Non-Technical Summary

24 NON TECHNICAL SUMMARY

24.1 INTRODUCTION

Long Son Petrochemicals Co., Ltd (LSP) is a joint venture between Vietnamese and Thai partners, and is seeking to develop a fully integrated petrochemical plant with a design capacity of Ethylene and propylene production around 1.1 and 0.5 million tons per year, respectively. This will be fully integrated to the downstream polyolefins (PE / PP) capacity of similar scale. With a total capital investment of approximately -5.4 billion USD, this combined petrochemical plant and seaport development (the Project) located on Long Son Island, Ba Ria-Vung Tau Province, Vietnam, will be the biggest independent petrochemical complex in the country. The Project has gained regulatory approval through the Socialist Republic of Vietnams legal framework. To secure Project financing from Equator Principles Financial Institutions (EPFI's), an Environmental and Social Impact Assessment (ESIA) was initially prepared by Environmental Resources Management (ERM) in accordance with the requirements of International Finance Corporations (IFC) Performance Standards (PS), Environmental Health and Safety (EHS) Guidelines and the Equator Principles (EP). The ESIA has been updated in August 2016 to incorporate a series of modifications to the Project design and gaps in the original study. At the time of writing it is not expected that the Government of Vietnam will require an updated ESIA because the changes are minor and will provide small environmental improvements over the approved documents.

This ESIA is comprised of five separate volumes, being:

- Volume I – Non Technical Summary
- Volume II – ESIA Report
- Volume III – Appendices
- Volume IV – Supplemental Resettlement Action Plan
- Volume V – Stakeholder Engagement Plan

This non-technical summary provides a high level overview of the key issues and outcomes presented within the main report.

24.2 PROJECT DESCRIPTION

24.2.1 *Project Description*

The Project is located within Hamlet 2 and Rach Gia Hamlet, Long Son Commune, Ba Ria – Vung Tau Province, Vietnam (see figure below). It is to be spread over an area of 464ha on a site presently comprised of swamps, mangrove forest, salt fields, rice fields, hills and residential dwelling and bordered by rural land and villages to the north and east, Ganh Rai Bay to the south and the Rang and Ong Ben Rivers to the east. The Project will be comprised of the following primary components:

- The Petrochemical Plant, consisting of an Olefins Plant, High Density Polyethylene (HDPE) Plant, Linear Low Density Polyethylene (LLDPE) Plant, Polypropylene (PP) Plant, Central Utility (CTU) Plant and Tank Farm. There are also a range of supporting facilities and buildings, including complex administration building, canteen, laboratory, emergency centre, and a first aid centre.
- A Seaport, consisting of a jetty, access channel and turning basin.

The Project electricity has been updated and the Project will no longer include a thermal power generation plant and associated infrastructure. Instead it will source electricity via a transmission line from the national grid. In addition, a new water pipeline running along the access road will bring water to the site. As of August 2016 an access road, which will be used for Project vehicles, is complete approximately (70%) and will be completed approximately 12 months.

It is proposed to commence the 51-month construction in the first quarter of 2017, with the Project anticipated to achieve the start-up and the commercial run tentatively around the end of the first and second quarter of 2021 respectively. The operations phase will last up to 50 years from the date of first certification of the Investment Certificate on 11 July 2008. A Resettlement Site has been developed separately by local authorities to accommodate households displaced by this Project, plus any future large Projects on Long Son Island. The detailed description of the Project is provided within Chapter 2.

24.2.2 Environment Context

The habitats on the site within the Study Area (extending 500m from the Project Boundary) includes three types defined as Natural Habitats by IFC PS6 (i.e., 24.17ha of mangrove patches along the coastline, 21.33 ha of coastal mudflats and 350.14 ha of marine area), with the remainder of the site being comprised entirely of modified habitats such as aquaculture mangrove ponds, water channels,

wooded hillsides, village plantations, rice fields and salt fields. Natural Habitat areas have been significantly reduced, by optimizing the tank farm and soil storage designs. The marine environment of Ganh Rai Bay (as well as the nearby mouth of Ong Ben River) is noted to be relatively shallow and consists of tidal flats on its edges. The marine area near the site also contains a range of man-made features such as fish nets and oyster farms. Species noted as either being of conservation interest and/or listed on the IUCN Red List or CITES (recognized lists of species that require protection due to their scarcity) include three plant species, three bird species and seven pisces fish species.

