environmental management actions that will be implemented to avoid negative impacts on the health and well-being of people and the environment.

Aligned with the current stage of the Project design process, the proposed recommendation defined in this ESMP is proposed with a mitigation hierarchy approach which prioritise avoidance over abate at receptor presented in the ESIA Section 4, and consideration toward the sensitivity analysis result discussed in the ESIA Section 6.7. It includes some immediate next steps in terms of environmental or social studies to further inform this process such as through consultation with local cultural leader regarding the old village boundary or coordination with regional forestry agency concerning forestry status (see Section 4 of this ESMP document). This approach will allow integration of the ESIA results into the final Project design and layout.

All items in this ESMP have been enumerated to facilitate ease of cross reference with the environmental and social impact assessment result (see Section 7 and 8 of the ESIA). Various codes have been used to flag ESMP issues of particular nature those flags include the following.

ENVIRONMENTAL IMPACTS	
AQ	Air Quality and Odour
NO	Noise
LU	Land Cover and Spatial Planning

ENVIRONMENTAL IMPACTS	
SO	Soil
SWQ	Surface Water Quality
HYD	Surface Hydrology and Hydraulics
WAS	Environmental Health and Waste Management
FLO	Terrestrial Ecology Flora
FAU	Terrestrial Ecology Fauna
SUS	Sustainability and Climate Change
COMMUNITY AND SOCIAL IMPACTS	
DISP	Land Acquisition and Economic Displacement
ECON	Socio-Economic
PH	Community Health and Safety
TTS	Traffic, Transport and Community Safety
AMEN	Community Amenity
VIS	Visual Impact
SOC	Socio-Cultural
LOHS	Labor Rights and Occupational Health and Safety (OHS) Issues

The above coding of impacts is consistent with the environmental and social impacts chapters to enable tracking of impacts through to their mitigation and responsibilities.

The ESMP has been broken down into the requirements for environmental and social management and monitoring measures (Section 4). Accordingly, a schedule for management measures and monitoring period of downstream procedures is also proposed. Implementation and monitoring of the implementation of measures in this ESMP is the responsibility of various different units/departments and entities as part of the Project, including contractors (see Section 6).

3. Environmental and Social Policy and Management Framework

3.1 PT SMI Environmental and Social Management System (ESMS)

PT SMI is a State-Owned Enterprises (*Badan Usaha Milik Negara - BUMN*) which was established to encourage the acceleration of national infrastructure financing through partnerships with the private sector and/or multilateral financial institution. PT SMI has committed to manage its business activities in an environmentally-and-socially-friendly manner, to remove or minimize environmentally or socially negative impacts, and to enhance environmentally or socially positive impacts in investment projects. Therefore, the Company has issued Guidelines for Environmental and Social Management System (ESMS) Corporation Guidelines, hereinafter referred to as "ESMS Corporation Guidelines" as a reference for the Company to comply with the provisions and requirements of the environment, health, safety and social regulations that apply in Indonesia.

In addition, related to the business of the Company, PT SMI has issued ESMS guidelines as a reference for financing activities and investments, project development, as well as providing consulting services for infrastructure projects in accordance with the provisions and requirements of the environment, health, safety and social that applies in Indonesia.

The ESMS Corporation Guidelines are intended to be a reference for the company in carrying out corporate activities with the following objectives:



- Ensuring that the Company will manage and comply with the provisions and requirements of the environment, health, safety and social regulations that apply in Indonesia;
- Providing clear authority and responsibilities as well as the role and function of each unit of work involved in managing the corporate ESMS; and
- Maintaining consistency and level of performance to implement and manage the ESMS, in an effective and efficient manner.



ESMS Policy

The Company is committed to managing projects in a safe and sustainable manner by:

- Ensuring the health and safety of employees and guests at the company's office;
- Ensuring environmental impact control of company operations;
- Meeting the regulations and other applicable requirements related to environmental, health, safety and social aspects; and
- Implementing continuous improvement for good environmental, health, safety and social management at the Company.

To achieve these commitments, the Company will:

- Provide facilities and adequate environment, health, safety and social infrastructure;
- Provide training and coaching for environmental, health, safety and social management to employees in order to increase their knowledge and awareness; and
- Play an active role in meeting all regulations and other requirements related to the environmental, health, safety and social regulations.

3.2 GEUDP Environmental and Social Framework (ESMF)

PT SMI has been in collaboration with the World Bank to prepare the Environmental and Social Framework (ESMF) for the Geothermal Exploration Energy Upstream Development Project (GEUDP).

The purpose of the ESMF is to provide all GEUDP projects with the details social and environment safeguard policies, principles, procedures, institutional arrangements, and workflows that should be followed in making its investments. GEUDP projects should use the ESMF to ensure consistent and effective implementation of social and environmental management practices in all its activities, investment and development projects, and also to guide the provision of all advisory services.

To achieve the above aim in relation to the Waesano Geothermal Exploration Project, the GEUDP ESMF serves the following purposes:

- Guide the Project to identify the above risks, hazards and impacts as early as possible in the project cycle, including considerations in the site selection process, the product design process, the engineering planning process for capital application, the demand for engineering work, facility modification authorization, or layout planning and process changes;
- Guide the Project to identify risk possibility and its scale based on: a) the nature of the project activities, whether the project will create the significant emissions or effluents, involve the process of hazardous and toxic substances, or disturb landscape hydrology or ambient water or air quality or noise levels; and b) potential consequences to workers, communities, economies or environment when the hazards are not managed properly; and
- Guide developers to educate workers and surrounding communities in anticipating any accident occurrence, including providing technical and financial resources to avoid or minimize risk, and for effective and safe control of every accident.

4. Environmental and Social Management and Monitoring Plan

This section presents a set of management and monitoring measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, or reduce them to acceptable levels. The mitigation measures include the type of impact, source of impact, key performance indicator, management plan or monitoring plan, location, time period, frequency and person in charge.

In addition to the ESIA requirements observed in the GEUDP ESMF which aligned with the World Bank Safeguard Policies, the Project is required to implement UKL-UPL measures under Indonesian environmental management requirements. UKL-UPL is being prepared at the time this document is developed, as a separate document from this ESIA. However, to allow effective use of this ESMP by the Project implementer, the required measures in the UKL-UPL are also included.

The proposed management measures for environmental and social impacts are presented in Table 4-1 and Table 4-2, while management and monitoring maps are provided in Figure 4-1 and Figure 4-2.

4.1 Environmental Management and Monitoring Plan

Table 4-1 Environmental Management and Monitoring Plan

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
AQ001	Emissions from Off-road and On-road Equipment	Equipment and material mobilization; Land clearing and preparation; Access road improvement; and Well pad and infrastructure development	UKL-UPL Requirements: <ul style="list-style-type: none"> Use vehicles that have passed emissions tests; Periodic machine maintenance; Limit the hours of operation for heavy equipment or operations. Attention will be paid to operations in the proximity of community areas; Equipping the workers with proper PPE. ESIA Requirements: <p>Prepare Vehicle & Traffic Management Plan (VTMP) that will include:</p> <ul style="list-style-type: none"> All requirement from UKL-UPL Exhaust emissions from off-road and on-road equipment operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards; Vehicle selection strategy to consider impact on total emissions; Ensure that the engines of all vehicles and machinery on site are not left running unnecessarily; Schedule of vehicle movement and number of vehicles in transit at any given time to limit emissions generation; Plant and equipment to be used in the project to comply with recognized performance design standards; Personnel working on-site would have at all times with them appropriate PPE; and Conduct air quality monitoring at boundary areas of nearby settlements 	<ul style="list-style-type: none"> Air emission controls performed in well pads areas and transportation route which traversed settlement area. At the locations of access road improvement; Maintenance of vehicles and heavy equipment performed in the workshop. 	During land clearing and preparation; equipment and material mobilization; access road improvement; and well pad and infrastructure development.	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Monitoring should be based on TMP; Ambient Air Quality Monitoring; Equipment maintenance records. 	<ul style="list-style-type: none"> Wae Sano Village, Nggoang Sub-district, especially at the well pads area which located near settlement areas At the locations of access road improvement. 	Bi-annual during land clearing and preparation; equipment and material mobilization; access road improvement; and infrastructure and well pad development.	Exploration Site Team (EST) – Environmental Officer	Ambient air quality does not exceed the ambient air quality standards in accordance with Government Regulation No. 41 of 1999	Civil Infrastructure Contractors budget
AQ002	Fugitive Dust Emissions	Equipment and material mobilization; Land clearing and preparation; Access road improvement; and Well pad and Infrastructure development	UKL-UPL Requirements: <ul style="list-style-type: none"> Regular road watering especially during the dry season; Limit the hours of operation for heavy equipment or operations. Attention will be paid to operations in the proximity of community areas Control vehicle speed on site, especially during the dry season and windy conditions; Covering trucks; and 	<ul style="list-style-type: none"> Fugitive dust emission controls performed in project areas and transportation route which traversed settlement area. Maintenance of vehicles 	During land clearing and preparation; equipment and material mobilization; access road improvement; and well pad and infrastructure development	Exploration Site Team (EST) – Environmental Officer	Ambient Air Quality monitoring during construction	Wae Sano Village, Nggoang Sub-district, especially at the well pads area which located near settlement areas	Twice a year during land clearing and preparation; equipment and material mobilization; access road improvement; and infrastructure and well pad development.	Exploration Site Team (EST) – Environmental Officer	Ambient air quality does not exceed the ambient air quality standards in accordance with Government Regulation No. 41 of 1999	Civil Infrastructure Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			<ul style="list-style-type: none"> Equipping the workers with proper PPE for dust protection. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> Minimize the amount of excavated material on site; For manageable stockpile volumes, geotextiles can be used to cover soil heaps to prevent erosion and dust generation by wind; Vehicle washing facilities provided to minimise the quantity of material deposited on public roads; Restrict heights from which materials are dropped, as far as practicable, to minimize the fugitive dust arising from unloading/loading; Spray stations to moisten loads and avoid dust shedding; Temporary suspension of material handling activities during high wind events; Consideration of the location of stockpiles for temporary storage areas with respect to the location of sensitive receptors and prevailing wind; Avoiding double handling of material wherever reasonably practicable; Field supervisors to have responsibility to monitor conditions and adjust the frequency of watering; and Sealing/re-vegetation of completed earthworks with local vegetation as soon as reasonably practicable after completion. 									
AQ003	Emissions from Off-road Equipment	Exploration Drilling	<p>UKL-UPL Requirements:</p> <ul style="list-style-type: none"> Periodic air drilling machine and electrical generator maintenance. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> Exhaust emissions from drill rigs will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards; Drill rig selection strategy to consider impact on total emissions; and Drill rigs used in the project shall comply with recognized performance design standards. 	<ul style="list-style-type: none"> Air emission controls performed in project areas. Maintenance of vehicles and heavy equipment performed in the workshop. 	During exploration drilling	Exploration Site Team (EST) – Monitoring Environmental Officer	Ambient Air Quality	Wae Sano Village, Sano Nggoang Sub-district, especially the well pads which located near settlement areas	Twice a year during exploration	Exploration Site Team (EST) – Environmental Officer	Ambient air quality does not exceed the ambient air quality standards in accordance with Government Regulation No. 41 of 1999	Drilling contractors budget.
AQ004	H ₂ S Emissions during Well Testing	Well Testing	<p>UKL-UPL Requirements:</p> <ul style="list-style-type: none"> Socialization with local community and village leader prior to the commencement of well testing, especially on evacuation procedures in the event of an early warning alarm; Secure the well location and establish safe and dangerous zones around the exploration areas; 	Project area particularly Well Pad and the surrounding area	During well testing	Exploration Site Team (EST) – Safety Officer	Routine monitoring of H ₂ S concentrations should take place in multiple locations both on-site and at nearby local receptor locations	<ul style="list-style-type: none"> Wae Sano Village, Sano Nggoang Sub-district, especially the at well pads area which located near settlement areas 	Every day in-situ measurement during well testing activity	Exploration Site Team (EST) – Safety Officer	H ₂ S concentration does not exceed the ambient odor standards in accordance with MoE Decree No 50 of 1996	Drilling contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			<ul style="list-style-type: none"> Equipping the workers with proper PPE, especially to those located in dangerous zones; Instalments of H₂S Monitoring Equipment and early warning alarm at well testing areas; Install and activate large blowers to disperse H₂S in direction that is far from population and safe area; Install danger signage and barriers including wind socks/wind direction flag, signage of strictly prohibited to enter construction area for unauthorized personnel; Evacuation of community surround the well pads area in case of H₂S is exceed the threshold; If the results of H₂S monitoring exceeding the standard, there will be an evaluation of the well testing results to determine the next step so that the concentration of H₂S in the ambient air is meeting the standard. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> Requirement to plan timing of vertical well testing based on weather conditions (low wind); and Ensure well integrity to avoid leakage. 				<ul style="list-style-type: none"> Well pads area 					
NO001	Construction Noise	Equipment and material mobilization; Land clearing and preparation; Access road improvement; and Well pad and infrastructure development.	<p>UKL-UPL Requirements:</p> <ul style="list-style-type: none"> Using vehicle with exhaust and silencer in accordance with the manufacturer's specifications, especially vehicles that potentially cause noise; Limit the hours of mobilization for equipment and material. Attention will be paid to operations in the proximity of community areas; and Equipping the workers with proper PPE. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> Whenever avoidance for construction at Well pad WS-B is not possible, install proper noise barrier wall to reduce noise spread to the nearest settlement i.e. Nunang Sub-village Limit the hours of operation for specific loud pieces of equipment or operations. Attention will be paid to operations in the proximity of community areas; Limit exposure of workers handling noisy and vibrating equipment; Construction activities should be limited to daylight hours although scheduling may require overnight operations on occasion; Use of hoarding/temporary noise barriers where noisy activities are to be conducted close to sensitive receivers; 	Noise controls performed in project areas, mobilization route, and the nearest settlement area	During land clearing and preparation; equipment and material mobilization; access road improvement; and well pad and infrastructure development	Exploration Site Team (EST) – Environmental Officer	Monitor noise level with a Sound Level Meter.	<ul style="list-style-type: none"> Wae Sano Village, Sano Nggoang Sub-district, especially the well pads which located near settlement areas; Mobilization route 	<ul style="list-style-type: none"> At least once a month for internal measurement; and Bi annual during construction phase for external measurement 	Exploration Site Team (EST) – Environmental Officer	The noise level does not exceed the quality standards as per MoE Decree No 48 of 1996, noise level for residential area (55 dBA).	Civil and Infrastructure Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			<ul style="list-style-type: none"> Require contractors to adopt and adhere to a Vehicle & Traffic Management Plan (VTMP); and Develop an effective grievance mechanism to record and respond to noise complaints. 									
NO002	Drilling Noise	Exploration Drilling	UKL-UPL Requirements: <ul style="list-style-type: none"> Periodic air drilling machine and electrical generator maintenance; Select equipment with noise-reducing features; Equipping the workers with proper PPE; and Setting the buffer zone. ESIA Requirements: <ul style="list-style-type: none"> Whenever avoidance for construction at Well pad WS-B is not possible, install proper noise barrier wall to reduce noise spread to the nearest settlement i.e. Nunang Sub-village; Develop an effective grievance mechanism to record and respond to noise complaints 	Project area particularly Well Pads and the surrounding area (near settlement area).	During exploration drilling	Exploration Site Team (EST) – Environmental Officer	Monitor noise level with a Sound Level Meter Records all grievances	Wae Sano Village, Sano Nggoang Sub-district, especially the well pads which located near settlement areas	At least once a month for internal measurement; and Bi annual during exploration drilling for external measurement	Exploration Site Team (EST) – Environmental Officer	The noise level does not exceed the quality standards as per MoE Decree No 48 of 1996, noise level for residential area (55 dBA)	Drilling contractors budget
NO003	Well Testing Noise	Well Testing	UKL-UPL Requirements: <ul style="list-style-type: none"> Usage of silencer in order to reached noise level between 70 – 110 dB; Setting the buffer zone; Socialization to local community and community leaders prior to well testing activity; and Periodic well testing machine maintenance and electricity generator maintenance. ESIA Requirements: <ul style="list-style-type: none"> Whenever avoidance for construction at Well pad WS-B is not possible, install proper noise barrier wall to reduce noise spread to the nearest settlement i.e. Nunang Sub-village; Vertical discharge tests will be conducted at times advised and agreed to by nearby communities; Design of atmospheric separators for production testing to be optimized for noise abatement; and Develop an effective grievance mechanism to record and respond to noise complaints. 	Well pads area and the surrounding area (near settlements area)	During well testing	Exploration Site Team (EST) – Environmental Officer	Monitor noise level with a Sound Level Meter	Wae Sano Village, Sano Nggoang Sub-district, especially the well pads which located near settlement areas	At least once a month for internal measurement; and Bi annual during well testing for external measurement	Exploration Site Team (EST) – Environmental Officer	The noise level does not exceed the quality standards as per MoE Decree No 48 of 1996, noise level for residential area (55 dBA).	Well testing budget
LU001	Construction of Civil Infrastructure	Land clearing and preparation	UKL-UPL & ESIA Requirements: <ul style="list-style-type: none"> Minimize the project footprint within the most sensitive areas, such as areas near settlements; and Revegetation of cleared areas should be with local vegetation and conducted following the completion of exploration activities in order to restore ecological function. 	Well Pads Area in Wae Sano Village	During land clearing and preparation	Exploration Site Team (EST) – Environmental Officer	Frequent monitoring of any potential negative impact such as erosion and water balance alteration	Well Pads Area in Wae Sano Village	Regular basis (at least once a week) during land clearing and preparation	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Development area is in low sensitivity area Regular Meetings with Government as needed Less impacts on vegetation and plantations 	Civil and Infrastructure Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
ESIA Requirements:												
			<ul style="list-style-type: none"> Restoration to pre-existing condition before project or to an alternative as selected by land owner after completion of the activity as agreed by both parties; and Continuous coordination and communication with the local government to keep relevant authorities informed of project updates and status. 								<ul style="list-style-type: none"> Proper Grievance mechanism has been in place, and record on received grievance and resolution are available 	
LU002	Land Cover Alteration	Site restoration and revegetation	UKL-UPL and ESIA Requirements: <ul style="list-style-type: none"> Replanting of the same vegetation species as before; Maintenance of replanted vegetation until established; Fencing the area around the wellhead. ESIA Requirements: <ul style="list-style-type: none"> Minimize the project footprint within the most sensitive areas, such as areas near settlements; Restoration to pre-existing condition before project or to an alternative as selected by land owner after completion of the activity as agreed by both parties; Revegetation of cleared areas should be conducted following the completion of exploration activities in order to restore ecological function; and Continuous consultation with landowners and coordination with the local government to keep relevant authorities informed of project updates and status. 	Well Pads Area in Wae Sano Village	During post operation activity	Exploration Site Team (EST) – Environmental Officer	Data collection/records on the growth of replanted vegetation	Well Pads Area in Wae Sano Village	Quarterly during post operation	Exploration Site Team (EST) – Environmental Officer	Minimum one (1) vegetation species (tree) per 10 meter square.	Revegetation budget
SO001	Landslide and Erosion	Land clearing and preparation	UKL-UPL Requirements: <ul style="list-style-type: none"> Building perimeter drainage around the well pad area; Avoidance of land clearance outside well pad corridors; Compacting soil minimum 20 cm thickness by using compactor; and Installing a retaining wall. ESIA Requirements: <ul style="list-style-type: none"> Stabilization of batters by planting crops or physical stabilization; Installation of interception measures such as drains and sediment traps; and Build terraces for high slopes (over 3m high) 	Well pads and infrastructure areas	During land Clearing and Preparation	Exploration Site Team (EST) – Environmental Officer	Frequent monitoring of any potential negative impact such as erosion and water balance alteration	Well Pads and infrastructures Area in Wae Sano Village, Sano Nggaoang Sub-District	Bi-annual during construction activity	Exploration Site Team (EST) – Environmental Officer	Minimum disturbance and disruption of sedimentation from land clearing and preparation	Civil and Infrastructure Contractors budget
SO002	Poor Handling, Storage and Accidental Spill of	Equipment and material mobilization;	ESIA Requirements: <ul style="list-style-type: none"> All equipment and facilities at well pads will meet international design standards for safe storage and dispensing of chemicals, 	Well Pads Area and Base Camp	During land clearing and preparation; equipment and material	• Exploration Site Team (EST) – Environmental Officer	Visual inspection of sensitive areas	Well pads and Base camp	Monthly	• Exploration Site Team (EST) – Environmental Officer	No spills affecting soil quality	Civil and Infrastructure Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
	Chemical and Petroleum Products	Land clearing and preparation; Access road improvement; and Well pad and infrastructure development.	<ul style="list-style-type: none"> lubricants and fuels, containment of spilled materials, including bunded areas, perimeter drains and interception traps; Barriers, containment systems and pollution interception measures will be inspected regularly as part of operations to ensure suitability for purpose, proper function and condition; and Any accidental spills will be managed in accordance with spill response procedures. 		mobilization; access road improvement; and infrastructure and well pad development		Record any poor handling, storage, spills incident and the improvement					
SO003	Pipe Leakage during Well Testing	Well Testing	ESIA Requirements: <ul style="list-style-type: none"> Prepare response plan for pipe leakage; Consider leakage in pipe design and construction; Check the consistency of pipes in terms of the quality of pipe materials; Corrosion control and inspection; Use of blowout prevention equipment such as shutoff valves and other related well control equipment; and If leakage is identified, response plans will be activated. 	Well pads area	During well testing	Exploration Site Team (EST) – Environmental Officer	Visual inspection of sensitive receptor areas Records any leakage and conduct soil test	<ul style="list-style-type: none"> Along geothermal fluid /brine water pipelines 	Twice a year (Bi - annual)	Exploration Site Team (EST) – Environmental Officer	No soil contamination	Well testing budget
SWQ001	Surface Water Quality Degradation	Land clearing and preparation and well pad and infrastructure development	UKL-UPL Requirements: <ul style="list-style-type: none"> Building perimeter drainage around the well pad area; Provide settling ponds; and Land clearing activities will be scheduled to avoid periods of heavy rainfall and strong winds as much as practicable. ESIA Requirements: <ul style="list-style-type: none"> Delineate the areas that will be cleared before any land clearing or earthmoving activity begins to limit the area of disturbance. If possible, conduct the clearing by phases to minimize area of disturbance and sediment generation at any given time; Ensure detailed design of access roads minimizes the disruption of the surface water flow regime. Provide adequate drainage to minimize contamination of proximal creeks with mud and dust from vehicle and equipment movement; Consider phasing plan to minimize the period of exposure for cleared areas; Use of interim control mechanisms such as sheeting to stabilize batters and slopes prior to permanent stabilization; Planting cover crops on affected areas as soon as possible for long term erosion control; and 	In the land clearing area of well pads and other facilities in the project footprint areas.	During land clearing and Preparation; and well pad and infrastructure development	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Monitoring of TDS and TSS value of Sano Nggoang Lake and its outlet at least once every 6 months; Inspection of site drainage and points of discharge to local waterbody; and Daily erosion and sediment control during land clearing activities 	At locations of baseline sampling: <ul style="list-style-type: none"> SW1: Lake SW2: Lake Outlet SW3: Lake SW4: Lake (50 m away from lake outlet) 	<ul style="list-style-type: none"> At least once every 3 months for surface water quality monitoring during construction activity; Daily monitoring of land clearing activities. 	Exploration Site Team (EST) – Environmental Officer.	TDS and TSS concentration comply with Government Regulation No. 82 year 2001	Civil Infrastructure Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources	
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge			
<ul style="list-style-type: none"> Management of impacts from bridge building and ford construction, by diverting water away from working areas, minimising work in the water way, and no discharge of materials and other sediment control measures. 													
SWQ002	Potential for spent drilling fluids to reach water bodies	Exploration Drilling	UKL-UPL Requirements: <ul style="list-style-type: none"> Collecting drill mud produced from drilling activities into a sump pit and be pumped for reuse (a closed-loop fluid system) or reinjection into injection well to minimize excess drilling waste; and Drilling mud circulation pond as well as drilling mud residual pond needs to be provided. ESIA Requirements: <ul style="list-style-type: none"> Construct ponds with impervious lining such as HDPE or geomembranes underlain by clay to catch drilling muds in case of accidental spills; Design capacity of the pond for collection should be equal if not exceed volume of drill fluid required during initial hydraulic test; Install oil traps on the pond inlet; and Prepare a Spill Response Plan. 	Project area	During exploration drilling	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Site inspection and records any spill/leakage of the pond lining Monitoring should be based on the Spill Response Plan 	<ul style="list-style-type: none"> Lake Sano Nggoang; Water bodies expected to receive leakage impacts from circulating pools. 	<ul style="list-style-type: none"> Site inspection at least once a week during wells drilling activity At least once every 6 months for surface water quality monitoring 	Exploration Site Team (EST) – Site Manager, and Environmental Officer	Soil and spoil heaps from construction phase is being properly managed	Drilling contractors budget	
SWQ003	Potential for Spent Brine Water	Well testing	UKL-UPL Requirements: <p>Brine water may be reinjected into the injection well by reference to Minister of Environment Regulation No. 13 of 2007.</p> ESIA Requirements: <ul style="list-style-type: none"> Testing injection wells will be prepared and pipelines installed, before the deeper exploration wells are developed; Latent capacity will be maintained in the ponds to contain fluids in the event of pipe or pump failures or accidental releases; and Precautions should be made to prevent blow-outs through standard good practice, including: proper cementing, pressure monitoring and provision of blow out preventers and related well control equipment 	Well pads area	During well testing	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Site inspection during Well pads area well testing Monitoring should be based on the Spill Response Plan 	Well pads area	Daily inspection during testing	site well	Exploration Site Team (EST) – Environmental Officer	No brine water discharged to the environment to comply with Minister of Environment Regulation No. 13 of 2007	Well testing budget
HYD001	Water resources alteration	Land clearing and preparation; Well pad and infrastructure development	ESIA Requirements: <ul style="list-style-type: none"> Once alignments are finalized, surface water demands will be assessed. Linear and cross drainage design will consider continuity of supply; Cut and fill should not impact paddy fields or other agricultural land outside the project footprint; Casual storage of spoil heaps to consider surface hydrology; Civil design will necessarily include a number of hydraulic designs, in particular drains and 	In the land clearing area of well pads and other facilities areas within the project footprint.	During the commencement of land clearing for site preparation, well pad and infrastructure development	Exploration Site Team (EST) – Environmental Officer	Frequent monitoring and review of surface hydraulics	Water spring sources around well pads and other facilities in the project footprint areas.	During the commencement of land clearing for site preparation, well pad and infrastructure development	Exploration Site Team (EST) – Environmental Officer	No disturbance on spring water for domestic consumption and agricultural activities.	Civil and Infrastructure Contractors budget	

