ESIA - Volume I

Non-Technical Summary

October 2014

CB&I

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Contents

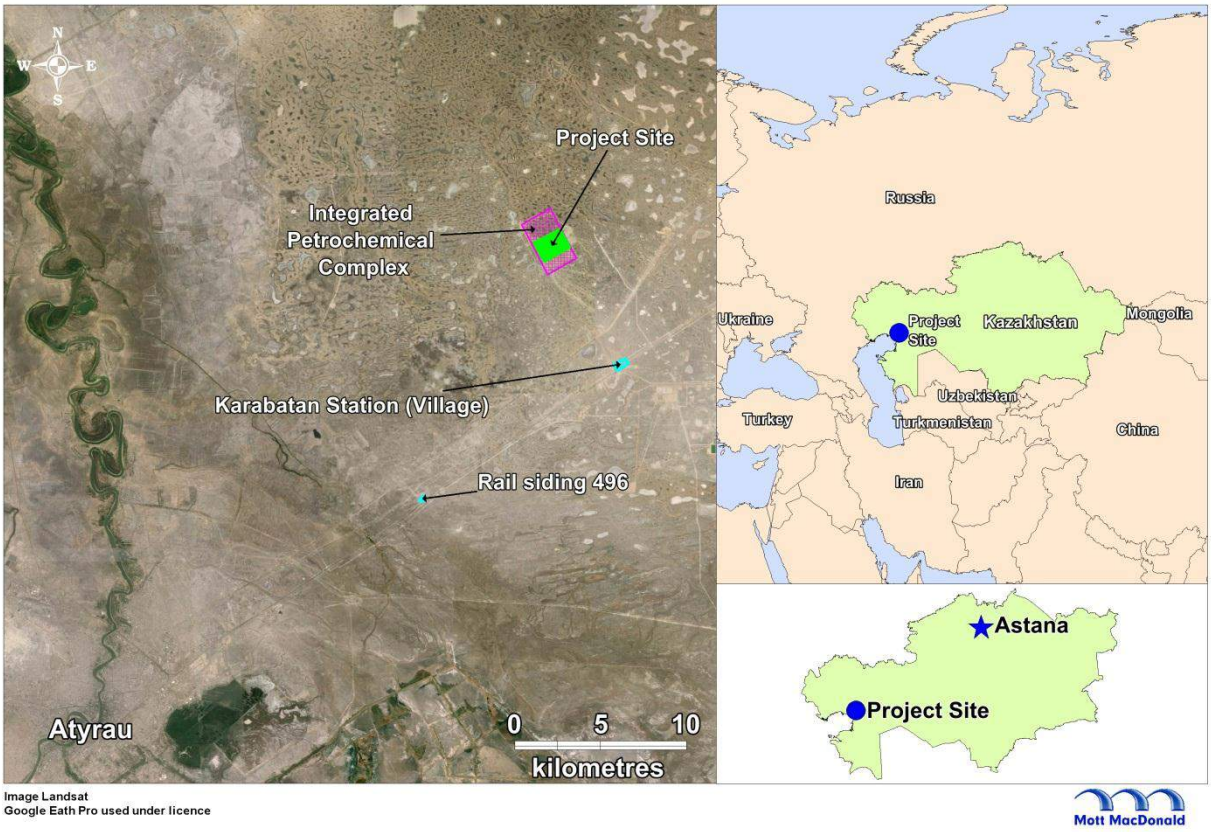
1 Introduction

1.1 Overview

The purpose of this non-technical summary (NTS) is to present in a clear, simple and concise manner the main findings and conclusions of the Environmental and Social Impact Assessment (ESIA) undertaken for the construction, operation and decommissioning of a Propane Dehydrogenation (PDH) plant and a Polypropylene (PP) plant (the Project) which will form part of an Integrated Petrochemical Complex (IPC) in Kazakhstan. When operational the Project will convert propane into polypropylene pellets which can be manufactured into different types of plastic products such as containers and pipes.

The Project is located within the Atyrau Region in western Kazakhstan and is situated approximately 45 km north east of Atyrau on the Kazakhstan steppe[1]. Figure 1.1 shows the Project location in Kazakhstan and in relation to Atyrau.