Baseline monitoring of physical environmental parameters showed the presence of TSP, PM2.5 and PM10 (air pollution) levels exceeding local regulatory standards at off-site sensitive receptors, and generally elevated levels of NO2 and SO2 (although within regulatory standards). Background noise levels already exceeding both IFC and Vietnamese requirements were assessed as occurring at a range of receptors. Water baseline surveys within adjoining coastal water bodies generally showed COD levels above regulatory limits.

A full description of the environmental baseline setting is provided within ***Chapter 6***.

24.2.2 Socio-Economic Context

Long Son Commune is an administrative unit of Vung Tau City, and encompasses the entire Long Son Island. It contains 11 hamlets. The economy of Long Son Commune is dominated by agriculture and aquaculture (including fishing); however, in recent years the tourism sector has slowly developed.

During surveys in 2013 and 2104, baseline information was gathered at Hamlet 2 and Rach Gia (both on the Project Site), as well as Hamlet 1 – being the location of the Resettlement Site (see figure below). The livelihoods of the people on the Project site are predominately (approximately 50%) land and resource based (i.e., fishing, rice farming, aquaculture, etc.), with the remainder of people being in either wage or enterprise based livelihoods. Survey data suggests that unemployment levels were noted as being between 10% and 16%. No ethnic minorities or communities were identified as living at the Project site. In order to accommodate the development of the Project (both the Project site and development of the Resettlement Site) a government led land acquisition process has been undertaken. The process, which is nearing completion, involved the economic displacement (loss of productive assets) of up to 391 households, with 151 of these also being directly physically displaced. Physically displaced people from this have been relocated to the resettlement area in Hamlet 1. As of August 2016, of those displaced by the Project, 99 households have been identified as vulnerable by the Project. The land acquisition process directly impacted upon 279 graves and two additional cultural heritage sites, the Ba Ong and Hung Long Temples. As of August 2016 the Ba Ong temple has been relocated, to the new cemetery site for Long Son Commune.

Resettlement Site Location

The site also partly overlaps with a larger (400ha) potential archaeological zone, which was surveyed to identify any relics. Items uncovered were processed by Vietnamese authorities; however, none were found to be of high cultural heritage value.

A full description of the socio-economic baseline setting is provided within ***Chapter 7.***

24.3 THE ASSESSMENT APPROACH

24.3.1 *Regulatory and Administrative Framework*

As detailed in ***Chapter 3***, the Project is subject to the legal framework of Vietnam, and has received regulatory environmental and social approval through the mechanisms outlined within the Law of Environmental Protection 2005 (LEP). The environmental impact assessments prepared to meet these requirements also incorporated public disclosure of Project information and stakeholder consultation. Recommendations and outcomes made during this consultation process have been incorporated into the ESIA and have formed on of LSP's key commitments. As such the Project is considered as being in compliance with all regulatory requirements of Vietnam.

The ESIA has also has been prepared in line with the IFC's Performance Standards on Social and Environmental Sustainability (2012), as well as relevant IFC Environmental Health and Safety (EHS) Guidelines. The IFC EHS Guidelines included the General Guidelines, and a number of specific guidelines relating to Crude Oil and Petroleum Product Terminals, Large Volume Petroleum-based Organic Chemicals Manufacturing,

Petroleum-based Polymers Manufacturing, and Ports, Harbours and Terminals. Other standards and requirements used in ESIA preparation include (but are not limited to) international conventions and protocols, and Organisation for Economic Cooperation and Development (OECD) Common Approaches.

24.3.2 Impact Assessment Methodology

The ESIA has been developed following a systematic process that screens and scopes potential impacts the Project could have on aspects of the physical, biological and social environments, identifies measures that the Project will take to avoid, minimise/reduce, mitigate, offset or compensate for potential adverse impacts. It also identifies measures to enhance potential positive impacts where applicable. The methodology applied is presented within Chapter 4.