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			culverts to ensure continuous hydraulic flows.; and • Grievance mechanism to ensure that affected parties can report abnormalities in surface water.									
HYD002	Potential of surface water deficit due to water abstraction	Exploration Drilling	UKL-UPL Requirements: Ensuring water extraction from Lake Sano Nggoang shall not exceed the water demand for drilling, thus the extraction will be in compliance with Surface Water Extraction Permit (SIPPA). ESIA Requirements: <ul style="list-style-type: none"> Development of a Water Management Plan considering project water requirements and lake water balance; Installation of weirs or collection boxes to ensure that appropriate flow regimes can be maintained; Eliminate water loss by efficient pipeline design; Use of ponds to collect excess water to be used for drilling activities; Re-use of drilling mud; and Grievance mechanism to ensure that affected parties can report abnormalities in surface water or groundwater flow. 	In the catchment area of well pads and other facilities areas within the project footprint.	During exploration drilling	Exploration Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Monitor drawdown of water take off points in millimetres to ensure that appropriate water balances are maintained On-site control of abstraction rate and treatment flow. 	Lake Sano Nggoang	Daily during the drilling activity preparation	Exploration Site Team (EST) – Environmental Officer	Lake water abstraction in accordance with the surface water abstraction permit	Drilling contractors budget
WAS001	Green waste	Land clearing and preparation	UKL-UPL Requirements: <ul style="list-style-type: none"> Felled trees should be stripped of and classified into trunks, branches, stripped branches etc, then cut into convenient lengths (maximum 3 m long) and any trunks of 100 mm diameter or bigger are to be stockpiled to be made available to local residents to use as they wish; Grass and very small shrubs are to be removed to stockpile with the topsoil. Green material should be buried in the stockpiled topsoil to encourage natural breakdown of the material for further revegetation purpose; The green waste should be stockpiled tidily at the dedicated area adjacent to the work area; Prepare dedicated green waste storage within well pad area; Coordination with DLHK for the disposal of green waste to nearest final disposal area ESIA Requirements: <ul style="list-style-type: none"> A Waste Management Plan (WMP) that includes appropriate collection and storage facilities, and involves appropriate disposal methods and required; Encourage reuse of green waste locally for composting/fire wood or landscaping purposes; and 	Well pads area and other facilities areas within the project footprint	During land clearing and preparation	Exploration Site Team (EST) – Environmental Officer	Activity logs for vegetation clearance; Site inspection	Well pads area and other facilities in the project footprint areas.	Daily during land clearing and preparation.	Exploration Site Team (EST) – Environmental Officer	No solid waste/inert waste scattered or piled around the work area	Civil and Infrastructure Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
<ul style="list-style-type: none"> Manage regular disposal schedules to remove waste from the site where necessary. 												
WAS002	Domestic solid waste during construction and operation	Whole of Project activities	UKL-UPL & ESIA Requirements: <ul style="list-style-type: none"> Preparation of a Waste Management Plan (WMP) that includes suitable disposal bins, maximises reuse and recycling, appropriate collection and storage facilities, and involves appropriate disposal methods as required; Provide temporary storage for domestic solid waste; Disposing of solid waste in the final disposal site in coordination with Environmental and Cleanliness Agency (DLHK) of Manggarai Barat Regency; and Coordinate with Environmental and Cleanliness agency (DLHK) in term of transporting waste to the nearest final disposal location. 	Project area	During exploratory phase	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Periodic monitoring and control of leachate generation in temporary waste storage area; Inspection at the entire sites of the project area to ensure that the disposal of waste is into suitable bins according to the type of waste; Maintain schedule of domestic solid waste transportation to the final disposal area in coordination with the Environmental and Cleanliness Agency (DLHK) Examination of waste manifest to be taken to the final disposal. 	Project area	<ul style="list-style-type: none"> Daily inspection during exploratory activities Every time when transporting waste transporting to the landfill/final disposal area of Environmental and Cleanliness Agency DLHK 	<ul style="list-style-type: none"> Exploration Site Team (EST) – Environmental Officer 	No uncontrolled leachate in temporary waste storage area Domestic solid waste disposed in disposal area that has been provided Regular transportation of domestic solid waste to the final disposal site of DLHK.	Civil and Drilling Contractors budget
WAS003	Domestic Liquid Waste during Construction	Whole of Project activities	UKL-UPL & ESIA Requirements: <ul style="list-style-type: none"> Provide a Waste Management Plan that includes collecting black and grey waters to septic tank (refer to relevant National Standard); Discharges from kitchen and washroom facilities into the septic tank are to be directed through grease traps, and appropriate disposal methods as required; Implement portable toilets in well pads, road work areas and workers camp to treat wastewater discharge as per Project design; and Portable toilets shall be used with septic tank which has function as effluent removal system. 	Project area	During exploratory phase	Exploration Site Team (EST) – Environmental Officer	Control of leakage from portable toilets/seepage from the septic tank	<ul style="list-style-type: none"> Lake Nggoang Project area 	<ul style="list-style-type: none"> Minimum once during well pad and infrastructure development Pipeline leakage observation once a week during exploration drilling; Bi-annual monitoring during operation activity 	<ul style="list-style-type: none"> Exploration Site Team (EST) – Environmental Officer 	Wastewater discharge do not pollute environment (No leakage and spill) Effluent tanks of portable toilets are cleaned at regular basis	Civil and Drilling Contractors budget
WAS004	Hazardous and Toxic (B3) Solid Waste	Whole of Project activities	UKL-UPL Requirements: <ul style="list-style-type: none"> Provide Temporary hazardous waste storage (<i>Tempat Penampungan Sementara/TPS B3</i>) as per regulation standard requirements; and Hazardous waste removed from site by a licensed hazardous waste transporter and disposed in a licensed facility in accordance with the Government Regulation No. 101 of 2014 on Hazardous Waste Management. ESIA Requirements: <ul style="list-style-type: none"> Provide a Waste Management Plan (WMP) that includes appropriate segregation of waste streams, includes appropriate collection and storage facilities, and involves appropriate storage and disposal methods as required. Assignment of roles and responsibilities to 	Project area	During exploration phase	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Hazardous waste management records/logbook Site inspection Monitoring should be based on Spill Response Plan 	Project area	Daily	<ul style="list-style-type: none"> Exploration Site Team (EST) – Environmental Officer 	Hazardous waste management in accordance with applicable regulation	Civil and Drilling Contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
<p>employees in managing hazardous and toxic waste shall be stipulated in this document; and</p> <ul style="list-style-type: none"> • Prepare a Spill Response Plan. 												
WAS005	Hazardous and Toxic (B3) Liquid Waste	Whole of Project activities	<p>UKL-UPL requirements:</p> <ul style="list-style-type: none"> • Provide Temporary hazardous waste storage (<i>Tempat Penampungan Sementara/TPS B3</i>) as per regulation standard requirements; and • Hazardous waste removed from site by a licensed hazardous waste transporter and disposed in a licensed facility in accordance with the Government Regulation No. 101 of 2014 on Hazardous Waste Management. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> • Provide a Waste Management Plan (WMP) that includes appropriate segregation of waste streams, describes appropriate collection and storage facilities, and requires appropriate storage and disposal methods. The assignment of roles and responsibilities to employees in managing hazardous and toxic waste shall be stipulated in this document; • Provide temporary hazardous waste storage (<i>Tempat Penampungan Sementara/TPS B3</i>) as per regulation requirements; • Hazardous and toxic waste will be removed from site by licensed hazardous waste transporter and disposed in licensed facility; and • Prepare a Spill Response Plan. 	Project area	During exploration phase	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> • Hazardous waste management records/logbook • Site inspection • Monitoring should be based on Spill Response Plan 	Project area	Daily	Exploration Site Team (EST) – Environmental Officer	Hazardous waste management in accordance with applicable regulation	Civil and Drilling Contractors budget
WAS006	Drilling mud and drilling cuttings	Exploration Drilling	<p>UKL-UPL requirements:</p> <p>Drilling mud and drilling cuttings managed in accordance with MEMR Regulation No. 21 of 2017 on Drilling Mud ad Drilling Cutting Management for Geothermal Exploration Drilling Activity.</p> <p>ESIA requirements:</p> <ul style="list-style-type: none"> • Provide a Waste Management Plan (WMP) that includes appropriate collection and storage facilities, as well as treatment and disposal methods as required; • Closed liquid loop systems can be used to recover drill fluids and minimize spillage or loss; • Water can be recovered through mud cleaning where the drilling fluid is dewatered by removal of solid cuttings with the use of shale shakers, screens or cyclones. The water can then be reclaimed to mix a new batch of drill fluid and the solid cuttings can be disposed; • Prepare a Spill Response Plan • Landfill facility with the key features should be provided when it was confirmed that the drilling 	Well pads area	During exploration drilling	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> • Drilling waste management records/logbook • Site inspection • Monitoring should be based on Spill Response Plan 	Well pads Area	Minimum once a week during exploration drilling	Exploration Site Team (EST) – Environmental Officer	Drilling muds and drilling cuttings management in accordance with applicable regulation	Drilling contractors' budget.