Figure 1.1: Project Location



[1] The Kazakhstan Steppe is a large area of open grassland and extends to the east of the Caspian depression and the north of the Aral Sea to the Ural Mountains in the north and the Altai Mountains in the east.

1.2 Project description

The Project is being developed by Kazakhstan Petrochemical Industries (KPI) following a Government decree set out to develop petrochemical projects. Chicago Bridge and Iron (CB&I) have been awarded an engineering package in support of the development of the Project which includes the Front End Engineering Design (FEED) verification and the development of an International Environment and Social Impact Assessment (ESIA). CB&I has commissioned Mott MacDonald Ltd to act as the International Environmental Consultant (IEC) to conduct the ESIA, associated Environmental and Social Action Plan (ESAP) and Environmental and Social Management Plan (ESMP) of the Project to support obtaining international finance for the Project.

The ESIA is being undertaken in addition to the national Environmental Impact Assessment (known as OVOS) that has already been completed and that has received all the appropriate approvals from the State Environmental Expertise issued by the Republic of Kazakhstan Ministry of Environment and Water Resources. Following some design changes the existing OVOS is being updated and will be resubmitted to the relevant authorities for final approval.

KPI intends to engage International Lending agencies to help finance the project from the initial design stage through to its operation. Currently the international lenders for the Project have not been confirmed and no formal agreement has been signed and therefore to address the potential environmental and social requirements of a range of banks that may wish to finance the Project this ESIA has been undertaken in line with the following international standards:

- The Equator Principles III (2013);
- International Finance Corporation Performance Standards and Environmental Health and Safety Guidelines (2012);
- The European Bank of Reconstruction and Development Environmental and Social Policy (ESP) and related Performance Requirements (2008);
- Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations (2012);
- OECD Common Approaches (2012).

1.3 Where can I find more information about the Project?

Consultation with local authorities, affected communities and non-governmental organisations has been undertaken by Mott MacDonald at the outset of the ESIA process and during preparation of the ESIA. A public consultation event was held on 02 September 2014 to discuss the findings presented within the draft ESIA. Future consultation and disclosure events include the communication of the final ESIA, including this NTS, KPI will make available hard copies of this volume (in Russian and Kazakh) and the key sections of the Environmental and Social management plan (in Russian). All ESIA documents will be made available in English as well as the Russian and Kazakh versions of this NTS and key sections of the Environmental and Social management plan on the KPI website.

To support the international ESIA process, Mott MacDonald has produced a Stakeholder Engagement Plan (SEP) that acts as a strategic document for planning a comprehensive approach to consultation and disclosure throughout the life of the Project.

Information on the project will be made available to interested parties through the following ways:

- Disclosure to the Akim of Geolog
- Ongoing media communications
- Ongoing stakeholder meetings during construction and operation
- Dedicated Project Community Liaison Officer
- Monitoring reports
- Annual reports

In addition to the formal consultation events and periods for comments on the ESIA, questions and comments can be addressed to KPI via the contact details presented below

Project Proponent	Information
Name of Company	KPI inc. For attention of Ms Balzhan Mukhambetaliyeva (Community Liaison Officer)
Address	5 Dossorskaya Str, Atyrau, Republic of Kazakhstan, 060002
Telephone	+7 (7122) 30-65-00
E-mail	Balzhan.Mukhambetaliyeva@kpi.kz
Website	www.kpi.kz

2 The Project

2.1 Why is the Project Needed?

The Republic of Kazakhstan has considerable hydrocarbon reserves and the oil and gas sector has been the cornerstone of Kazakhstan's recent economic growth; however, until recently, oil refining and further processing of raw materials in petrochemical plants was not undertaken and most projects were for exploration and production only. There is increasing demand for polypropylene from local and national business and new production facilities such as this Project will contribute to satisfying this demand.

As well as meeting the growing national demand for polypropylene this Project presents a significant opportunity for Kazakhstan to increase its global exports. Growing demand from end-use industries such as packaging and consumer products is expected to sustain the demand for polypropylene over the next decade and beyond. In addition, factors such as changing lifestyles and increasing disposable incomes in Asia Pacific are also creating a large demand for polypropylene in that region.

As a result of this increasing national and international demand there is increasing pressure on producers to generate more propylene. Therefore, to help meet this demand the Government has implemented a program for further development of the petrochemical industry in the Republic of Kazakhstan. This proposed Project will therefore directly help Kazakhstan increase production capacity of polypropylene, create a number of jobs and contribute to the development and diversification of industries and businesses in the region.