24.3.3 Analysis of Alternatives

A range of alternatives has been explored through the Project design phase including inputs from a variety of technical disciplines. The process and outcomes of the alternatives assessment are presented within ***Chapter 2***. Key outcomes of the alternatives considered include:

- Selection of the Project site was based on its size (requirement of 400ha of land), location next to an area suitable for deep-water port construction, and the general suitability of the terrain and underlying geology.
- Ensuring overall Project layout met requirements for the technical process, safety and environmental impacts (primarily relating to the prevention, limitation and mitigation or escalation of adjacent or domino events, and logistics considerations).
- A number of process technology alternatives to ensure compliance with applicable laws, international best practice, and reducing overall energy requirements and pollutant generation.

24.3.4 Stakeholder Engagement

As part of its on-going activities, preparation of local regulatory EIA, and the various activities involved in gathering socio-economic data, a variety of stakeholders were consulted and provided their feedback on the Project. Engagement used variety of methods (such as formal meetings with authorities, community meetings, focus group discussions, and meetings with households). Feedback received was incorporated into the ESIA. Issues raised by stakeholders at all levels have aided in shaping the assessment process and are detailed within Chapter 8. As part of its on-going stakeholder engagement process, LSP developed a Stakeholder Engagement Plan (Volume V), which will form the basis for its integrated, structured and formal on-going engagement process for all phases of the Project. Additional consultation and disclosure was carried out with affected people during July-August 2016 regarding the optimized ESIA and Management Plans.

Engagement Activities at the new Resettlement Site in 2016

LSP has established a community based grievance office, to receive community grievances in Long Son Commune throughout the pre-construction and construction phases. Actions of LSP staff are guided by the Community Grievance Management Plan, which is one of a suite of management plans developed for the Project. Information on how to lodge grievances has been shared with affected and non-affected households in Long Son Commune; information dissemination on the grievance redress mechanism will continue as part of on-going engagement activities.

24.4 IMPACT ASSESSMENT

24.4.1 *Air Quality and Greenhouse Gas Emissions*

Air Quality modelling was undertaken (presented within ***Chapter 9***) to determine the potential changes to the quality in ambient air quality due to construction and operation of the Project. Models were developed to cover both the construction phase (including fugitive dust emissions and pollutants from vehicles and machinery) and operations (including stack emissions and fugitive emissions). Impacts to air quality during construction were assessed to be Major Negative, with exceedances of allowable limits noted at a range of sensitive receptors, particularly for particulates. Operational impacts variously assessed to be moderate or negligible, expect for NO_2 (1-hour) levels, which are expected to result in a moderate impact. However, national limits will not be exceeded for NO_2. Background levels of TSP, PM_{10} and $PM_{2.5}$ exceed national standards.

Impacts associated with the construction phase, primarily relating to increased levels of TSP against already elevated ambient levels, will be minimized through a range of readily implementable standard mitigation measures. These are mainly aimed at eliminating the potential for dust to become air borne. This includes measures such as water spraying on unpaved roads, covering trucks transporting dusty materials

and using windbreaks to protect stockpiles. Construction activities will also be planned around rainfall and prevailing wind patterns. Implementing these measures will reduce residual impact levels to minor.

All operational impacts are to be reduced to minor or negligible, with the exception of impacts related to NO_2 emissions that will remain at moderate. It is proposed to implement a long term monitoring program to confirm the outcomes of the modelling, long term fluctuations to NO_2 levels and if levels should be exceeded in the future, possible human health monitoring. This will form part of a detailed air quality-monitoring program during both construction and operational phases.