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
		waste from the Waesano is classified as non-hazardous waste:										
			<ul style="list-style-type: none"> Sizing to sufficiently contain the maximum anticipated volume of all solid drilling waste produced during the exploration drilling phase including backfilling with topsoil as part of site reinstatement; Installation of impermeable liner to prevent infiltration of any waste products into the soil and groundwater system beneath the landfill. This will be the same liner material planned for the drilling sumps; Perimeter drains to intercept any overland flows into the landfill during rainfall run off events; Burial of waste to at least 2 m below ground surface to minimise any potential surface exposure to the environment. 									
FLO001	Impacts to vegetation during preparation and development	Land clearing and preparation, and access road improvement	<p>UKL-UPL requirements:</p> <ul style="list-style-type: none"> Ecological survey required to ensure no tree species classified as protected to be cut down; and If there is a tree species are classified as protected, the tree needs to be marked, registered, documented and moved by the Project to other places that will not be disturbed by project activities. <p>ESIA requirements:</p> <ul style="list-style-type: none"> Vegetation surveys of proposed permanent and temporary works areas once the final well pad locations are known; surveys should identify species of conservation interest and/or mature trees. Where possible, the alignment/boundary of works areas should be modified to avoid direct impacts to plant species of conservation interest and/or mature trees. If modification of boundaries is not possible, transplantation of rare/protected plant species should be considered; Clearly delineate areas for land preparation/other activities in the field to prevent loss of vegetation outside of designated works areas; Construction should not be permitted within 5 m of the drip line of large trees of conservation interest to avoid damage to tree roots; Wash vehicles periodically or consideration of temporary wash facilities to ensure that seeds from exotic and invasive species are not introduced by vehicle traffic during construction; Develop top-soil management plan; Restoration to pre-existing condition before project commenced or to an alternative as 	Area within and adjacent to a 50 m radius of the project site boundary	<ul style="list-style-type: none"> Prior to the commencement of land clearing for site preparation During the commencement of land clearing for site preparation Post commencement of land clearing for site preparation. 	Exploration Site Team (EST) – Environmental Officer	<ul style="list-style-type: none"> Observation on the existing vegetation within the radius of 50 m from the project site boundary. Establishment of permanent photo-documentation spots to take photos of potential changes. Undertake a qualitative method (e.g. quadrat sampling) in order to measure changes. Include immediate areas near the 50 m radius from the project site. Detailed records shall be made for any unexpected significant damage on the existing vegetation/flora habitat due to construction activities. 	All areas within the radius 100m from the footprint.	<ul style="list-style-type: none"> Prior to the commencement of land clearing for site preparation Bi-annual during construction activity During and post land clearing for site preparation. 	Exploration Site Team (EST) – Environmental Officer	Minimum damage on existing vegetation (less than 5% of cleared area).	Civil and infrastructure contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			<ul style="list-style-type: none"> selected by land owner after completion of the activity; Re-vegetation of areas outside the project footprint that are affected by construction activities. Native plant species should be used. If planting takes place during the dry season, the planted areas should be watered regularly until properly established; and Inspections of vehicles and equipment upon mobilization to limit the potential for carrying seeds of non-native/ invasive plant species. 									
FLO002	Impacts to vegetation by the drilling	Exploration Drilling	ESIA Requirements: <ul style="list-style-type: none"> Clearly delineate areas for land preparation/other activities in the field to prevent loss of vegetation outside of designated works areas; Restoration to pre-existing condition before project or to an alternative as selected by land owner after completion of the activity as agreed by both parties; Development of a revegetation plan utilizing native vegetation to address vegetation loss due to inadvertent discharge of geothermal fluids. 	Area within a 50m radius of project affected areas	<ul style="list-style-type: none"> Prior to the commencement of land clearing for site preparation During the land clearing for site preparation Post land clearing for site preparation 	Exploration Site Team (EST) – Environmental Officer	Observation on the existing vegetation within the radius of 50 m from the project site boundary. Detail records shall be made for any unexpected significant damage on the existing vegetation/flora habitat due to drilling operation activities.	All areas within a radius 100m from the footprint.	<ul style="list-style-type: none"> Prior to the commencement of land clearing for site preparation During the land clearing for site preparation Post land clearing for site preparation 	Exploration Site Team (EST) – Environmental Officer	Minimum damage on existing vegetation (less than 5% of affected area).	Drilling contractors budget
FLO003	Impacts to vegetation from well testing	Well testing	UKL-UPL and ESIA Requirements: <ul style="list-style-type: none"> If feasible, apply cover on the potential exposed plants at distances of 5–50 m from the well silencer as necessary; Clean water spraying on plants might be applied as an alternative in case application of cover is not feasible; and This mitigation will not be applied during the wet season since rain will wash-off salt spray during horizontal discharge. 	Area within a 50m radius of project affected areas	<ul style="list-style-type: none"> Prior to the commencement of well testing; During the well testing; and Post well testing. 	Exploration Site Team (EST) – Environmental Officer	Observation on the existing vegetation at distances of 5–50 m from the well silencer. Detail records shall be made for any unexpected significant damage on the existing vegetation/flora habitat due to well testing activities.	Area within a 50m radius of project affected areas	<ul style="list-style-type: none"> Prior to the commencement of well testing; During the land clearing for well testing; Post land clearing for well testing; 	Exploration Site Team (EST) – Environmental Officer	Minimum damage on existing vegetation (less than 5% of affected area).	Well testing budget
FAU001	Impacts to sensitive wildlife species during preparation and development	Equipment and material mobilization, land clearing and preparation and Well Pad and Infrastructure Development	UKL-UPL Requirements: <ul style="list-style-type: none"> The management plan is similar to noise impact, such as: <ul style="list-style-type: none"> Using vehicle with exhaust and silencer in accordance with the manufacturer's specifications; and Limit the hours of mobilization for equipment and material. Attention will be paid to operations in the proximity of community areas. No wildlife species classified as protected in the project area prior to land clearing and preparation; and If there is a wildlife species are classified as protected, the wildlife to be registered and moved by the Project to other places that will not be disturbed by project activities. 	All areas within a 100m radius from the footprint and along the mobilization route.	During land clearing and preparation; and well and infrastructure development.	Exploration Site Team (EST) – Environmental Officer	Observation of living wildlife particularly during the night and morning shift when the nocturnal the diurnal species are active for feeding. Monitoring activities should be combined with observations by monitoring team and/or encounters by the workers	All areas within a radius 100m from the footprint.	<ul style="list-style-type: none"> Prior to the commencement, during and post land clearing for site preparation Bi-annual during construction activity. 	Exploration Site Team (EST) – Environmental Officer	Zero injured and/or mortality of living wildlife (particularly less mobile species) trapped in active project site.	Civil and infrastructure contractors budget
			ESIA Requirements:									

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			<ul style="list-style-type: none"> Reduction of habitat disturbance, such as not exceeding the specified project footprint; Training of construction crews on the appropriate response to wildlife encounters that may occur in the project area; Instruction to construction crews to refrain from harassing wildlife; Instructions to the construction foreman to stop work in the event that large or interest conservation wildlife enter the work area; Proper disposal of construction and worker waste to avoid any attracted animals for leftovers; Fencing/hoarding around works areas to prevent animal entry and minimize light/disturbance impacts; Prohibit hunting and poaching of wildlife; Provide banner informing prohibitions of hunting and poaching of wildlife; and Collaboration with Indonesia BirdLife Foundation to conduct specific monitoring and protection in particular for critically endangered species with providing signage and socialization. 									
FAU002	Impacts to sensitive wildlife species during drilling	Exploration Drilling	<p>UKL-UPL Requirements: The management plan is similar to noise impact, such as:</p> <ul style="list-style-type: none"> Periodic air drilling machine and electrical generator maintenance; Select equipment with noise and light-reducing features; and Setting the buffer zone. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> Fencing around work areas to prevent animal entry and minimize light/disturbance impacts during the night time. An application unidirectional light is an alternative if the fencing is not feasible; Installation of safety barriers such as fences to avoid wildlife contact with hot pipelines, should temperatures exceed safe levels; Instruction to the site foreman to stop work in the event that large or interest conservation wildlife enters the work area; Training for crews, during operation of the well pads, on the appropriate response to wildlife encounters that may occur on the well pad site; Prohibit hunting and poaching of wildlife; Provide banner informing prohibitions of hunting and poaching of wildlife; and 	All areas within a 100m radius from the footprint	<ul style="list-style-type: none"> Prior to the commencement of drilling; During of drilling; and Post drilling. 	Exploration Site Team (EST) – Environmental Officer	<p>Observation of living wildlife particularly during the night time and morning shift when the nocturnal the diurnal species are active for feeding. Monitoring activities should be combined with observations by monitoring team and/or encounters by the workers</p>	All areas within the radius 100m from the footprint.	<ul style="list-style-type: none"> Prior to the commencement, during, and post drilling; Bi-annual during operation activity. 	Exploration Site Team (EST) – Environmental Officer	<p>Zero injured and/or mortality of living wildlife (particularly less mobile species) trapped in active project site.</p>	Drilling contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Sources	
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge			
<ul style="list-style-type: none"> Training for base camp occupants on the appropriate response to wildlife encounters that may occur and instruction to occupants to refrain from harassing wildlife 													
FAU003	Impacts to sensitive wildlife species during well testing	Well Testing	Same as FAU002	All areas within a 50m radius from the footprint	<ul style="list-style-type: none"> Prior to the commencement of well testing; During the well testing; and Post well testing. 	Exploration Team (EST) Environmental Officer	Site –	Observation of living wildlife particularly during the night and morning shift when the nocturnal the diurnal species are active for feeding.	All areas within a 100m radius from the footprint	<ul style="list-style-type: none"> Prior to the commencement, during, and post well testing 	Exploration Site Team (EST) – Environmental Officer	Zero injured and/or mortality of living wildlife (particularly less mobile species) trapped in active project site.	Well Testing budget

4.2 Social Management and Monitoring Plan

Table 4-2 Social Management and Monitoring Plan

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Source
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
DISP001	Impact to loss of agriculture land	Land acquisition and compensation	<p>ESIA Requirements:</p> <p>Preliminary LARAP has been developed to reflect land acquisition implementation plan/procedures specifically for the Project's land acquisition process. This document will be treated as a living document with the method potentially updated to better fit the Project future development. The document has included recommendation for consultation with local customary leader in relation to cultural sensitive areas, also coordination with relevant government agency pertaining to forestry boundary in adjacent to the proposed Project facilities locations</p> <p>Once sites are confirmed, the Project will develop of a Land Acquisition and Resettlement Action Plan (LARAP) which should include, at minimum, the following:</p> <ul style="list-style-type: none"> • Socio-economic data of each of the affected people as a basis to identify vulnerability associated with loss of agricultural land; • Further consultation with each of the Cultural Leaders/Family Clan owners of the proposed land is required to enable the land release, along with appropriate disclosure and consultation to all affected persons regarding the Project land acquisition process; • Prioritize willing buyer-willing seller negotiations for land lease or land purchase; • Compensation framework to be developed in accordance with Indonesian regulation and World Bank safeguard policies, to ensure fair compensation for land, crops, structures, and replacement value; and • Grievance Redress Mechanism (GRM) to be established to allow all groups of affected people to share their concerns and complaints regarding the land acquisition process. 	Wae Sano, Wae Lolos and Golo Kondeng Villages, Sano Nggoang Sub-District, West Manggarai Regency	During the land acquisition process	Project Management Unit (PMU) Safeguards Team – Social Specialist	<p>Reporting the land acquisition process, including:</p> <ul style="list-style-type: none"> • The progress of compensation against the Project timeline for exploration; • Record or documentation of consultation and compensation; • Implementation of each steps written in the plan. 	Wae Sano, Wae Lolos and Golo Kondeng Villages, Sano Nggoang Sub-District, West Manggarai Regency	Minimum 1 (one) time during land acquisition process	Project Management Unit (PMU) Safeguards Team – Social Specialist	<ul style="list-style-type: none"> • Land Acquisition for the project is in accordance with: 1) Indonesian Law and Regulations that applicable for the Land Tenure Scheme of the Waesano Geothermal Project; and 2) Requirements of the World Bank OP 4.12 on Involuntary Resettlement is developed and implemented as guidance for land acquisition; • All consultations with land owners and disclosures process, including negotiations are recorded; • All transaction are well documented; • Valuation of crops and land is defined with consideration of fair compensation for land, crops, building, and loss of income based upon market price, and livelihood restoration. 	Land acquisition cost Compensation value to be determined after the asset valuation by independent consultant, certified by government (i.e. KJPP – Land Valuator).
DIPS002	Disturbance to community livelihood and income	Land acquisition and compensation; well pad infrastructure development; access road improvement; and equipment and material mobilization	<p>UKL-UPL Requirements:</p> <ul style="list-style-type: none"> • Consultation with the identified affected people and cultural leaders (<i>Tu'a Golo</i> and Member of <i>Wau</i>) regarding the compensation mechanism; • Assistance in the use of compensation; • Prioritizing the land acquisition-affected people to receive benefits from the community development program. <p>ESIA Requirements:</p>	Wae Sano, Wae Lolos and Golo Kondeng Villages, Sano Nggoang Sub-District, West Manggarai Regency	During the land acquisition process and the whole Project exploration phase	Project Management Unit (PMU) Safeguards Team – Community Liaison Officer	<ul style="list-style-type: none"> • Implementation report of livelihood restoration program; and • Record of implementation of grievance mechanism and resolution progress for received grievances. 	Wae Sano, Wae Lolos and Golo Kondeng Villages, Sano Nggoang Sub-District, West Manggarai Regency	During Project exploration activities	Project Management Unit (PMU) Safeguards Team – Community Liaison Officer	<p>The project livelihood restoration report applied to the requirements of the World Bank OP 4.12 on Involuntary Resettlement, including:</p> <ul style="list-style-type: none"> • Socio-economic data of the affected people such as livelihood and alternative sources, income losses from the Project land acquisition; • Livelihood restoration program of the affected 	The livelihood restoration budget component to be determined as part of the compensation value appraisal. Social-economic census for all affected households to be conducted as part of the detailed Land Acquisition Procedure and Resettlement

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			<p>Proposed LARAP to manage further disturbance to community livelihoods and loss of income, aligned with World Bank expectation:</p> <ul style="list-style-type: none"> Identification of vulnerable parties affected by the Project based on socio-economic data for each of the affected land owners and their households; Compensation for economic loss or displacement in accordance with World Bank OP 4.12 with particular attention to ensuring that economically affected parties, including vulnerable people, receive compensation pertaining to and reflecting the loss of livelihood or access to income sources; Livelihood restoration program for the significantly affected and vulnerable people – the program is to be developed and implemented as part of the Project social responsibility commitment or community development program for the wider affected community within the AOI (program may include alternative livelihood activities for secondary income sources, provision of employment opportunities, and agricultural-related vocational/skill trainings to increase revenue of the affected local farmers or businesses); and Develop a Grievance redress mechanism (GRM) to provide an opportunity for community members, including vulnerable groups, to share their concerns and formally lodge complaints regarding the land acquisition process 								people who have significant income losses;	Action Plan (LARAP).
DIPS003	Land disputes	Land acquisition and compensation	<p>UKL-UPL Requirements:</p> <ul style="list-style-type: none"> Further consultation regarding the most appropriate compensation mechanism for land lease and its process; Ensuring consent form from the affected people; Ensuring transparency in the acquisition process including methods for determination of compensation value. <p>ESIA Requirements:</p> <ul style="list-style-type: none"> Prioritize willing buyer-willing seller negotiations for land lease or land purchase; Consultation widely with <i>tu'a golo</i> and other community leaders to identify legal or traditional land owners; Community development and community relations team to be directly responsible for management of community issues throughout the duration of the Project life; Maintain a record to monitor community disputes and project responses. 	<p>Wae Sano, Wae Lolos and Golo Kondeng Villages, Sano Nggoang Sub- District, West Manggarai Regency</p>	During the land acquisition process	<p>Exploration Site Team (EST) – Community Liaison Officer</p>	<ul style="list-style-type: none"> Record and documentation of consultation process that are conducted during the land acquisition process; Record of implementation of grievance mechanism and resolution progress; Report of implementation of community development/ relation program align with the effort to manage land acquisition issues/ concerns. 	<p>Wae Sano, Wae Lolos and Golo Kondeng Villages, Sano Nggoang Sub-District, West Manggarai Regency</p>	Minimum 1 (one) time during land acquisition process	<p>Exploration Site Team (EST) – Community Liaison Officer</p>	<ul style="list-style-type: none"> The project land acquisition monitoring report applied to the requirements of the World Bank OP 4.12 on Involuntary Resettlement Map and identification of legal or traditional land owners as the result of consultation with <i>tu'a golo</i> and other community leaders is developed and used for guidance to solve land disputes A community development and community relations responsible for management of community issues team developed A record to monitor community disputes 	Land acquisition budget