2.2 What is the Project?

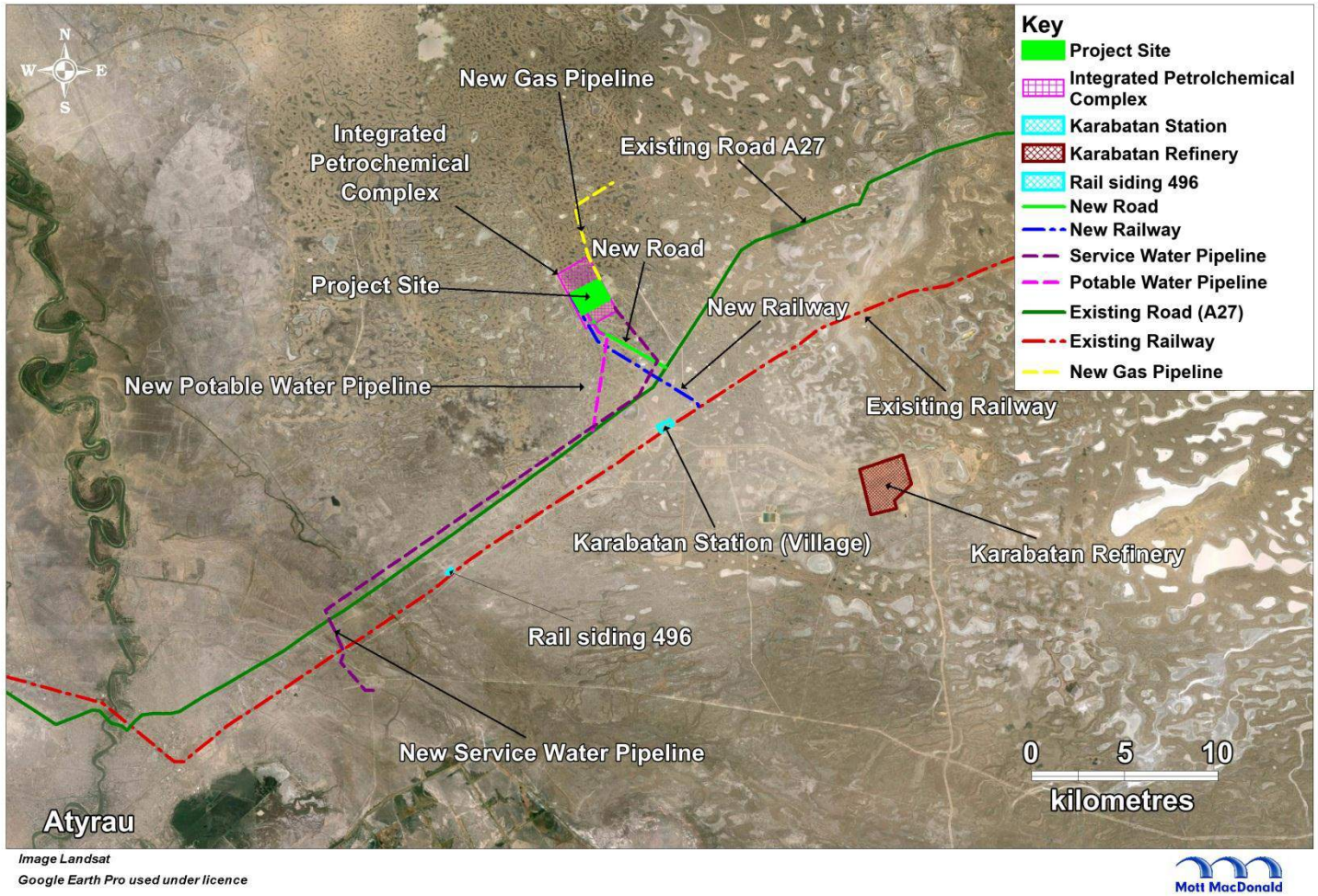
2.2.1 Project Overview

The Project is being developed as part of an IPC on an area of land which has been identified for such industries. When complete the IPC will consist of the following facilities:

- Propane dehydrogenation (PDH) plant and a polypropylene (PP) plant (This Project)
- Ethylene and polyethylene production plant (located to the north)
- Butadiene production plant (located to the south)
- Plastic bag production plant (located to the south)

Figure 2.1 shows the Project location in relation to nearby villages and the existing infrastructure that the Project will use during its construction and operational phases. The closest settlement to the proposed project is Karabatan Station which is located 7 km to the south-east of the IPC and has an approximate population of 200 people. The closest industrial facility is the Bolashak Onshore Processing Facility (commonly called the Karabatan Refinery), operated by AGIP KCO, which is located approximately 16 km south-east of the IPC.