Total greenhouse gas emissions during the construction and operations phases were also calculated in accordance with the IPCC Guidelines for National Greenhouse Gas Inventories. As detailed within ***Chapter 10***, the maximum total annual emissions during construction were calculated to be 81,115 tons/CO_2-e per year, with annual emissions during operations being estimated to be 3.19 million tons/CO_2-e. A range of mitigation and management measures are being considered to either reduce (including the development of an **Energy Management** Program for the operations phase) or offset this amount through an appropriate mechanism. Considering that according to IFC standards the Project will result in significant emissions, LSP will have to quantify direct emissions from the petrochemical complex, as well as indirect emissions associated with the off-site production of energy used by the project. Quantification of GHG emissions should be conducted annually in accordance with internationally recognized methodologies and good practice.

24.4.2 Noise and Vibration

A noise and vibration assessment, including calculation of predicted noise levels at sensitive receptors during both construction and operations was undertaken and is presented within ***Chapter 11***. During construction, noise levels of between 60.1dBA and 91.5dBA are anticipated to occur at a range of sensitive receptors, particularly those located to the north, and northeast and east of the Site. In order to mitigate these, an acoustic barrier (such as an earth bund) will be installed. Vibration levels associated with blasting of rock were noted to be within acceptable limits.

During operations, noise limits will be exceeded at one particular sensitive receptor by 3.7dBA during daytime and 2.3dBA during the night. This impact level was noted to be moderate and will be generally mitigated through ensuring that all elements of the Project meet their technical specifications. Additional noise reduction measures (such as acoustic enclosures and liners) will also be put in place around particularly noisy equipment. The optimized Project design is expected to produce less noise and vibrations during operations

24.4.3 Water Quality

As identified within ***Chapter 12***, the land development phase of the Project will involve the excavation, disturbance and exposure of large amounts of topsoil.

Surface water runoff from this exposed soil can be expected to contain elevated levels of suspended solids, debris and potentially contaminants such as oils, fuel and grease. This water may make its way off site into near shore marine environments, rivers and possibly into the water streams used to supply local aquaculture and agriculture. To mitigate this Major Negative impact, a range of detailed surface water management measures have been developed to manage surface water flows.

Other impacts during construction relate to domestic waste water management, however, as it is proposed to collect all domestic waste water flows for treatment

During the operations phase, all potentially contaminated operational flows of wastewater will all be directed to a central wastewater treatment system. All of this water will be treated to meet all relevant standards prior to discharge to the marine environment. There is also a range of water flows, such as storm water from "clean" areas within the Petrochemical Complex, which can be directly discharged without any treatment.

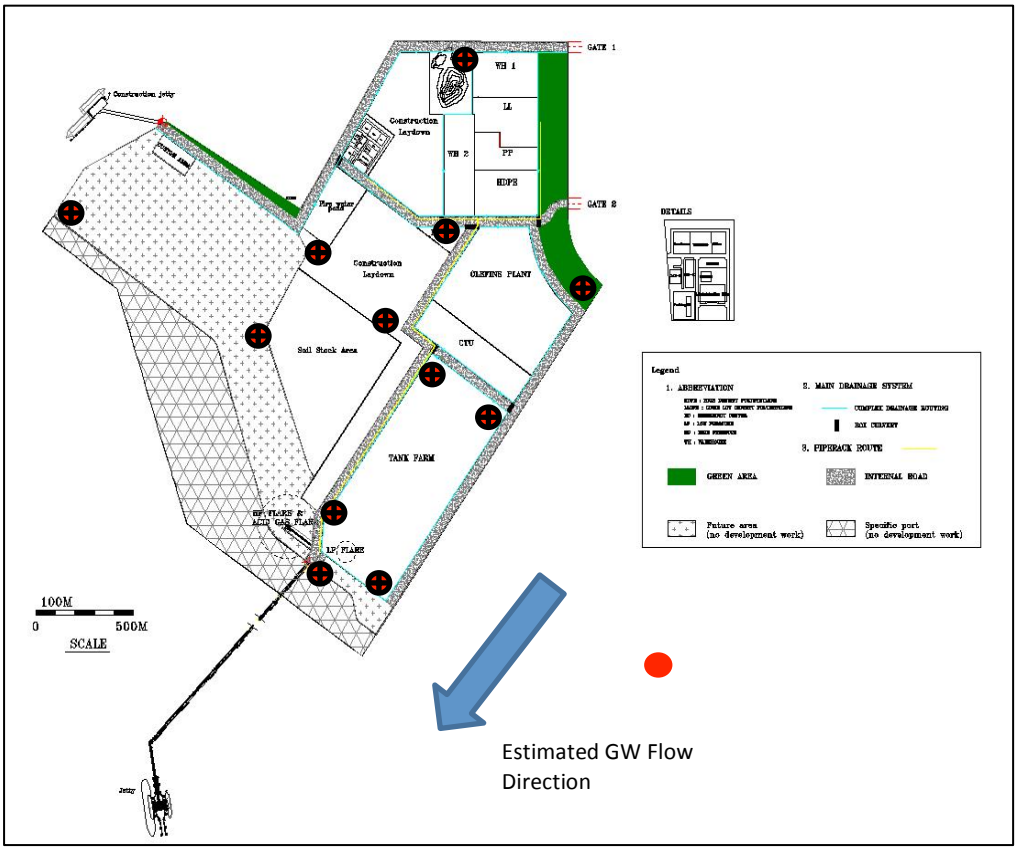
Man-made surface water features on and adjoining the Project site