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			<ul style="list-style-type: none"> Develop and disclose a community GRM to provide an opportunity for community members to formally lodge complaints related to land acquisition process; and Should any land disputes arising from the Project, issues will be addressed through further consultation with the cultural leader in a culturally appropriate manner. 								and project responses maintained	
ECON001	Local employment and business opportunities	Recruitment of workforce; access road improvement, equipment and material mobilization; well pad and infrastructure development.	UKL-UPL Requirements: <ul style="list-style-type: none"> Prioritizing local workers in accordance with the Project qualifications; Coordination with the local manpower agency and village government for the local recruitment process; Transparency of the process to avoid social jealousy between community members; Ensuring wages for the local workers are in accordance with applicable regulations; Providing opportunities for local business in the procurement of goods and services to support the Project activities, including non-formal or indirect services e.g. transportation services/car rental, food catering and homestays for workers; ESIA Requirements: <ul style="list-style-type: none"> Develop a Labor Management Plan (LMP) in accordance with applicable national and regional regulation, as well as the World Bank Safeguard Policy and World Bank Guidance Note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx; Develop a transparent, clear and neutral procedure of local worker recruitment which is appropriately disclosed to the local community; coordinate with the sub-district or village government and leaders; Community development/ empowerment plan for potential local business partners through (a) Consultation with the local business to identify need and potencies for development; and (b) Implement a series of training sessions targeted at improving community capacity to provide materials and services required by the Project; and GRM to be established to allow all groups of affected people to share their concerns and complaints regarding the Project worker recruitment process. 	Wae Sano, Sano Nggoang, and Pulau Nuncung Villages, Sano Nggoang Sub-district, West Manggarai Regency	<ul style="list-style-type: none"> During workforce recruitment process During material and equipment mobilization During well pad and infrastructure development 	Exploration Site Team (EST) – Community Liaison Officer	<ul style="list-style-type: none"> Documentation of employment recruitment process and records of employment number and composition between local and non-local (as defined and consulted with relevant stakeholders e.g. regional manpower agency); Data collection on potential construction material resources owned by individual or communal as well as transportation services/car rental, food catering and homestays regarding the business opportunities and the existence of migrant workers 	Wae Sano, Sano Nggoang, and Pulau Nuncung Village, Sano Nggoang Sub-District, West Manggarai Regency.	<ul style="list-style-type: none"> At least once during workforce recruitment process Bi-annually during material and equipment mobilization Bi-annually during well pad and infrastructure development 	Exploration Site Team (EST) – Community Liaison Officer	<ul style="list-style-type: none"> A transparent, clear and neutral procedure of recruitment developed and implemented by project Records of recruitment disclosures Number of local workers hired based on project qualification and skills required Numbers of new businesses and entrepreneur from the community especially from the project affected people recorded 	<ul style="list-style-type: none"> Local workforce recruitment and local business partnership under Civil and Drilling contractors budget. Potential local business development under CDP budget
ECON002	Project Induced In-migration (PIIM) Impacts	Workforce requirements and provisions of	ESIA Requirements: <p>Considering small number of workers requirements throughout the Project exploration phase, the following mitigation measures could</p>	Wae Sano, Sano Nggoang, and Pulau Nuncung Villages, Sano Nggoang Sub-	During the entire Project exploration phase	Exploration Site Team (EST) – Community	Report employment data (Monograph) from the villages and Sub District.	Wae Sano, Sano Nggoang, and Pulau Nuncung Villages, Sano Nggoang Sub-	Bi-annually during the entire Project	Exploration Site Team (EST) –	A stakeholders engagement plan and a contractor's management plan to incorporate PIIM risk reduction planning,	Civil and Drilling contractors budget

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	goods and services	be conducted as part of Project labor management, community development, and the stakeholder engagement plan: • PIIM risk reduction planning, which involves effective and ongoing engagement with the local community to optimize employment and business opportunities for locals, while consulting the community regarding predicted PIIM, which includes disclosure of the potential benefits and risks associated with these changes, align with World Bank Guidance Note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx; • Community empowerment program to increase their capacity to absorb benefits not only from the Project but also other potential economic opportunities to improve their livelihoods; • Build close coordination of stakeholder strategies, and incorporate it in the Project stakeholder engagement plan (SEP), particularly working closely with the village government to better understand if any potential social conflicts or tensions may result with the presence of in-migrants; and • In relation to labor management, particularly those assigned in the workers camps, strengthening of the contractor's worker management and health and safety policies and procedure to ensure inclusion of international OHS standards to minimize risks of communicable disease spread to local community.	District, West Manggarai Regency	Liaison Officer	District, West Manggarai Regency.	exploration phase	Community Liaison Officer	which involves close coordination of stakeholder strategies and actions as well as on-going commitment of budgets should be developed.	PIIM is implemented referring to World Bank Guidance Note on Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx.			
ECON003	Positive impact to tourism	Project activities	ESIA Requirements: • Minimize impact with providing walkway access to existing track for birds watching adjacent to Well Pad B (WS-B) area; • Grievance Redress Mechanism to be established to allow all groups of affected people to share their concerns and complaints.	Wae Sano Village, Sano Nggoang Sub District, West Manggarai Barat Regency	During the entire Project exploration phase	Exploration Site Team (EST) – Community Liaison Officer	Record grievance	Wae Sano Village, Sano Nggoang Sub District, West Manggarai Barat Regency	Bi annually during the entire project exploration phase	Exploration Site Team (EST) – Community Liaison Officer	• No significant disturbance to local ecotourism • All grievance are resolved/ closed	Civil and Drilling contractors budget
ECON004	Disturbance to bird watching ecotourism	Well pad and infrastructure development; and drilling activities	UKL-UPL Requirements: • Adequate consultation and information disclosure regarding the Project activities to local communities involved in ecotourism business and related stakeholders such as the <i>Yayasan Burung Indonesia</i> (BirdLife Foundation) prior to the commissioning of well construction and drilling; • Implementation of Grievance redresses mechanism (GRM) regarding ecotourism issues; and • Collaboration with Indonesia BirdLife Foundation to conduct specific monitoring and protection in particular for critically	Nunang Sub-village, Wae Sano Village, Sano Nggoang Sub-District, West Manggarai Regency	During the entire Project exploration phase	Exploration Site Team (EST) – Community Liaison Officer	Stakeholder Engagement Plan report ; Record grievance; Noise measurement	Nunang Sub-village, Wae Sano, Village, Sano Nggoang Sub-District	Bi-annually during the entire Project exploration phase	Exploration Site Team (EST) – Community Liaison Officer	• Stakeholder and community consultations are implemented and reported; • All grievance are resolved/ closed; • The noise level does not exceed the quality standards as per MoE Decree No 48 of 1996, noise level for residential area (55 dBA).	Civil and Drilling contractors budget

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			endangered species with providing signage and socialization.									
			ESIA Requirements:									
			<ul style="list-style-type: none"> Proper environmental management to reduce noise during land preparation and well drilling; and Minimize the amount of artificial lighting used at the pad sites and use directional lighting (downward facing lighting); and Implement the Stakeholder Engagement Plan and Grievance Redress Mechanism. 									
PH001	Dust emissions impacts and temporary noise disturbance to community health	Land preparation; improvement of access road; mobilization of equipment and material; well pad development; and drilling activities	ESIA Requirements: Establish a grievance mechanism that is accessible for all community groups to report dust/emissions/noise issues. Should any complaint be received, the Project will undertake an immediate investigation as part of the grievance resolution procedure.	Project areas and transportation route which traversed settlement area	During land preparation, improvement of access road, mobilization of equipment and material, well development and drilling activities	Exploration Site Team (EST) – Community Liaison Officer	<ul style="list-style-type: none"> Community health program reporting Record for dust management measures Traffic record 	Intersection of Trans Flores Road to the project site entrance in Wae Sano Village, Sano Nggoang Sub-District	Bi-annually during land preparation, improvement of access road, mobilization of equipment and material, well development and drilling activities	Exploration Site Team (EST) – Community Liaison Officer	<ul style="list-style-type: none"> Traffic Management Plan developed and implemented; Response plan to dust generation developed; A community grievance redress mechanism (GRM) to provide the community with the opportunity to formally lodge complaints related to project developed and disclosed, and record on received grievance and resolution are available. 	Civil and Drilling contractors budget
PH002	H ₂ S exposure and impacts to community health	Well testing	UKL-UPL Requirements: <ul style="list-style-type: none"> Evacuation of community surround the well pads area in case of H₂S is exceed the threshold; and Coordination with community health center of Sano Nggoang for providing information disclosure/consultation with local community and village leader regarding the Project activities with may create H₂S exposure. ESIA Requirements: <ul style="list-style-type: none"> Emergency Response Plan (ERP) to include a process for unplanned H₂S leaks; The ERP should include measures that are applicable for anyone in the AOI, therefore a wide community should be involved during the ERP planning process; and The ERP to be consulted and a simulation-drill should be conducted with a nearby community to ensure community acknowledge the evacuation procedure should the risk present. 	Well pads and the surrounding areas	During well testing	Exploration Site Team (EST) – Safety Officer	Regular H ₂ S monitoring at each well during drilling and well testing; Conduct air quality monitoring to settlements area near the wells; Record community grievance; To make sure regular safety briefing to include the potential H ₂ S hazard.	Well pads and the surrounding areas	Regular inspection during well testing and bi-annual reporting	Exploration Site Team (EST) – Safety Officer	<ul style="list-style-type: none"> The Ambient Air quality meets the applicable standards GRM is effective, including record on received grievance, and its resolution No incident due to H₂S exposure caused by the Project Any emergency occur and resolution action are recorded 	Well Testing budget
TTS001	Traffic management of vehicles and drill rig trucks	Equipment and material mobilization and site closure	UKL-UPL and ESIA Requirements:	Along Trans Flores road and local roads	<ul style="list-style-type: none"> During land clearing and preparation, equipment and 	Exploration Site Team (EST) –	Traffic observation at road junctions and sensitive receptor areas due to	Along Trans Flores road and local road (Werang – Sano Nggoang)	<ul style="list-style-type: none"> Daily observation of the traffic 	Exploration Site Team (EST) –	<ul style="list-style-type: none"> No traffic related complaints; 	Civil and Drilling contractors budget

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	passing on existing road corridors and villages		<ul style="list-style-type: none"> Development of Vehicle & Traffic Management Plan (VTMP) to be implemented throughout project exploration phases. Contractors will be required to adopt and adhere to a Vehicle & Traffic Management Plan (VTMP) for affected roadway segments. TMP shall include the following: <ul style="list-style-type: none"> - Coordination with related government agency regarding the affected road routes; - Public consultation about implementation plan of equipment and material mobilization; - Appropriate placement by construction contractors of temporary traffic cones/barricades and direction delineators to maintain one through lane in each direction during peak hours; - Construction staging and idling vehicles should be away from sensitive receptors to the extent feasible; - Installation of safety signs and barricades; - Safety inductions for vehicle drivers and construction contractors; - Strict enforcement of a 20- km hour speed limit through the villages; and - Disciplinary action for project-related traffic breaches of the VTMP. 	(Werang – Sano Nggoang)	material mobilization, access road improvement and infrastructure and well pad development	Community Liaison Officer	equipment and material mobilization;		Bi-annual traffic survey particularly in peak periods of the Project activities during equipment and material mobilization	Community Liaison Officer	<ul style="list-style-type: none"> No traffic accident caused by the Project activities; No traffic congestion with the road service level ($V/C \leq 0.7$) No damage road and infrastructure (bridge) due to exceeding the indicators/parameters as follows: <ul style="list-style-type: none"> - Maximum width; - Maximum length; and - Maximum heaviest axis. 	
TTS002	Safety risk of road users and community residing along the access road	Mobilization of equipment and material	UKL-UPL and ESIA Requirements: <ul style="list-style-type: none"> Vehicle & Traffic Management Plan (VTMP): installation of traffic signs along the road traversed by the Project traffic, establishment of a speed limit for Project vehicles when going through villages or in the presence of groups of pedestrians, provision of defensive driving training for all drivers, the creation of new pathways in areas of high pedestrian traffic, and disciplinary action for endangering pedestrians; Security Management Plan (SMP): the assignment of site security personnel, site registry or identification system, and measures for response to trespassers; Safety awareness campaign program for local communities; and Establish a Grievance Redress Mechanism (GRM) that is accessible for all community groups to report safety issues related to the Project activities. Should any complaint be received, the Project will undertake an immediate investigation as part of the grievance resolution procedure. 	Intersection of Trans Flores Road to the project site entrance in Wae Sano Village, Sano Nggoang Sub-District	During mobilization of equipment and material	Exploration Site Team (EST) –Safety Officer	The traffic plan's report (journey management, safety driving training, traffic signs documentation) & GRM report.	Intersection of Trans Flores Road to the project site entrance in Wae Sano Village, Sano Nggoang Sub-District	Bi-annually during mobilization of equipment and material	Exploration Site Team (EST) – Safety Officer	<ul style="list-style-type: none"> No traffic accident caused by the project activities; Traffic Management Plan (TMP) developed and implemented Safety awareness programs is implemented <ul style="list-style-type: none"> ○ Use of helmets for motorcyclists ○ Enforce speed limits ○ Designated pedestrian crossings 	Civil and Drilling contractors budget
AMEN001	Impacts on quality of public road and	Access road improvement	ESIA Requirements: <ul style="list-style-type: none"> Ensure ongoing maintenance of the access road quality in coordination with Regional Public Works and Spatial Planning Agency, 	Project areas and transportation route which traversed settlement area	During the entire exploration phase, in particular during mobilization of equipment and	Exploration Site Team (EST) – Community Liaison Officer	Regular road checking and maintenance for road disruption	Project areas and transportation route traversing settlement areas of	Bi-annually during the entire Project	Exploration Site Team (EST) – Community Liaison Officer	<ul style="list-style-type: none"> No complaints from community regarding road quality which will be traversed by the 	Civil contractors budget

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	community access		<p>including regular checks on any damage that may trigger traffic incidents or extreme dust which would impact the health and safety of locals and general road users; and</p> <ul style="list-style-type: none"> Coordination with related government institutions, i.e. public works agency, prior to the road upgrades process to ensure alignment with regional development planning and future road maintenance. 	Manggarai Regency	material, well pad development and construction of the supporting infrastructure			West Manggarai Regency	exploration phase		<p>Project vehicle mobilization;</p> <ul style="list-style-type: none"> Effective GRM to solve any complaints 	
VIS001	Visual Impact during preparation and development	Land clearing and preparation, equipment and material mobilization, access road improvement and infrastructure and well pad development	<p>ESIA Requirements:</p> <ul style="list-style-type: none"> Consideration of areas with value of importance for tourism during the site selection (see ESIA Section 6.7 Thematic and Sensitivity Mapping); Consider tree/shrub planting around project components; Minimize visual impact during design of the pipeline route; Keep design for pipeline and drilling rig, color and structure material compatible with the natural settings, where possible and practicable; Store excavation material away from residences and the existing roads; Clean and tidy temporary waste storage areas; Provide proper waste disposal; Construction site management to ensure that heavy equipment remains in designated areas; Socialization to the community regarding the project components and activities; and Ensure site restoration to be conducted refer to the baseline condition (pre-existing condition) and previous land use of the affected area or to an alternative as selected by the land owner. 	Project facilities nearby the identified sensitive receptor	<ul style="list-style-type: none"> During land clearing and preparation, equipment and material mobilization, access road improvement and infrastructure and well pad development During drilling 	Exploration Site Team (EST) – Community Liaison Officer	<p>Observation and record/document housekeeping activities during the Project</p> <p>Record Community feedback and grievance</p>	Project facilities nearby the identified sensitive receptor	<ul style="list-style-type: none"> During land clearing and preparation, equipment and material mobilization, access road improvement and infrastructure and well pad development During drilling 	<ul style="list-style-type: none"> Exploration Site Team (EST) – Community Liaison Officer 	<p>No significant visual changes;</p> <p>No community complaints.</p>	Civil and Drilling contractors budget
SOC001	Disturbance to Local Cultural Values, Norms, and Practices, and Changes in Community Perception	All project activities	<p>UKL-UPL and ESIA Requirements:</p> <ul style="list-style-type: none"> Develop and implement a Stakeholder Engagement Plan (SEP) which includes ongoing stakeholder engagement and consultation not only at macro/regional level with the government, but also at local level with the cultural groups and the local community; Disclosure of information regarding land acquisition mechanism, jobs and business opportunities widely to the local community within the Project AOI, along with information about the Project activities, as part of the SEP; Providing a proper induction/training to all workers concerning local culture and 	<ul style="list-style-type: none"> Wae Sano, Wae Lолос, Golo Kondeng, Sano Nggoang, and Pulau Nuncung Villages, Sano Nggoang Sub-District, West Manggarai Regency 	During the entire Project exploration phase	Exploration Site Team (EST) – Community Liaison Officer	<ul style="list-style-type: none"> Records related training; Record community complaints and feedback; Monitor and assure the implementation of Stakeholder engagement plan 	<ul style="list-style-type: none"> Wae Sano, Wae Lолос, Golo Kondeng, Sano Nggoang, and Pulau Nuncung Village Sano Nggoang Sub-District West Manggarai Regency 	<ul style="list-style-type: none"> Minimum 1 (one) time during land acquisition and requirement of workforce activities; Bi-annually during the entire Project exploration phase. 	<ul style="list-style-type: none"> Exploration Site Team (EST) – Community Liaison Officer; 	<ul style="list-style-type: none"> Local workers wherever possible in preference to non-local workers hired; A social code of conduct for the project workforce and with worker induction sessions developed and scheduled; A community grievance redress mechanism (GRM) to provide the community with the opportunity to formally lodge complaints related to project 	Civil and Drilling contractors budget