Figure 2.1: Project Infrastructure



Source: Mott MacDonald

The overall area of the IPC is approximately 600 ha, of which 165 ha is required for the Project. The whole project site is 20 metres below sea level and historically formed the bed of the Caspian Sea. It is characterised by a flat, arid landscape with predominately low lying desert vegetation. A distinctive feature of the area is the presence of “sors”. Sors are natural, relict relief depressions and low-lying areas where water collects when it rains, and then evaporates, leaving mud plains, saline or saline areas.

2.2.2 Project Components

The Project will consist of two main process plants, the PDH plant and the PP plant. The PDH plant will convert propane into propylene, which will then be used to make polypropylene pellets in the PP plant. When operational the Project will manufacture approximately 500,000 tonnes of polypropylene pellets every year, which will be sold to both national and international customers.

The polypropylene pellets will be packed in the bagging and storage warehouse and transported from the IPC using a combination of road vehicles and trains on roads and rail lines within Kazakhstan and internationally.

The Project has been designed in such a way to maximise its efficiency and reduce its impacts on the environment. For example water used within the production process will, where possible, be recycled to minimise water requirements and to prevent discharges to surface or ground water. Additionally the Project will make use of excess heat generated from the process equipment to reduce the amount of natural gas that is required to be burned, therefore helping to reduce emissions to the atmosphere.

During the operation of the Project a number of utilities will be required. Some of these, such as steam, will be generated from within the Project boundary but others will be supplied by the IPC’s shared facilities that will be constructed for all the other future projects that will be located within it. Potential impacts from these associated facilities have also been assessed within the ESIA. The associated facilities included within the assessment are:

- Gas supply
- Water supply (potable and process)
- Gas turbines for generating electricity
- Process water treatment plant (PWTP)
- Rail spur and station
- Access roads to the A27.

2.2.3 Construction Phase

Although some initial preparation works have been carried out the main development and construction of the Project is expected to commence in March 2015. The overall schedule for construction of the Project will depend on the delivery period of a number of major plant items and receipt of all approvals, permits and international finance. The final construction management plan is not confirmed, and at this stage no

construction contracts have been signed although it is likely that there will be a Contracting Party or Parties under the control of KPI employed to manage and undertake the construction process.

Some of the supporting infrastructure for the Project has already been constructed or its construction is nearing completion. This includes;

- A rail spur from Karabatan station
- A road bridge on the A27 across the rail spur
- An access road to the site from the A27
- A natural gas supply pipeline connecting the IPC to the main gas pipeline in the area.

Prior to the construction of this infrastructure KPI applied for and received all the appropriate national construction permits and approvals.

Materials and equipment for construction will be brought to the site mainly by river barge and train, with heavy goods vehicles bringing materials by road where other options are not feasible. During the construction phase one of the early items to be constructed will be the storage warehouse. Following completion, the warehouse will be used as the main laydown area for the Project. It is not expected that any additional land outside the IPC boundary will be required for laydown.

The Project will generate on average 1,000-1,500 construction jobs, based on current estimates. It is expected that during the peak construction period during the second half of 2016 and the first half of 2017 the number of construction workers will peak at between 2,000-2,500. It is anticipated that construction will take place six days a week and the maximum number of hours any construction worker will work within a week will be 60 hours, which is in accordance with Kazakhstan national labour laws.

Currently no construction contractor has been appointed for the Project, so the details of what accommodation will be required to house construction workers has not been confirmed. However there are a number of existing workers' camps already located within the Atyrau region and it is anticipated that where possible these would be utilised for the construction workforce. If this is not the case and a new construction workers accommodation is required it is anticipated it would be constructed approximately 15 km from the IPC and be constructed and operated in accordance with national and international requirements.