24.4.4 Soil and Groundwater

Impacts pertaining to soils and the connected groundwater system were identified and assessed within ***Chapter 13***. As well as impacts associated with soil loss (the management of which is closely linked to measures developed with regards to surface water quality), construction related impacts pertaining to limiting the potential for soil and groundwater contamination were noted and assessed to be Moderate Negative. A raft of measures have been developed to minimise the potential for contamination to occur, including ensuring that all imported backfill sources (earth used to replace disturbed soil) are free of contamination, and spill prevention and management techniques to be implemented by all construction contractors. During operations, spills and leaks were identified as the primary source of impacts to soil and groundwater, however impacts were assessed to be

minor. A groundwater-monitoring programme will be implemented throughout the operations phase to enable any sub surface leaks to be detected as soon as possible.

Soil and Groundwater Monitoring Locations during the Operation Phase



24.4.5 *Terrestrial Biodiversity*

The development of the Project will have a direct impact on terrestrial and coastal habitats, primarily due to the direct removal of vegetation during the land development phase. This impact was assessed to be Moderate Negative. A range of mitigation measures have been developed to reduce this impact level, including a pre clearance and clearance processes to limit the amounts of vegetation being cleared to only that within the Project footprint. Additionally, the Project has committed to ensuring no net loss of Natural Habitat and is developing a biodiversity offset strategy with regards to the loss of mangrove (2.33 ha) habitat that is classed as Natural Habitat. This is to be undertaken using the Habitat Hectare model (BBOP 2012a) and will leverage the local regulatory requirements relating to offsets as much as possible. The Habitat Hectare model looks at the type, species, amount and condition of habitat and compares it with what can be gained over time by investing in habitat at another location.

Project optimization has included redesigning the tank farm and the soil storage areas to reduce the areas of mangrove and mudflat (to zero) impacted by the Project.

24.4.6 *Marine Biodiversity and Fisheries*

During the development of the Port, a total of 5.3ha of marine habitat will be lost. Given that this is a small amount, and over time it is considered the environment will adapt and new marine taxa may colonise the hard substrate of the jetty piers, impacts associated with direct loss are considered to be negligible. Other impacts to the marine environment, in particular fish species, will be managed through ensuring that impacts to surface water quality during dredging activities are appropriately managed (in accordance with the surface water quality measures outlined within ***Chapter 12***) and attempting to schedule dredging activities at times that are less important to fisher folk who use fishing grounds within and adjoining the Project Site.

Fishing Boats used by local fishermen

24.4.7 *Waste Management*

As identified within ***Chapter 16***, hazardous and non-hazardous waste streams will be generated from a variety of sources during both the construction and operation phases. Due to the numerous streams and types of waste, a number of waste management measures will be implemented to mitigate impacts and risks. This includes the enforcement of the waste management hierarchy (avoid, reduce, reuse and recycle), selection of waste contractors and waste disposal facilities to ensure that adequate environmental and social standards are being met, and monitoring of waste generation to identify opportunities to improve waste management practices.