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			<p>customs, and encourage workers appreciation toward these cultures, as part of the Project Code of Conduct; and</p> <ul style="list-style-type: none"> • Develop a Community GRM to provide the community with the opportunity to formally lodge complaints related to the Project workforce behavior or other social-related issues. 								<p>developed and disclosed, and record on received grievance and resolution are available;</p> <ul style="list-style-type: none"> • Community socialization on project activities done and recorded; and • A stakeholder engagement program with a PIIM risk reduction planning included is created and implemented. 	
SOC002	Impacts on Cultural Heritage	Land clearing and preparation, and well pad development and construction of the supporting infrastructure	<p>ESIA Requirements:</p> <p>The following recommended measures to be included in a cultural heritage management plan:</p> <ul style="list-style-type: none"> • Consultation with cultural leaders and family clan owners of the affected land area regarding the process to avoid significant cultural areas, or if avoidance is not possible, to consult the culturally acceptable ways to relocate any cultural objects identified within the proposed Project facilities locations. In addition, consultation should be conducted pertaining to the Project plan to use Lake Sano Nggoang water for well drilling purposes. These consultations should start early during the current Project design process, prior to land acquisition process; • Use of sensitivity map in determining well pads locations and confirming the Project description/process including the intake of lake water for well drilling; • Further consultations and coordination with regional cultural agency and local university to identify a complete cultural landscape mapping of the area, to confirm the sensitivity mapping results and identify potential disturbance of access to cultural sites; and • Development of cultural heritage chance finds procedure which should be understood by the Project contractors and workers. 	<p>Wae Sano and Sano Nggoang Villages, Sano Nggoang Sub-District, West Manggarai Regency.</p>	<ul style="list-style-type: none"> • During the well development • Construction of the supporting infrastructures 	<p>Exploration Site Team (EST) – Community Liaison Officer;</p>	<p>Monitor and assure the implementation of the Change Find Procedure Record grievance and community feedback.</p>	<p>Wae Sano and Sano Nggoang Villages, Sano Nggoang Sub-District, West Manggarai Regency.</p>	<p>Regular monitoring during land preparation and well development</p> <p>Bi-annually reporting during the well development and construction of the supporting infrastructure</p>	<p>Exploration Site Team (EST) – Community Liaison Officer;</p>	<ul style="list-style-type: none"> • The mapping of the Sano Nggoang Cultural Heritages within the Project area of influence in place • No disturbance or development nearby the cultural objects • The Change Find Procedure is implemented • The GRM and other community feedback are developed and reported 	Civil and Drilling contractors budget
LOHS001	Potential Violation of Labor Rights and Working Conditions	Workforce recruitment and management	<p>ESIA Requirements:</p> <ul style="list-style-type: none"> • Preparation of Company Regulations (Labor Management Plan (LMP)); • Working conditions and terms of employment include aspects such as wages and benefits, hours of work, overtime arrangements and overtime compensation, breaks, rest days and leave for illness, maternity, vacation or holiday; • Maintain and improve the worker-management relationship to promote fair treatment, gender equality; non-discrimination 	<p>Project site area</p>	<p>Throughout project activities</p>	<p>Exploration Site Team (EST) – Community Liaison Officer</p>	<p>Monitor the implementation of Labor Management Plan;</p> <p>Inspection of working conditions</p>	<p>Project site area</p>	<p>Regular inspection and bi-annual reporting during the entire Project exploration phase</p>	<p>Exploration Site Team (EST) – Community Liaison Officer</p>	<ul style="list-style-type: none"> • Company regulation and employee handbook has been in place in accordance with applicable regulation, also International standard • Training and induction for workers on the company regulation and employee handbook has been provided and recorded 	Civil and Drilling contractors budget

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			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
			<p>and equal opportunity of workers, and enable a grievance mechanism for workers; and</p> <ul style="list-style-type: none"> There will be inclusion in the contract requirements for all contractors and suppliers that they will comply fully with the laws and regulations of the government of Indonesia and the LMP. 								<ul style="list-style-type: none"> Record on HR activities observed in the Company Regulation or Employee Handbook, including: <ul style="list-style-type: none"> Training Employee grievance Labor organization, if any Other provisions required in the document 	
LOHS002	OHS Risks	All project activities	<p>UKL-UPL Requirement:</p> <ul style="list-style-type: none"> Ensure the OHS system in accordance with: <ul style="list-style-type: none"> Minister of Labor Regulation No. 05 of 1996 on Occupational Health and Safety; Minister of Labor Regulation No. 03 of 1998 on reporting and inspection accident procedures; and Indonesia National Work Competency Standard (<i>Standar Kompetensi Kerja Nasional Indonesia/SKKN</i>) Oil and Gas Sector and Geothermal Sub-sector on Land Drilling as Minister of Labor Decree No. 241 of 2007. Develop a Health and Safety Site Specific Plan <p>ESIA Requirements:</p> <p>Prepare an Occupational Health & Safety Plan (OHS), aligned with the World Bank safeguard policy expectations include:</p> <ul style="list-style-type: none"> Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; Provide emergency prevention and preparedness teams and response arrangements, especially locations with high exposure risks; Provide workers with a fact sheet or other readily available information about the chemical composition of fluids they may come in contact with, in both liquid and gaseous phases, with an explanation of potential implications for human health and safety; Training of workers for awareness of basic hazards, site-specific hazards, safe working practices, and emergency procedures; Documentation and reporting of occupational accidents, diseases, and incidents 	Project site area and nearest location that potentially have a risk of work accidents	During the entire exploration phase	Exploration Site Team (EST) – Safety Officer	Assure Safety, Health Environmental Report, weekly and monthly report; Emergency Response Report; Man Hours and Man Power Report; and Incident and Accident Investigation Report.	Project site area and nearest locations that have a risk of work accidents	Regular inspection and bi-annual reporting during the entire Project exploration phase	Exploration Site Team (EST) – Safety Officer	<ul style="list-style-type: none"> OHS procedure has been in place Worker induction and training program on OHS measures, including regular refresher program are delivered for all workers Training material on OHS and number of workers participated in the training HS awareness program for workers are implemented e.g. through posters and regular toolbox meeting The use of PPE on all workers ERP in place and socialized to workers e.g. through posters and regular toolbox meeting Weekly and monthly OHS report Record for any incident occur and resolution action – no risk of incident and injuries 	Civil and Drilling contractors budget

Code	Type of Impact	Source of Impact	Management Measures				Monitoring Measures				Key Performance Indicator	Fund Source
			Management Plan	Location	Period	Person In Charge	Monitoring Plan	Location	Period	Person In Charge		
<ul style="list-style-type: none"> In addition, to implement detailed OHS Management Measures (as discussed in the Section 8.10.3 of the ESIA). 												

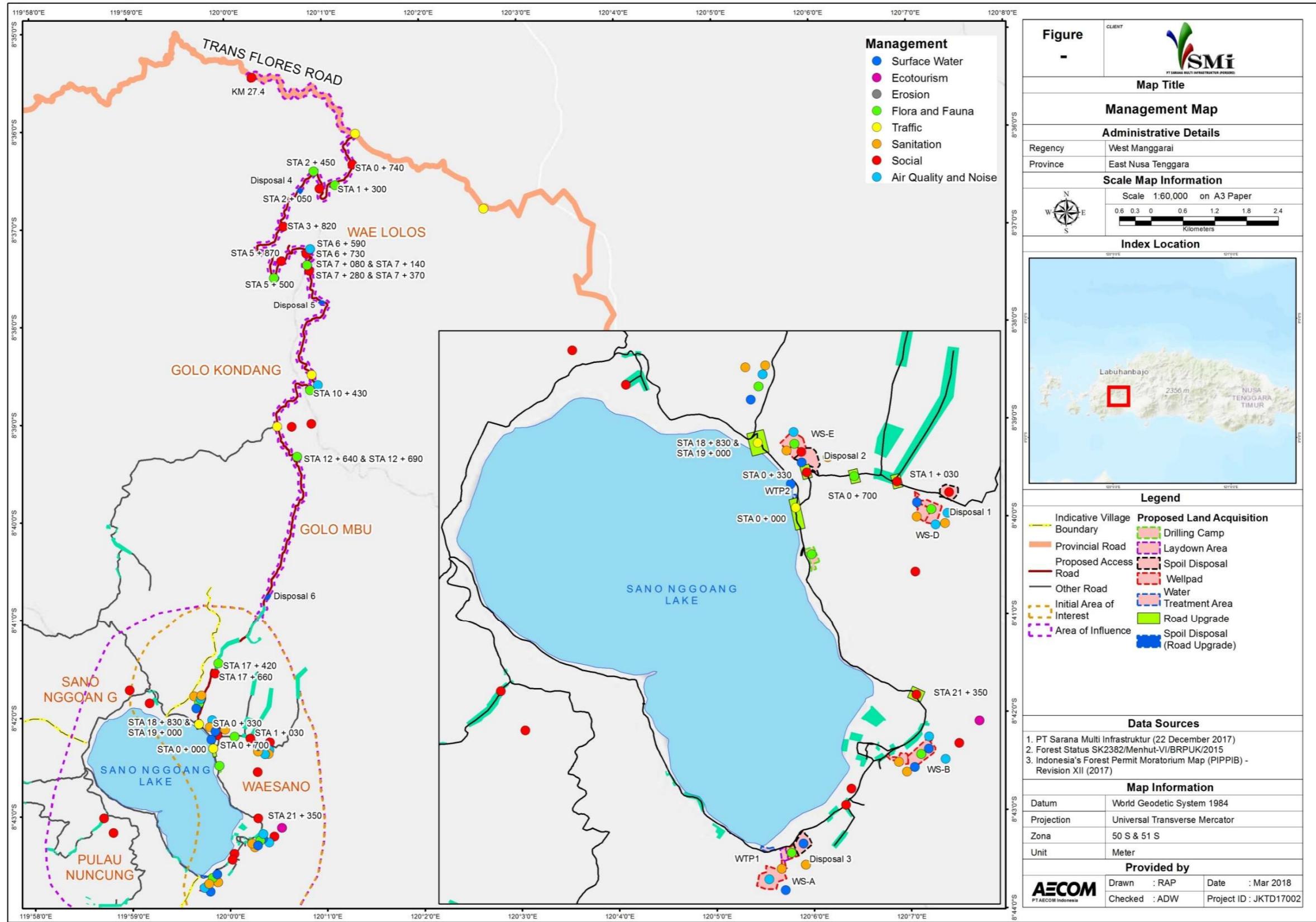


Figure 4-1 Environmental and Social Management Location

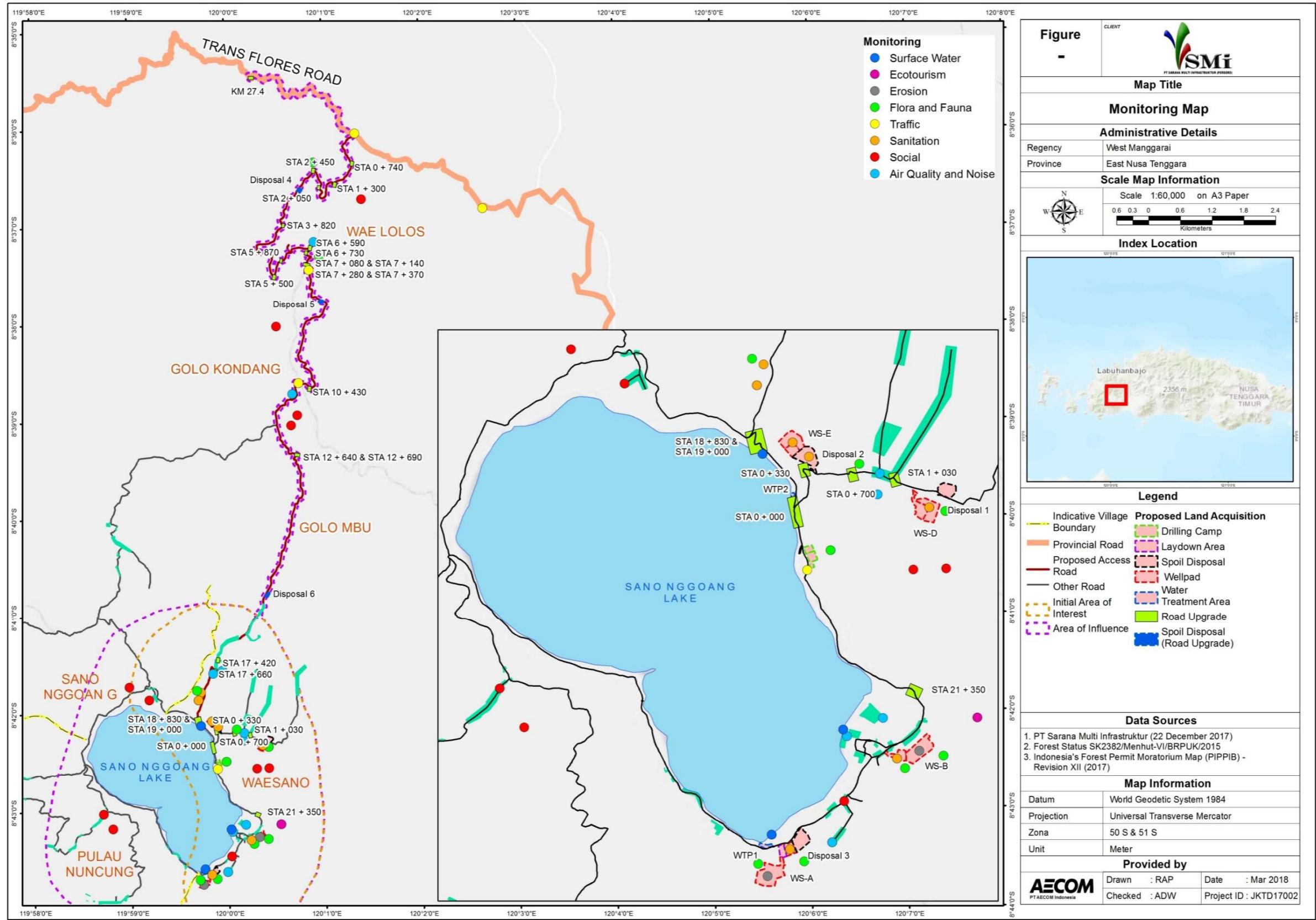


Figure 4-2 Environmental and Social Monitoring Location

5. Outline of ESMP

The successful implementation of the EMSP and its subsequent environmental management plans is reliant on the establishment of a number of environmental procedures, and the incorporation of environmental considerations into a number of the operational components of the project. The following management plans and procedures to be implemented for the project will be developed in a separated document. These will be included as a specification in the civils works contract so that the contractor prepares these plans to the timescales indicated.

The successful contractors shall complete a risk assessment of their work to identify hazards associated with contract tasks /activities and methods of controlling or preventing them in the form of the Contractors Environmental and Social Management Plan (CEMP), procedures and work instructions and submit it to the Project Management Team for approval prior to commencement of work

The outline of each document is described below:

5.1 Air Quality Management Plan

The objectives of the Air Quality Management Plan (AQMP) are:

- To minimise the impact to air quality from site;
- To ensure the air quality management and objectives of the project through all phases are met; and
- As the performance indicators for monitoring of air sampling and air quality.