2.2.4 Operation Phase

KPI will be responsible for the operations and maintenance (O&M) organisation for the Project. It is proposed that the majority of employees will be sourced from Kazakhstan although it is possible that some staff will need to be sourced from outside the region as there are not expected to be sufficient numbers of certain specialist staff available located within Atyrau.

Under normal operating conditions, the Project will be operated all year round with and only not be operational during planned maintenance or in the event of a mechanical failure. It is expected that the

Project will employ approximately 400 workers. These will be split into three separate shifts with each shift lasting up to eight hours a day.

KPI plans to revise its existing Environment, Health and Safety (EHS) department to oversee and manage all EHS issues during the construction and operational phases. Integral to this will be the development of an Environment and Social Management system (ESMS) that will encompass overall management of the construction phase and then evolve to provide a robust system for managing and monitoring all environmental and social issues for all the Project components. The ESMS will be developed in line with international standards such as ISO 14001:2004 and OHSAS 18001:2007.

3 Environmental and Social Impacts

3.1 What are the Project activities that could affect the environment and people?

It is recognised that a project of this scale and duration has the potential to impact the environment and local communities in both positive and negative ways. The aspects that could experience the more important effects include:

- Social impacts associated with:
  - Employment generation for local people
  - Loss of grazing land
  - Community health, safety and wellbeing
- Materials and waste management
- Traffic and transportation impacts
- Greenhouse gases emissions

Other aspects where they may be an impact but which is predicted to be minor include;

- Noise and vibration effects on local communities
- Air quality impacts
- Direct and indirect impacts on ecology
- Impacts to cultural heritage and archaeology
- Impacts to ground conditions
- Impacts on water resources.

3.2 How was the Project assessed and what where the findings?

3.2.1 Overview

An assessment has been undertaken for potential impacts arising from the Project development, including the above issues; the assessment comprises a Social Impact Assessment and Environmental Impact Assessment (collectively presented as an ESIA). The ESIA includes:

- Establishment of the baseline to understand current conditions at and around the proposed Project site;
- Prediction of impacts and identifying the most important (significant) impacts; and
- Identification of mitigation measures to be included in the design, procedures, development and management of the Project.

The significance of an impact is described based on the sensitivity of the receptor (project affected persons, their community or environmental aspect) and magnitude of the impacts of the Project on that receptor. Where possible, impact magnitude and sensitivity is described with reference to legal requirements, accepted scientific standards or accepted impact assessment practice and/or social acceptability. Where appropriate the ESIA identified actions or procedures (referred to as mitigation measures) to avoid, reduce or otherwise mitigate the effects and reduce their significance. A great number of potential impacts can either be avoided or reduced through mitigation; however, some residual environmental impacts may be unavoidable. Each chapter of the ESIA has assessed whether residual

impacts, either beneficial or adverse, remain after mitigation. A summary of the key findings is provided below.

3.2.2 Social Impact Assessment

The Project could have a number of minor to moderate beneficial effects on employment generation and the local economy during the construction phase. The construction phase will create a large number of jobs for approximately 3 years, peaking at 1,500 – 2,500 workers and although the construction plan has not been confirmed many of these construction jobs could be filled by Kazakh construction workers. This temporary employment generation in the construction phase of the Project has the potential to stimulate the local economy through the provision of income to workers. This includes the opportunity for vulnerable local unemployed people, especially those from Karabatan Station and Railway Siding 496 villages, to benefit. Moreover, during the construction phase KPI's contracting parties will need to purchase materials, equipment and services for the Project, thereby creating business opportunities for suppliers. These opportunities will provide economic benefits to suppliers, especially to those who receive longer term contracts.

However, the Project could also have minor and moderate adverse effects during construction, including: the loss of access to grazing land as a result of the Project's (and its associated facilities) footprint. Nuisance and disturbance to local communities resulting from dust and noise from construction activities and there could also be additional rail movements. Cumulative impacts with other projects in the area could result in a change in the sense of place as the area becomes increasingly industrialised.

The operation of the facility is predicted to have moderate beneficial effects on employment. Employment will be permanent and for approximately 400 workers. As well as maintaining or improving the wellbeing of the staff employed and their families, the creation of these jobs will contribute to the development of specialist skills and experience within the local population.