24.4.8 *Land Acquisition and Economic Displacement*

In order to develop the Project site, a government-led land acquisition process has been undertaken. This is being undertaken by local authorities in accordance with the Land Law 2003 and all supporting Decrees. As described within ***Chapter 17***, 151 households across both the Project and Resettlement sites were physically resettled and lost their land – which includes their residential house, productive land and other structures on the site. In addition to these households, there are 240 other land holders who own and operative productive land (salt farm, rice field and aquaculture) to be acquired and thus be subject to economic displacement. Additional temporary land acquisition may be required for worker camps and this will follow voluntary negotiations and separate assessment documentation (i.e., a social sensitivities assessment). Local fishermen may also be impacted due to the Project likely interfering with access to mooring areas and possibly fishing grounds, particularly during the construction phase. Impacts associated with both physical and economic displacement were assessed to be Major Negative.

In order to reduce the impact level, mitigation measures have been developed primarily focusing on addressing any inconsistencies between local land acquisition regulatory requirements and IFC PS5. A Supplemental Resettlement Action Plan (SRAP) has been developed and in contained within Volume IV. This will apply to physically displaced households and include provisions relating to security of land tenure and assistance during relocation. A Livelihoods Restoration Action Plan (LRAP) has been prepared to ensure that impacts associated with loss of livelihoods are minimised.

Constructed houses at the new Resettlement Site

24.4.9 Influx and In-Migration

Impacts to the local community, infrastructure and services as a result of the influx of formal and informal migrants (peak workforce of 20,700) during the construction phase were identified and assessed to be Major Negative. This include strains on local public services, potential health impacts, possible rise in price of commodities, food and services, increased risk of traffic accidents, increased crime and cultural

effects such as an erosion of traditional values and changes in social networks. Some of these impacts will be focused on the specific areas surrounding worker camps and will be assessed during the worker camp sensitivities assessment and appropriate mitigation measures implemented. In addition, a range of more general mitigation and management measures are proposed to minimise these impacts and will predominately be implemented through the Project-Induced In-Migration Management Plan.

24.4.10 Economic Impacts

The Project will result in the creation of significant employment opportunities, both directly and indirectly throughout the supply chain. There is the opportunity for direct employment by either LSP or construction contractors during the construction phase, as well as indirect downstream business services to the construction workforce such as provision of supplies and food, as well as services including restaurants, hairdressers and transportation. Access to longer- term, specialist positions for the operations phase will likely require a high degree of investment in education and training.

Measures to enhance this positive impact and ensure that the local community benefits from the Project a Community Development Action Plan (CDAP) has been developed to determine the focus areas for potential programs. Programs may include skills training, apprenticeship programs, basic business skills development, and focused assistance for vulnerable groups to improve their access to project benefits. Programs seeking to maximize local recruitment through construction contractors will also be included.

24.4.11 Cultural Heritage

An archaeological survey and excavation was undertaken within an area of the site considered to have high potential to contain sub-surface relics. This was undertaken by the Viet Nam National Museum of History and the Ba Ria – Vung Tau Province Department of Culture, Sports and Tourism. The study identified that there was no significant cultural heritage in the area that needed to be excavated. A Chance Finds Procedure has been developed to provide formal procedures for the Project and its contractors to follow should any other unexpected items be encountered during land clearance and construction.

As part of the land acquisition process, the Ba Ong Temple on the Project site was relocated by contractors hired by Temple representatives. The temple is now located at the new Long Son Commune cemetery.

24.4.12 Traffic

As part of the overall development of Long Son Island, the Provincial level Department of Transport will be developing an access road direct to the Site from National Route 51. This will mean that the existing local road network on Long Son Island will be largely bypassed by Project traffic and not impacted. However, as discussed in ***Chapter 18***, delayed project implementation means that this road is

nearing completion prior to the need to mobilize heavy machinery through the local road network, which had not been designed to accommodate large amounts of heavy traffic. This will limit the potential for impacts from heavy vehicles in residential areas, however there will still be potential impacts and risks related to increased traffic in the Long Son Commune and from interactions between project heavy vehicles and other vehicles on the Access Roads. Road accident risks are typically a significant risk in relation to large construction projects and these are being reviewed under the new scenario for the updated study. Measures to mitigate the impacts and risks identified will be included in updated traffic and road accident management plans, as well as in updated emergency response plans.