The AQMP shall include:

- Proponent identity;
- Roles and identities of persons responsible with this plan;
- Control measures for general construction emissions:
 - All requirements from UKL-UPL
 - Exhaust emissions from off-road and on-road equipment operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards;
 - Vehicle selection strategy to consider impact on total emissions;
 - Ensure that the engines of all vehicles and machinery on site are not left running unnecessarily;
 - A schedule of vehicle movement and number of vehicles in transit at any given time to limit emissions generation;
 - Plant and equipment to be used in the project to comply with recognized performance design standards;
 - Personnel working on-site would have at all times with them appropriate PPE; and
 - Conduct air quality monitoring at boundary areas of nearby settlements
- Control measures for fugitive dust:
 - Minimize the amount of excavated material on site;
 - For manageable stockpile volumes, geotextiles can be used to cover soil heaps to prevent erosion and dust generation by wind;
 - Vehicle washing facilities provided to minimize the quantity of material deposited on public roads;
 - Restrict heights from which materials are dropped, as far as practicable, to minimize the fugitive dust arising from unloading/loading;
 - Spray stations to moisten loads and avoid dust shedding;
 - Temporary suspension of material handling activities during high wind events;

- Consideration of the location of stockpiles for temporary storage areas with respect to the location of sensitive receptors and prevailing wind;
- Avoiding double handling of material wherever reasonably practicable;
- Field supervisors to have responsibility to monitor conditions and adjust the frequency of watering; and
- Sealing/re-vegetation with local vegetation of completed earthworks as soon as reasonably practicable after completion.
- Control measures for exploration drilling:
 - Exhaust emissions from drill rigs will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards;
 - Drill rig selection strategy to consider impact on total emissions; and
 - Drill rigs used in the project shall comply with recognized performance design standards.
- Control measures for well testing:
 - Requirement to plan timing of vertical well testing based on weather conditions (low wind); and
 - Ensure well integrity to avoid leakage.
- Schedules for air quality monitoring.

5.2 Noise Management Plan

The objective of the Noise Management Plan (NMP) is to minimise the impact of noise from the Project construction and operation activities.

The NMP shall include:

- Proponent identity;
- Roles and identities of persons responsible with this plan;
- Control measures for general construction emissions:
 - Whenever avoidance for construction at Well pad WS-B is not possible, install proper noise barrier wall to reduce noise spread to the nearest settlement i.e. Nunang Sub-village
 - Limit the hours of operation for specific loud pieces of equipment or operations. Attention will be paid to operations in the proximity of community areas;
 - Limit exposure of workers handling noisy and vibrating equipment;
 - Construction activities should be limited to daylight hours although scheduling may require overnight operations on occasion;
 - Use of hoarding/temporary noise barriers where noisy activities are to be conducted close to sensitive receivers;
 - Require contractors to adopt and adhere to a Vehicle & Traffic Management Plan (VTMP); and;
 - Develop an effective grievance mechanism to record and respond to noise complaints.
- Control measures during drilling:
 - Whenever avoidance for construction at Well pad WS-B is not possible, install proper noise barrier wall to reduce noise spread to the nearest settlement i.e. Nunang Sub-village;
 - Develop an effective grievance mechanism to record and respond to noise complaints.
- Control measures during well testing:
 - Whenever avoidance for construction at Well pad WS-B is not possible, install proper noise barrier wall to reduce noise spread to the nearest settlement i.e. Nunang Sub-village;
 - Vertical discharge tests will be conducted at times advised and agreed to by nearby communities;
 - Design of atmospheric separators for production testing to be optimized for noise abatement; and

- Develop an effective grievance mechanism to record and respond to noise complaints.

5.3 Waste Management Plan (WMP)

The purpose of Waste Management Plan is to provide guidance for effective waste management from activities for geothermal resource exploration.

The objective of the plan will be to:

- Ensure that the waste management at site will comply with all applicable law regulations and standards;
- Minimise the generation and disposal of wastes to final disposal area;
- Maximise reuse and recycling of any materials which can be used;
- Ensure that appropriate storage and transfer facilities are used to ensure appropriate sanitation and good housekeeping;
- Ensure that all hazardous and toxic materials at site are appropriately handled labelled and stored; and
- Guarantee that the ultimate fate of hazardous waste materials is appropriately handled by duly licensed and certified practitioners.

Appropriate multiple bin systems will be used around the site to segregate waste and streamline collection procedures. Waste management procedures shall be circulated and promulgated to ensure that all staffs are aware of the appropriate use of waste disposal and storage facilities. All employees and staff working in all phases of the project will have a responsibility for the waste management procedures. Appropriate records will be kept and waste management will be a key element in all levels of safety induction for personnel working at the site.

There may be two separate plans for the project, one involving non-hazardous waste and the other hazardous waste.

5.3.1 Non-hazardous Waste

The non-hazardous waste generated would be solid and liquid form and can be generated from domestic and non-domestic source. The waste management plan for non-hazardous waste (household waste and household-like waste) includes waste reduction and waste handling (segregation, collection, transportation, processing and final waste processing). This refers to Law No.18 Year 2008 on Waste Management, and will be regulated further by government regulation and/or local regulation. Waste reduction of this type of waste will be conducted through minimising the quantities of waste produced, upholding the principles of reduce, re-use and recycle. Domestic solid waste is surplus materials generated from domestic or office activity, such as food waste, paper, packaging, cans, plastic and paper containers, rags, etc. The solid waste handling will be done as follows:

- Separate containers will be located throughout the project site in all facilities to collect non-hazardous waste;
- The waste from these containers will be regularly transferred to appropriate storage containers in the temporary collection site; and
- The waste in the temporary collection site will be transported to a composting facility, recycling facility or the local landfill by coordinating with environmental local agency.

Domestic wastewater (black water and grey water) will be generated mainly from the Well pad camp. The design and technical requirements of septic tank system refer to the National Standard SNI No. 03-2398-2002 on Procedure of Septic Tank and Leach Pit System. Since there is no off-site sludge treatment facility in West Manggarai, the solid from septic tank will be treated with bio activator.

5.3.2 Hazardous Waste

General hazardous waste management includes reduction, storage, collection, transportation, utilization, treatment, and/or landfill. This refers to Government Regulation No.101 Year 2014 on Hazardous Waste Management. Waste reduction of hazardous waste will be conducted by material substitution and use of environmentally friendly technology. Material substitution includes substituting raw materials with less hazardous materials. Procedure will be as follows:

- Identification
 - Determine the waste type in accordance with the hazardous waste type list in the applicable regulations; and
 - If not on the list of hazardous waste types, it could refer to the MSDS (material safety data sheet) of raw materials, or check whether it has the characteristics of a hazardous waste.
- Packaging
 - Hazardous waste that has been identified must be packed in containers that are labelled in accordance with the regulation on procedure of packaging and labelling for hazardous waste;
 - Packaging should be prepared well in order to avoid spills during transported; and
 - Hazardous waste with oil containments should be kept in waste storage, such as a holding tank.
- Temporary Storage
 - Hazardous waste generation could be kept for 365 days at maximum from the day it is generated; and
 - Hazardous waste temporary storage is in a designated warehouse and is properly labelled (label and symbol).
- Transportation
 - Hazardous waste to be carried by transportation must meet the requirements set by the regulations;
 - Transported by licensed transporter and managed by licensed hazardous waste management operator; and
 - Hazardous waste shipments must be documented in the shipping documents (cargo manifest & waste manifest).

Detailed storage and collecting procedures shall refer to Head of BAPEDAL Decree No. 01/BAPEDAL/09/1995 on Methods and Technical Requirements for Hazardous Waste Storage and Collecting.

5.3.3 Drilling mud and cuttings

Drilling Sump

Specifically for the drilling mud and cuttings, according to the Minister of Energy and Mineral Resource No.21 year 2017 on Drilling Mud Waste and Drilling Cuttings Management on Geothermal Activities, the waste is not categorized as hazardous waste as long as the cuttings are water-based or air-based and are using environmental friendly materials as stipulated in this regulation. The management of such waste will be done as follows:

- Sampling and laboratory testing of drill mud and drilling cuttings will be undertaken as a precautionary measure. If testing indicates that the drill mud and drilling cuttings material is classified as a hazardous waste it shall be handled and stored (temporarily) in accordance with the Indonesian standards for B3 hazardous waste, and ultimately disposed of off-site by a licensed hazardous waste operator to a licensed hazardous waste management facility;
- It may be possible for the drilling cuttings waste material to be used to produce construction materials such as concrete, retaining wall materials, or additives for bricks (in accordance with Annex II and III of

Regulation of the Ministry of Energy and Mineral Resources No.21 of 2017), if the material is deemed suitable for use by a geotechnical engineer;

Other measures that will be implemented at each well pad to contain any wastes or potentially hazardous materials produced during the drilling process include:

- Construction of perimeter drains around the pad boundaries to prevent any offsite migration of contaminants due to rainfall run-off. This run-off will pass through an oil/water separator before discharging to the sump;
- Control of drilling sump level to avoid any overflow. A drain pipe and valve will be provided from the sump to facilitate draining the sump when required; and
- Containment of hazardous materials (e.g. fuel, mud additives) in secure areas, including effective sheltering from the weather, and with bunding to contain any spillages.

Permanent Waste Disposal Site

Subject to laboratory confirmation that the drilling waste produced from the Waesano drilling is not classified as hazardous, it will be consigned for permanent disposal within a landfill facility. The landfill facility will be located within the project area and its siting and construction design will take into account local geotechnical, hydrogeological and social/environmental considerations. Key features of the landfill will include:

- Sizing to sufficiently contain the maximum anticipated volume of all solid drilling waste produced during the exploration drilling phase including backfilling with topsoil as part of site reinstatement;
- Installation of impermeable liner to prevent infiltration of any waste products into the soil and groundwater system beneath the landfill. This will be the same liner material planned for the drilling sums (as shown in Figure 4);
- Perimeter drains to intercept any overland flows into the landfill during rainfall run off events;
- Burial of waste to at least 2 m below ground surface to minimise any potential surface exposure to the environment. This will be achieved by placing a low permeable cap (10^{-7} cm/s) on top of the landfill waste and covering it with top soil as part of the site reinstatement process.

The Company shall submit the Drill Mud and Cutting Waste Material Handling/Managing Plan to the MEMR Minister c/q General Director within not later than three (3) month prior to the drilling of the first well. The monitoring report will be submitted to the minister align with RKL-RPL implementation report (referring to Annex IV).

5.4 Oil Spill and Leakage Prevention and Response Procedures

Oil spill and leakage prevention and response procedures will include:

- Instructions during vehicle and heavy equipment maintenance and fueling, such as application of secondary containment and suitable spill kits;
- Implementing proper hydrocarbon-based substances/chemicals handling and storage procedure, including providing designated area with impermeable surface and adequate bunding (110% of fuel/chemicals container capacity); and
- The fuel spill response plan will be a standard operating procedure to provide a generic response for the managing the fuel spills wherever they may occur in the project construction phase.

The objective of the procedure will be to:

- Identify and describe spill response and emergency response measures in the case of an accidental release of undesirable substances including chemicals, fuels, lubricants or any other fluids which may have a detrimental impact on the environment;

- Ensure that fuel spills are reported as an incident via the environmental incident reporting procedures and the environmental issues register;
- Ensure that all spill events will be dealt with promptly and effectively so that secondary impacts to soil and groundwater can be minimized; and
- Ensure that a post-incident investigation is undertaken to identify the root cause, provide an action plan to identify lessons learned, to prevent recurrence and to improve equipment and procedures when necessary.

5.5 Top Soil Management Plan

The Top Soil Management Procedure covers all activities that could result in adverse effects on topsoil and through all phases of the project. The procedure principally relates to soil quality, the maintenance of the productive capacity of local soils and stripped topsoil, and erosion control from stripped topsoil. The objectives of the Top Soil Management Procedure will be to:

- Devise and maintain a top soil balance;
- Ensure effective topsoil removal techniques are employed to maximise volumes of suitable topsoil removed and minimise wastage; and
- Maintain topsoil viability during stripping, spreading, and stockpiling, through best practice techniques and effective stockpile design and management.

During the construction phase, the implementation of this procedure including:

- Quantities of topsoil removed;
- Storage locations, quantities and type of topsoil; and
- Storage procedures and methods used.

Monitoring any changes to in situ soil condition shall ensure that the soils in the area do not undergo any adverse changes over the life of the project. It shall be done at the same locations where the vegetation monitoring is undertaken and shall require establishing representative sampling locations to assess the potential effects of acid deposition, fugitive dust emissions and the mobilization of metals/elements through changes in soil chemistry.

5.6 Water Management Plan

The objectives of the Water Management Plan are to:

- Plan for managing and conserving water resources;
- Defined schedule of sample collection and locations;
- To minimise the impact to water quality from site;
- To ensure the water quality management and objectives of the project through all phases are met;
- Utilize the performance indicators for monitoring of:
 - Water sampling and water quality
 - Groundwater sampling and groundwater quality
 - Erosion and sediment control
 - Sediment traps
- Water Management Plan considering project water requirements and lake water balance, including limitations of instantaneous and daily abstraction rates and monitoring requirements.

General quality control measures during construction and operation shall include:

- All exposed surface water quality should comply with Government Regulation No. 82 of 2001 on Water Quality Management and Water Pollution Control;
- All wastewater quality should comply with Minister of Environment Regulation No. 8 of 2009 on Wastewater Quality Standards for Thermal Power Plant Business and/or Activity; and
- All groundwater quality should be complied with the Minister of Health Regulation No. 16/MENKES/PERIX/1990, Appendix II regarding Clean Water Standard.

5.7 Revegetation Plan

The objectives of the landscape and revegetation plan will be to:

- Ensure that planting of vegetation is conducted properly to promote successful regrowth;
- Ensure appropriate management and monitoring of regrowth to ensure success; and
- Maximise the use of regrowth materials such as topsoil, seeds, seedlings and mulch which have been recovered from land clearing activities.

The landscape and revegetation plan will address methods for:

- Recovery of viable regrowth materials;
- Revegetation plan;
- Land preparation; and
- Planting and maintenance.

A component of the work plan for any activity will be restoration and/or revegetation and if necessary landscaping of impacted areas post-construction. There will be an objective to achieve revegetation as quickly as possible as an initiative to prevent erosion of soils. As much is possible growth medium recovered from clearing activities will be reused for revegetation and landscaping.

5.8 Emergency Response Plan (ERP)

Appropriate emergency response plans must be developed to ensure the effective management and mitigation of emergency incidents.

The following aspects of emergency response must be addressed:

- The identification of the emergency scenarios and the development of appropriate and specific emergency response procedures for each scenario;
- The training of emergency response teams on the appropriate procedures and the use of emergency response equipment;
- The identification of emergency contacts and support services and the development of effective communication systems / protocols (including communication with potentially affected communities);
- Procedures for interaction with local and regional emergency and health authorities; and
- Protocols for fire truck, ambulance, and other emergency vehicle services.

5.9 Vehicle & Traffic Management Plan (VTMP)

The Vehicle & Traffic Management Plan (VTMP) will cover all transport arrangements during construction and operation, including delivery of all materials and equipment direct to the project site. All routes used by Project vehicles shall be studied for their potential environmental and social effect and measures shall be developed and implemented to reduce adverse effects.

Various implementation tools are expected, which include production of maps showing approved traffic routes to be used by Project vehicles, driver safety training, fleet maintenance program, and ongoing community engagement and third party service provision during planning of non-routine deliveries to minimize disruption.

Overall the VTMP is an essential tool to avoid creating congestion and social friction (for example from drivers taking non-approved short cuts), providing for community safety and enabling efficient delivery of materials and the workforce to the work sites.

VTMP shall contain:

- Use vehicles that have passed emissions tests;
- Periodic machine maintenance;
- Limit the hours of operation for heavy equipment or operations. Attention will be paid to operations in the proximity of community areas;
- Equipping the workers with proper PPE.
- Exhaust emissions from off-road and on-road equipment operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards;
- Vehicle selection strategy to consider impact on total emissions;
- Ensure that the engines of all vehicles and machinery on site are not left running unnecessarily;
- a schedule of vehicle movement and number of vehicles in transit at any given time to limit emissions generation;
- Plant and equipment to be used in the project to comply with recognized performance design standards;
- Personnel working on-site would have at all times with them appropriate PPE; and
- Conduct air quality monitoring at boundary areas of nearby settlements

Appropriate placement by construction contractors of temporary traffic cones/barricades and direction delineators to maintain one through lane in each direction during peak hours.

5.10 Stakeholder Engagement Plan (SEP)

Stakeholder analysis is a tool to identify all parties that have direct and indirect interests in the project and its potential impacts on them. Failure to identify the stakeholders and consult with them could impair transparency in decision-making and which, in turn, could lead to conflicts, delaying the project process. Therefore, it is important to identify the stakeholders, the potential project impacts on them, to evaluate their concerns and needs, and their ability to understand and influence the decision-making at the project preparation stage

Stakeholders can be defined as individuals, communities, non-government organisations, private organisations, government agencies, financial community, company workers¹, suppliers/contractors and others who have an interest or a "stake" in the project and its outcome. Stakeholders may be impacted by, or influence the planning and operations of a project in varying degrees of significance. There are 5 categories of stakeholders: 1) Local communities; 2) Civil society; 3) Government and local government bodies; 4) Private sector bodies; and 5) Other institutions.