24.4.13 Unplanned and Accidental Events

Oil spill modelling and a major hazards analysis have been undertaken in the ESIA process and are discussed within ***Chapter 19***. This modelled and discussed risks associated with a range of scenarios during construction and operations (including oil spills, explosions and toxic releases) have been modelled.

The outcomes of modelling and discussions have been used to drive development of emergency response plans and preventative maintenance plans for the Project. These plans are also being updated to the new Project configuration.

24.4.14 Cumulative Impacts

The ESIA includes a cumulative impact assessment ***(CIA, Chapter 20)*** which looked at likely trends resulting from impacts from both the Project, and the construction and operation of other large scale industrial projects on Long Son Island in the future was undertaken. Key outcomes of the CIA included the need to ensure a collaborative approach to soil and surface water management during the construction phase, particularly when construction of the adjoining shipyard was being undertaken concurrently. There are also considerable opportunities to ensure that positive socio-economic impacts are distributed spatially and temporally so that communities throughout Long Son Island can take advantage of the long term industrial construction and operation that will be occurring.

24.5 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

An Environmental and Social Management Plan (including monitoring plan) has been developed to collate all management and mitigation measures developed throughout the ESIA into a single point. Presented within ***Chapter 21***, it provides clarity regarding the impacts that have been identified, how they will be mitigated and managed, and through what means. It has been used as a basis for developing a suite of detailed management plans to be implemented throughout the construction phase; which will subsequently be updated again prior to the operation phase. These management plans have also been updated to the new Project configuration.

An Environmental and Social Management System has also been developed as a framework document through which the ESMP will be implemented, tracked and

reported upon. LSP places social and environmental performance as a core measurement of Project success, and through the framework ESMS (***Chapter 22***) sets out the means to achieve this through setting objectives and target, quantitative evaluation of management plan effectiveness and working towards continual improvement.

24.6 CONCLUSION

The Project has been developed in accordance with international best practice, including the IFC Performance Standards. In development of the ESIA, LSP has systematically identified and assessed all impacts likely to be result from development of Project. A range of mitigation, management and monitoring measures have been developed to reduce the overall residual impact level to one that is considered acceptable. With the implementation of these measures, through the ESMP, ESMS and detailed management plans, the construction and operation of the Project is considered to be able to undertaken in a manner consistent with the IFC Performance Standards. There are elements of the projects that cannot yet be in compliance with IFC Performance Standards, such as contractor Construction Environment and Social Management Plans and Worker Accommodation Plans. In order to capture these and other items there will be an Environment and Social Action Plan developed that will set out the actions to be taken, the timescale for these and the evidence to be produced to demonstrate full compliance for the project.

In terms of the Project optimization, the ESIA and associated management plans have been updated to reflect the new configuration in August 2016. The key changes at the Project over the previously developed studies should reduce the initially predicted impacts. Particularly the updated ESIA and management plans will:

i) Impact smaller areas of mangrove and mudflat natural habitat than previous configurations;

ii) Produce lower levels of air emissions, noise and vibrations due to the removal of the thermal power plant and associated coal handling facilities as well as the removal of the Vinyl Chloride Monomers Plant, Air Separation Plant, MTBE and B1 units;

iii) The delayed implementation of the Project means that the worst traffic impacts from the Project, involving heavy vehicle transportation through residential streets will now be avoided, although traffic impacts are still expected to occur and are being further detailed;

iv) There is also increased potential for improvement in commune services with the arrival of a 110KV power line under the auspices of EVN (although this is not a project component) and through a new fresh water line. The water line will follow the access road route and hence additional land acquisition will be non-existent and impacts will be very limited.