Systematically engaging with the stakeholders and specially with the affected communities in the identification and management of the impacts that negatively affect them contributes to building trust, credibility and local support and provides the opportunity to highlight the positive aspects of the company's presence. This lowers the risk of anti-company sentiments that could lead to costly litigation or disruption of company operation. The stakeholder engagement and consultation with the affected communities is most effective if you adhere to these guidelines: 1) Start early; 2) Disclose meaningful and accurate information; 3) Use culturally appropriate means to reach them; 4) Provide opportunities for two-way dialogue; 5) Document to keep track of issues raised; and 6) Report back on how their input has been used and considered.

The details of the Stakeholders Engagement Plan (SEP) in the future will be drawn up with the participation of parties set forth in the organization. A planning workshop will be held to arrange a detailed plan of stakeholder engagement activities. The plan must also include the roles and responsibilities for each stage of the project development.

The underlying value in implementing stakeholder engagement is not just in the format of the process, but also in how to speak with the community in the project area. The team will be engaging in person with affected parties and as such must engage in diplomatic language and behaviour. Some good practices for community engagement include: empathy, concern, respect for local culture, sensitivity to vulnerable parties, long-term conditions that may affect the PAPs, integration between activities, minimizing negative perceptions and potential conflicts, etc.

The stakeholder engagement strategy will implement a number of approaches, which are included in Table 5-1.

Table 5-1 Stakeholders Engagement Strategy

Approach	Strategy
Inform	Information sharing, including: information sessions or public notification in public area, emails, information in newsletters, Frequent Asked Questions (FAQs), websites
Consultation	Community meeting, group discussion, Socialization, public consultation and disclosure, survey
Involve	Action research, cultural approach, involving for local labor
Collaboration and Empowerment	Empowerment program, such as community development program, corporate social responsibility programs, training and workshop

The SEP will adjust to the conditions in the field and to the stakeholders or relevant actors, so that sustainability of the project can be maintained, and should be included in the project's detailed ESMPs. Information and consultation are an important approach in providing information about the status of the project, while involvement; and collaboration-empowerment is one way to be closer to the community and provide community attachment to the project. Each activity of stakeholder engagement will be documented in a tracking log. The status pattern and trends of issues that arise will be analysis materials in relation to project response.

5.11 Grievance Redress Mechanism (GRM)

The project has to establish a mechanism of meetings to accommodate grievance and discuss specific issues. The grievance redress mechanism should be scaled to the risks and adverse impacts of the project. It should address affected persons' concerns and complaints promptly, using an understandable and transparent process that is

¹ Workers are an important internal stakeholder group. They also need to be involved in the identification of risks that affect them and be consulted when developing action plans and procedures. However, the methods of engagement with them will differ from those used for external stakeholders.



gender responsive, culturally appropriate, and readily accessible to the affected persons at no costs and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The project will inform affected persons about the mechanism.

The purpose of GRM is to establish the procedures, roles and responsibilities for registering, addressing and managing grievances that are received by PT SMI. Grievances may be submitted at the local level by any stakeholder, including the local community, government, non-governmental organisations, and other local groups if they have an inquiry, a concern or a formal complaint. Figure 5-1 outlines the GRM procedures.

The objective of the GRM is to ensure that grievances are promptly documented, understood, analysed, and responded to in order for PT SMI to address community concerns, take preventative actions and detect the causes of unexpected events. Furthermore, the grievance procedure provides a mechanism to determine what events, actors or incidents could damage relationships with the local community, which then may affect the Project.

PT SMI and their Contractor(s) will accept all comments and complaints associated with the Project. Any person or organisation may send comments and/or complaints in person, by phone, drop box or email using the contact information provided at the end of the document.

All comments and complaints will be responded to either verbally or in writing, in accordance with the preferred method of communication specified by the complainant, if contact details of the complainant are provided. All grievances will be registered and acknowledged within 5 days and responded to within 10 working days. Individuals who submit their comments or grievances have the right to request that their name be kept confidential. At all times, complainants are also able to seek legal remedies in accordance with the laws and regulations of Indonesia.

PT SMI will monitor the way in which grievances are being handled by their staff and Contractor(s) and ensure they are properly addressed within deadlines specified above. PT SMI will keep a grievance log of all grievances (including those received and addressed by the Contractor(s)), based on which grievance management reports will be produced and included in the annual environment and safety reports, published on the PT SMI website.

The grievance mechanism will be managed by a community relation officer and will be gender sensitive (i.e. a male and female community relation officer for managing complaints).

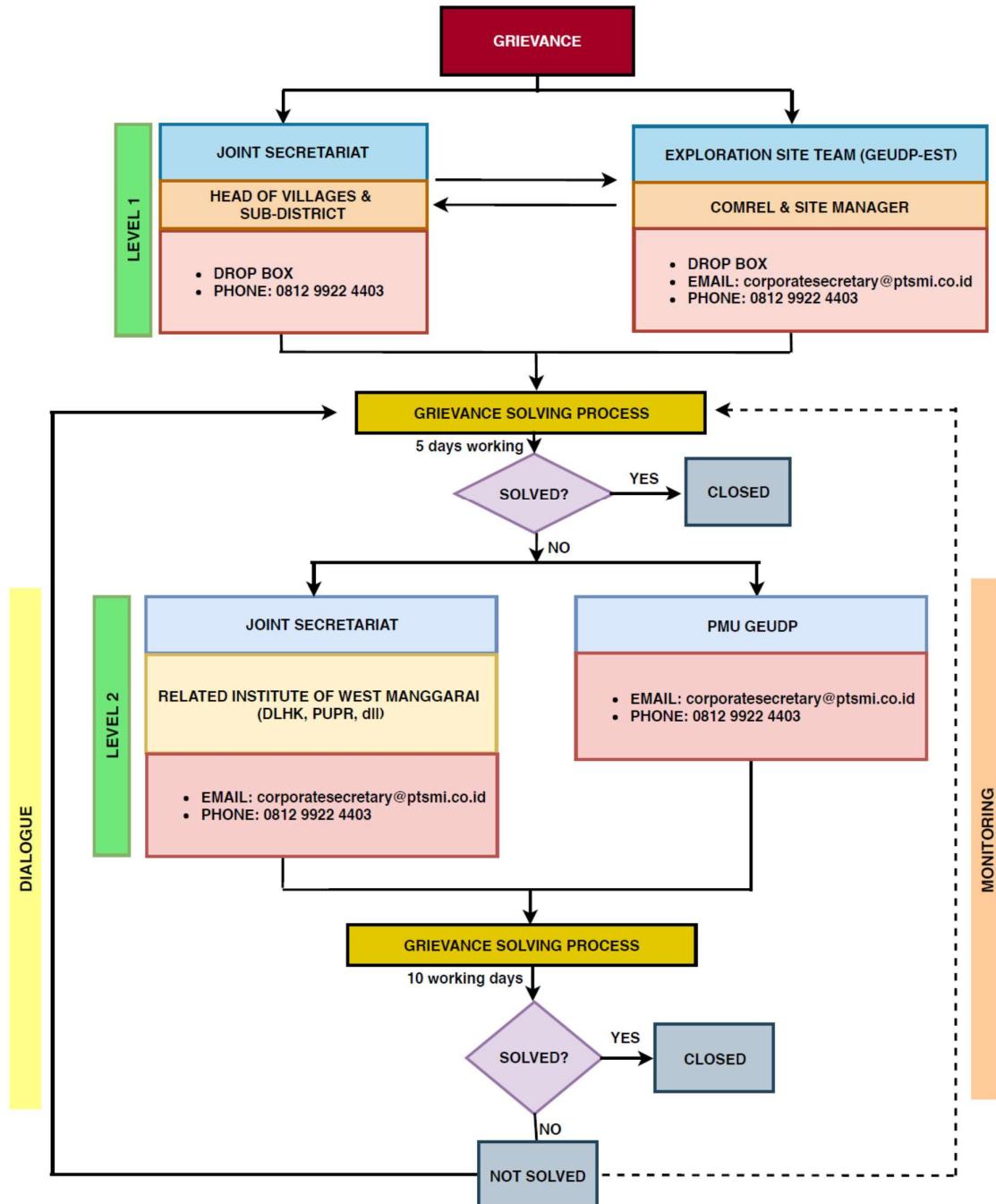


Figure 5-1 Grievance Mechanism Procedure

5.12 Community Development Plan (CDP)

A community development program called *Desa Bhakti Untuk Negeri II* (DBUN II) was developed by PT SMI to address potential adverse impacts to the surrounding community and environment within the area of influence for the Waesano Geothermal Exploration activities. According to the assessment conducted by *Yayasan Dian Desa* (YDD-a NGO assigned by PT SMI in implementing the program), DBUN II activities are divided into two programs, namely Category A which the program consists of education facilities improvement and revitalization or rehabilitation of water supply system, and Category B which consists of entrepreneurship capacity building for four components i.e. fabric weaving handicrafts, processing of honey and cashew nuts (non-timber forest product) and carbonizing of candle nut waste. Category A and fabric weaving handicraft programs has being started since October 2018 whilst the others would be commenced in 2019. The plan has set out the Project's social responsibility obligations as required in the Law No. 40 Year 2009 Concerning Limited Company and Government Regulation No. 47 Year 2012 concerning social and environmental responsibility.

The active participation of the communities in the development of the CDP will be crucial to ensure the ownership and sustainability of the plan. The following activities was undertaken during development of CDP :

- Consultation with related stakeholders to identify and explore the interest of the community in the Wae Sano project area;
- Participatory assessment to examine the existing problems in the Wae Sano project area, using local knowledge to strengthen the Wae Sano community's influence on decision-making, and encouraging ownership by the Wae Sano people in the CDP; and
- Development of a participatory community development program based on the stakeholder analyses, which guide the choice of groups to engage and mitigating the problems that might occur (gathered from the participatory assessment).

5.13 Land Acquisition and Resettlement Action Plan (LARAP)

A land acquisition procedure and resettlement action plan should be developed once the current Project exploration scheme has been confirmed. It should be in accordance with the applicable Indonesia regulation and World Bank Safeguard Policy on Involuntary Resettlement.

A separate Recommendation for Land Acquisition has been developed to provide a framework on how both requirements should be implemented.

The land acquisition procedure and resettlement action plan should include the following steps:

- Consultation to project affected peoples, host communities and other stakeholders to ensure the planning have considered their concerns. Ensure their participation in planning, implementation and monitoring and evaluation of land acquisition process.
- Inventory of losses and household socio-economic survey to all the affected people;
- Valuation of the affected assets by independent appraisal. Compensation payment should be at replacement cost. Pay particular attention to the needs of vulnerable groups.
- Establish a grievance redress mechanism to receive and facilitate resolution of the PAPs concerns Heritage Management Plan (CHMP)

5.13.1 Physical Cultural Resources Management

The following physical cultural resources management measures are recommended to manage impacts on the identified cultural heritage of significance for local community of Manggarai and Mata Wae Sub-ethnic:

- Consultation with cultural leaders and family clan owners of the affected land area regarding the process to avoid significant cultural areas, or if avoidance is not possible, to consult the culturally acceptable ways

to relocate any cultural objects identified within the proposed Project facilities locations. In addition, consultation should be conducted pertaining to the Project plan to use Lake Sano Nggoang water for well drilling purposes. These consultations should start early during the current Project design process, prior to land acquisition process;

- Use of sensitivity map in determining well pads locations and confirming the Project description/process including the intake of lake water for well drilling; and
- Further consultations and coordination with regional cultural agency and local university to identify a complete cultural landscape mapping of the area, to confirm the sensitivity mapping results and identify potential disturbance of access to cultural sites.

5.13.2 Chance Find Protocol

A Chance Find Procedure will be established to initiate a process to avoid and/or minimize the Project impacts on cultural heritage resource materials that will be implemented over the whole Project area. The procedure will define the management of previously unknown cultural heritage uncovered during land and excavation works. Adherence to the Chance Find Procedure will be included as a condition in the construction contract.

The procedure includes:

- (i) Record keeping of cultural object findings;
- (ii) Consultation with community, relevant government institution, and expert verification procedures;
- (iii) Clear criteria for potential temporary work stoppages related to any historical and cultural heritage items.

As such, the following aspects are to be observed:

- Where sensitivity is low, ground-disturbing activities should be proceeded by careful removal of topsoil to terminal depths for potential human occupation;
- Stop work if heritage resources are encountered;
- For a discovery of local or major importance, disruption to land works activities would be expected, work will be halted and consultation with community, relevant government institution, and expert verification procedures will need to be conducted; and
- Training for all construction personnel will need to be conducted in identification of cultural objects and familiarize team with chance finds protocol.

5.14 Company Regulation and Workforce Code of Conduct

The Company Regulation requires approval by the Indonesian government, in accordance with Indonesian Law. This is aligned with International Standards as Indonesia has ratified a number of international treaties on labor rights. In addition to this, the development of Workforce Code of Conduct is aimed at managing recruitment fairly and transparently, in particular in relation to local workforce recruitment, and including the following measures.

- Labor rights and standards as well as non-discrimination and equal opportunities towards the right to information, annual review, forced labor, child labor, employees' accommodation, occupational safety and health, and suppliers;
- Policy against forced labor and child labor;
- Worker grievance mechanism procedure; and
- The handbook will take into consideration working conditions of women workers during construction and operations.

In addition, the following measures will be observed as part of the Code of Conduct to manage local workforce recruitment:

- The local recruitment plan will detail how the Project expects to prioritize the local community in employment and contracts for local business;
- Formalize in all contracts a clause on local employment and the provision of local good and services that supports the Project's overall commitment; and
- Communicate in advance the Project's requirements around employment and business opportunities and prioritize locals where feasible.

5.15 Occupational Health and Safety (OHS) Procedure

Proper OHS Procedures are expected to be in place, align with Indonesia Regulation, and align with World Bank requirements. This includes:

- Identification of potential hazards to workers, particularly those that may be life-threatening;
- Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; and
- Training of workers on awareness of basic hazards, site-specific hazards, safe working practices, and emergency procedures.

The Project would then have to ensure the procedure will be observed by Contractors. The procedure will include, at minimum, the following measures:

- Contractor will be committed to ensure all health and safety measures are in place to prevent accidents and reduce the consequences of non-conformance events;
- Contractor will provide training, awareness and supervising to ensure all of its workers comply with the OHS procedure;
- Contractor shall provide all appropriate resources i.e. personal protective equipment (PPE) onsite; and
- Emergency response procedure and infrastructure will be available on site to ensure providing first aid for personnel in case of occurrence emergencies.

5.16 Summary and Timeline for Preparation

The following table summarises the required detailed management plan which will be developed at different stages of the Project implementation.

Table 5-2 Summary and Timeline for Preparation of Detailed ESMP

Detailed ESMP	Permitting, Land Acquisition, and Workforce Recruitment	Equipment and Material Mobilization, and Land Clearing	Access Road Improvement, Well Pad and Infrastructure Construction	Exploration Drilling and Well Testing	Site Restoration and Revegetation
Waste management plan (WMP)		V			
Oil spill and leakage prevention and response procedures		V			
Top soil management plan		V			
Water management plan		V			
Revegetation plan					V

Detailed ESMP	Permitting, Land Acquisition, and Workforce Recruitment	Equipment and Material Mobilization, and Land Clearing	Access Road Improvement, Well Pad and Infrastructure Construction	Exploration Drilling and Well Testing	Site Restoration and Revegetation
Emergency response plan (ERP)		V			
Vehicle & traffic management plan (VTMP)		V			
Stakeholder engagement plan (SEP)	V				
Grievance redress mechanism (GRM)	V				
Community development plan (CDP)	V				
Land acquisition and resettlement action plan (LARAP)	V				
Cultural heritage management plan (CHMP)	V				
Company Regulation and Workforce Code of Conduct	V				
Occupational Health and Safety (OHS) Procedure		V			

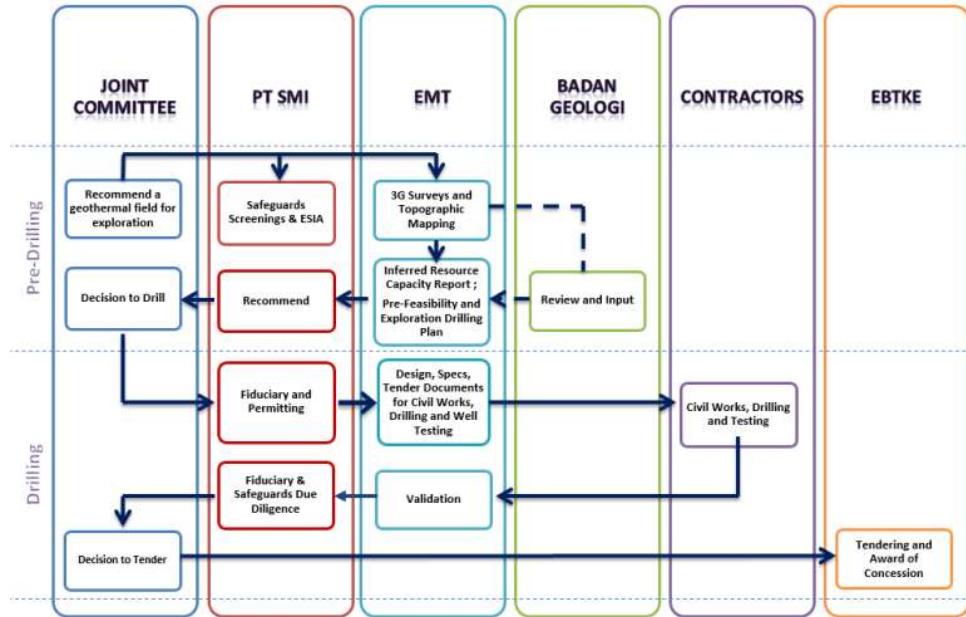
6. Institutional Arrangements and Capacity Building

This section discusses the following institutional arrangements for the implementation of Waesano Geothermal Exploration Project:

- Overall management of the Project, linked to different national government institution associated with the Project planning and implementation;
- Roles and responsibility specifically for the Project which consisted of 3 main entities i.e. (i) the Project Management Unit (PMU) Safeguards Team; (ii) Exploration Site Team (EST); and (iii) Contractors (Civil and Engineering); and
- Proposed capacity building program for the involved implementer.

6.1 Overall Project Management

The overall process for project implementation and the key roles of PT SMI and partners is shows in Figure 6-1 below.



Source: (PT SMI (Persero), 2016)

Figure 6-1 Geothermal Energy Upstream Development Project Institutional Framework

The government agency responsible for supervising and controlling environmental management and monitoring aspects at the Regency level is Environmental and Cleanliness (*Dinas Lingkungan Hidup dan Kebersihan-DLHK*) of West Manggarai. DLHK is responsible for reviewing the implementation of local environmental management and monitoring plans. DLHK will ensure that the implementation reports frequency and contents meet the requirements as stated in the environmental management and monitoring plan (UKL & UPL) document. The agency will ensure that all monitoring results meet the relevant standards (water, air, noise, etc.).

6.2 Roles and Responsibilities

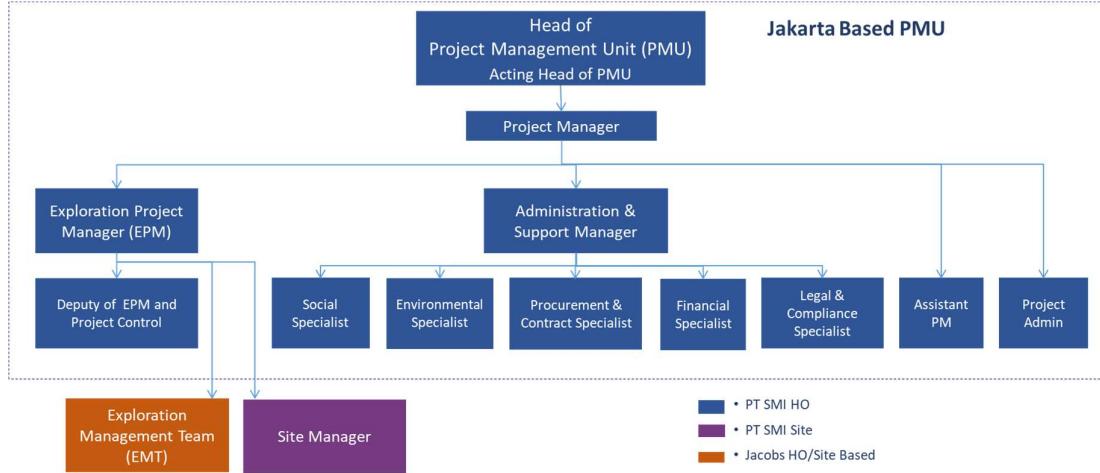
6.2.1 Project Management Unit (PMU) Safeguards Team

The PMU Safeguards Team will have two full time staff (one environmental, one social), based in Jakarta. This team will be responsible for safeguards screening, safeguards document preparation and the oversight of safeguards implementation for each project. They will also supervise the technical advisory component that will prepare the Industry Good Practice guidance materials for safeguards. The Safeguards Team will have a close working relationship with PT SMI's in-house safeguards team – the Environmental Social Safeguard and Business Continuity Management (ESS&BCM) Division - under the Risk Management Directorate. The roles and responsibilities of the PMU Safeguards Team are as follows:

- Manage safeguards via a management plan, keeping track of resources, tasks, timeframes etc. for each sub-project.
- Basic screening checklists for each geothermal exploration sub-project.
- Detailed screening checklists, including the management of consultants' outputs, for each geothermal exploration sub-project.
- Oversee and provide screening reports to BG, EPM and EST.

- e) Prepare TOR for sub-project safeguard instruments, estimate budgets and manage the procurement of safeguards consultants.
- f) Manage the preparation of instruments by the consultants, review draft safeguard instruments and provide comments. Clear safeguards instruments for disclosure and approval processes.
- g) Lead sub-project consultation, in partnership with safeguards consultants and local government.
- h) Implement the sub-project ESMP and UKL-UPL, including managing monitoring that is not the responsibility of the Contractor.
- i) Review TOR for TA for inclusion of safeguards aspects.
- j) Review TA reports, in particular the Good Practice Guidance Materials, for appropriate treatment of safeguards.
- k) Review draft pre-feasibility reports and Inferred Resource Capacity Reports and provide comment.
- l) Review draft technical specifications, bid documents, Contractors contracts prepared by EPM / EST and provide comment.
- m) Responsible for developing SEPs.
- n) Supervise implementation of the LARAP.
- o) Implement the CDP together with EST Safeguards Team.
- p) Supervise project implementation and review monitoring report related to implementation of ESMP, Indigenous Peoples Planning Framework (IPPF) (if required) and RPF documents.
- q) Audit EST supervision reports on a regular basis, including site visits and audits of reports.
- r) Manage the GRM, including coordination with Contractors' GRM, EST grievance redress activities and PT SMI Corporate GRM system. Follow up and close out incidents, complaints and non-conformances.
- s) Provide safeguards input and recommendations to Ministry of Energy and Mineral Resources for tendering geothermal prospects. The team must be willing to present information to the wider team that may conflict with the technical and economic assessment of feasibility, in order to prevent potentially significant impacts from geothermal development.
- t) Provide training to PMU and EST team members on the implementation of safeguards instruments and the PT SMI safeguards management system.
- u) Quarterly safeguards reporting to the World Bank and other stakeholders.
- v) Maintain and update framework documents as required.

In the organizational structure, there are Social and Environmental Specialist on SMI Project Management Unit (see Figure 6-2)



Source: (PT SMI (Persero), 2018)

Figure 6-2 PT SMI Project Management Unit

6.2.2 Exploration Site Team (EST)

The close supervision of the Contractor's activities will be undertaken by the EST Safeguards Team (see Figure 6-3). The EST will have environmental and community relation staff who will monitor and report on the Contractor's ESMP implementation. These staff will also be responsible for assisting with land acquisition, community relation, complaints and grievance redress and environmental and social monitoring. The roles and responsibilities of the EST Safeguards Team are as follows:

- Supervision of Contractors' ESMP, HSMP, compliance management, non- conformance management, and issuance of penalties on a day-to-day basis, with reports to the PMU Safeguards Team;
- Provide training to Contractors as required on technical matters of environmental and social impact mitigation (e.g. sediment and erosion control);
- Provide technical training to Contractors on GRM, complaints management, community engagement and other aspects of environmental and social impact mitigation where necessary, or recruit consultants to perform training;
- Manage local stakeholder engagement and community relation, and respond to complaints and grievances; and
- Environmental and social management plan implementation and monitoring roles (see details in Section 4).

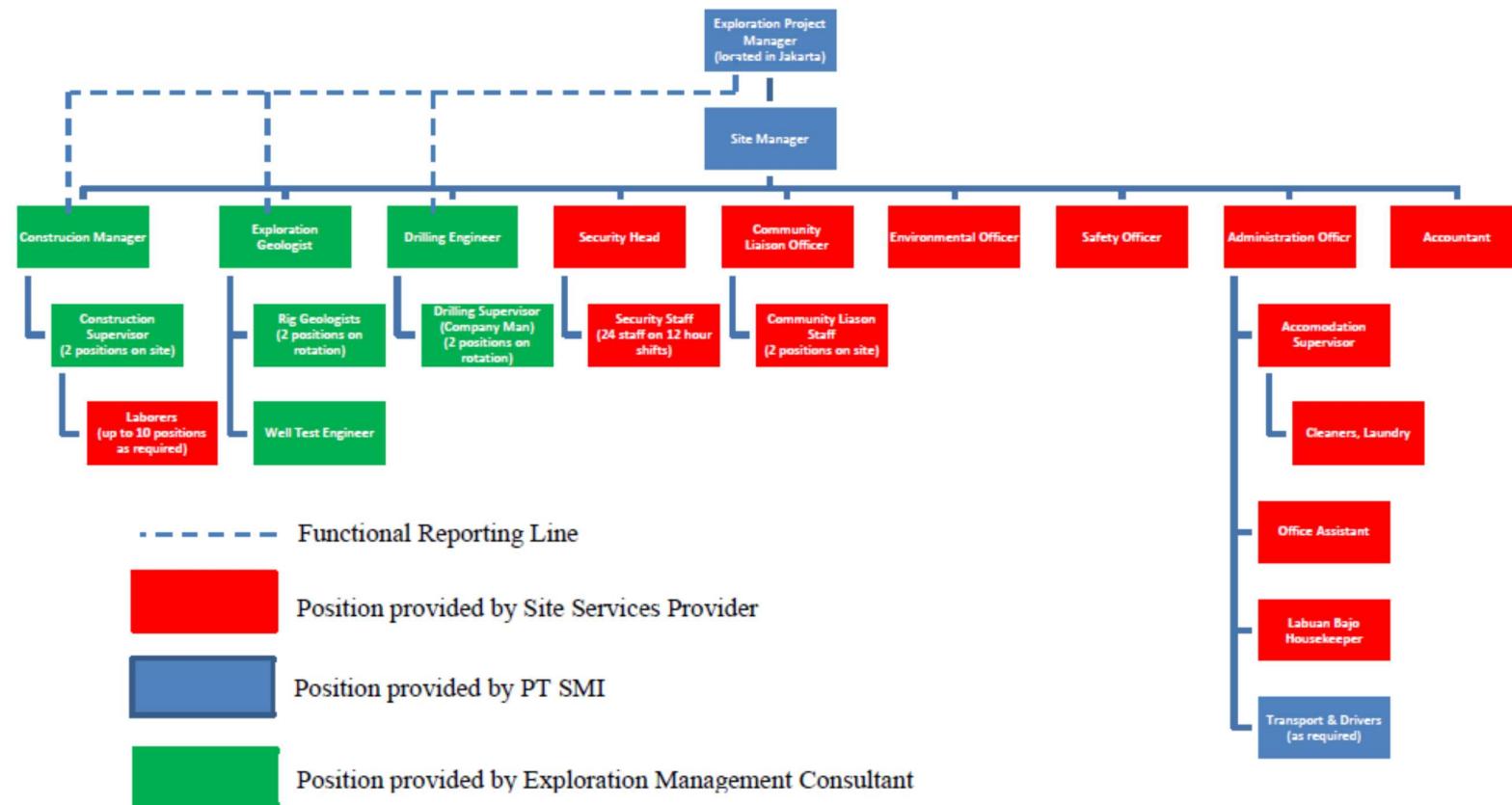


Figure 6-3 Exploration Site Team

Source: PT SMI (Persero), November 2018

6.2.3 Contractors (Civil and Drilling)

The roles and responsibilities of the Contractors are as follows:

- a) Full compliance with the ESMP and UKL-UPL throughout the contract.
- b) Provision of Safeguards Managers and Officers on site throughout the Contract.
- c) Prepare a comprehensive Contractors ESMP and HSMP before works begin.
- d) Implement the Contractors ESMP and HSMP throughout the Contract, including community engagement, avoidance and management of impacts, monitoring, GRM, incident management, training and other tasks.
- e) Construct, maintain and decommission ponds in accordance with designs and specifications provided by qualified and experienced engineers.
- f) Comply with the laws of Indonesia and obtain any permits as necessary (hazardous waste, blasting and explosives, etc.).
- g) Provide reports to the EST Team.

All contractors and staff should undergo training as required. Ensure all staff are suitably trained, and have suitable protective equipment at all times.

6.3 Capacity Building and Training

The Waesano project design includes capacity building for safeguards in the geothermal industry in Indonesia. The PMU will recruit safeguards staff that will provide capacity that is not currently within PT SMI, including the EST Safeguards Team that will provide safeguards supervision during the geothermal exploration activities.

Currently, PT SMI has a full-time environmental and a full-time social safeguards specialist to duly coordinate all safeguards requirements for the PMU, based in Jakarta. Besides the environmental and social safeguard specialist, PT SMI has a full-time project advisor who was appointed for the duration of the Project to manage the technical parts such as preparing TOR, reviewing contracts, reviewing bid docs, preparing reports, reviewing and approving consultant reports, and undertaking consultation.

Staff and consultants working on the Waesano Project, including the EST, will take part in ESMF, RPF and IPPF training events at the beginning of project implementation, to ensure that all parties understand their roles and obtain the required skills. It will cover the sub-project cycle and the milestones for safeguards tasks, supervision, communication and reporting expectations, clear assignment of roles and responsibilities, and where gaps may require filling through employment of additional staff or consultants. Attendees will include PT SMI project managers and safeguards staff, EPM, EST, BG, EBKTE and MoF staff.

Framework training sessions will be held at least annually for new team members, to update stakeholders on external changes (legal requirements, safeguards, etc.), for operational experience-sharing, and to communicate revisions carried out in the ESMF. It will be provided by the World Bank safeguards specialists and/or an external consultant in the first instance, with PT SMI running the workshops for second and subsequent training sessions.

Safeguard training is also planned as follows:

Table 6-1 Planning of Safeguard Training

Capacity Building	Audience / Participants	Trainer	Program Timeframe
Supervision of ESIA and LARAP consultants – on-the-job training and mentoring	PMU Safeguards Team	PT SMI Expert Consultant and/ or World Bank	Throughout the project

Capacity Building	Audience / Participants	Trainer	Program Timeframe
	Safeguard Learning Centre/ Specialists		
Supervision of Construction Safeguards, including Contractors ESMP and management of non- conformances and incidents. Workshop / interactive learning environment	EST Team	Expert Consultant and / or the World Bank Safeguard Learning Centre/ Specialists	Once prior to preparation of first sub-project bid documents.
Preparing and implementing Contractors' ESMP (CEMP)	Contractor	Expert Consultant and / or the World Bank Safeguard Learning Centre/ Specialists	After contract negotiation prior to preparation of Contractor's ESMP and start of drilling works. At least once per sub-project
Technical engineering training on aspects of safeguards management	Contractor	Engineering Consultant and / or Industry training organization	As required through the project, for specific aspects identified through the ESMP, non-conformance or incident.

Source: (PT SMI (Persero), 2016)

7. Contractor Management

For the exploration phase of the project, invitations to tender and contracts for Contractors should contain specific clauses that bind contractors and sub-contractors to safeguard the environment, employee safety, and human health in line with this ESMP. The Project Management Team should review the terms of the contract for such requirements prior to being published and signed. Penalties for non-compliance with the ESMP will also be set out in the contracts and rigorously enforced.

Contractors must be able to demonstrate that they have the competence to manage EHS and social issues and meet the selection criteria by providing references, details of experience, qualifications and skills, and information on their ability to manage such issues. The contractor should also be able to provide personnel who have received training in EHS and social management.

The successful contractors shall complete a risk assessment of their work to identify hazards associated with contract tasks /activities and methods of controlling or preventing them in the form of the Contractors Environmental and Social Management Plan (CEMP), procedures and work instructions and submit it to the Project Management Team for approval prior to commencement of work, including, but not limited to the following:

- Waste Management Plan;
- Oil Spill and Leakage Prevention Procedures;
- Spill Response Plan/Procedure;
- Top-Soil Management Plan;
- Water Management Plan;
- Revegetation Plan;
- Emergency Response Plan (ERP);

- Vehicle & Traffic Management Plan (VTMP);
- Grievance Redress Mechanism (GRM);
- Community Development Plan (CDP);
- Company Regulation, including Workforce Code of Conduct; and
- OHS Procedure, including the use of PPE.

As part of the accreditation process of suppliers, contractors and sub-contractors, they will be required to submit necessary documentation to show that their operation is in compliance with all the environmental, labor, and health laws. As such, PT SMI will take necessary effort to ensure that contractors and sub-contractors comply with applicable law through inclusion of conditions in contracts, monitoring and evaluation.

8. Monitoring and Reporting Requirements

Regular monitoring will need to be undertaken throughout the Project lifecycle. The frequency of monitoring would be different for each required measure; this is as proposed in the Section 4 of this ESMP.

In addition to assessing performance, audits/inspections will need to assess the effectiveness of the environmental and social plans and policies. All audit findings will need to be reviewed and where corrective actions are deemed necessary, specific actions (with designated responsibility and timing) will need to be developed aimed at achieving delivery of the socio-economic commitments to enable continuous improvement in performance.