The Project is expected to be operational for a minimum period of 25 years; however, when the Project is eventually decommissioned there will be retrenchment of the staff employed during the operational phase. This could cause income insecurity for those members of staff affected, although this effect is likely to be insignificant.

Measures will be put in place to safeguard the health, safety and wellbeing of workers and local communities, and to enable employment benefits to be shared equitably with affected communities and the local economy to be enhanced.

3.2.3 Air Quality

Emissions to air during the construction, operation and decommissioning phases of the Project have the potential to affect nearby receptors. To avoid impacts from construction dust good practice mitigation measures such as building wind breaks and covering stockpiles of soil will be used throughout the construction phase.

A baseline air quality survey was undertaken as part of the ESIA to supplement existing air quality monitoring data in the area which concluded that that existing concentrations of the pollutants monitored were below standards required for the protection of human health. A modelling assessment of the emissions sources associated with the Project and its associated facilities was undertaken using an internationally approved dispersion model. The assessment concluded that the Project would have an insignificant effect on pollutant concentrations at ground level.

Emissions to air during the operational phase will be mitigated within the design of the Project by the choice of technologies being used and abatement technologies that will be incorporated within the design. In addition all combustion sources will have appropriate height stacks to conform to Good International Industry Practice and maximise the dispersion of pollutants.

The Project will be carefully managed to reduce fugitive emissions to the atmosphere and where fugitive emissions are collected from storage tanks they will be combusted in one of the Project's two flares.

3.2.4 Ground Conditions

Soil and groundwater are potentially at risk of contamination from the construction and operational activities of all of the Project facilities, including the management of wastewater and other fluids generated by the Project and the storage and handling of other hazardous materials. There is also the potential for secondary impacts to human health as a result of soil and groundwater contamination. However, there will be no discharges to ground or groundwater of industrial process wastewater from the Project as the Project will operate a closed circuit zero-discharge waste water system.

The potential for land contamination to occur from construction and operation of the Project is predicted to be insignificant. The main potential impacts during the construction phase are likely to be from poor handling and storage of chemicals, oils, lubricants etc. as well as poor handling and storage of any waste arising from the Project. These risks can however be managed to reduce the likelihood and severity by means of good practice environmental management.

During the construction phase, risks will be managed via a Construction Environmental Management Plan (CEMP) and will be supplemented by an Emergency Preparedness and Response Plan (EPRP) and a separate Spill Contingency Plan in accordance with local Emergency Response regulations and IFC and HSE guidance. Operational risk will be mitigated using the proposed KPI Environmental and Social Management System (ESMS) which is being developed based on existing KPI departments and systems.

3.2.5 Ecology and Biodiversity

There is not likely to be any impact on protected areas during construction or operation of the Project as the IPC is over 60 km from the closest protected area. Project impacts on protected areas during operation are therefore predicted to be insignificant.

The Project could, however, have a number of impacts on ecology and biodiversity during the construction of the scheme, including noise and light disturbance from construction activities affecting birds and

mammals; dust deposition around working areas affecting adjacent habitats; increased risk of localised pollution events due to use of construction vehicles affecting adjacent habitats; accidental introduction and dispersal of invasive species from construction activities; and the temporary habitat loss during construction of the new water pipelines.

During operational activities of the Project, the potential adverse impacts on habitats, flora and fauna may include: a low pollution risk from the storage and transport of raw materials and finished products; a low risk of pollution from new gas pipelines that will provide natural gas to the plant; a negative impact on migrating birds as a result of emergency flaring; and increased disturbance and noise from workers having an impact on fauna.

Following mitigation, which includes incorporated mitigation measures and best practice mitigation measures such as the use of flares and wind breaks the potential effects on ecology and biodiversity are considered to be insignificant.

3.2.6 Water Resources and Water Quality

High evaporation levels and a low rainfall characteristic of the continental climate suggest the risk of rainfall related flooding from surface water runoff is insignificant for both construction and operation phases. It is also assumed that the IPC is not at risk of flooding from rivers both during construction and operation, due to the presence of sors and other depressions between the river and the IPC, which provide storage for flood flows, and due to a lack of a flow pathway between the river and Sea, and the IPC.

Water required for construction will be delivered by tankers and stored in tanks and potable water will be supplied from a new pipeline being connected to the existing potable water supply in the area. Once constructed all waste water will be directed to the new process water treatment plant (PWTP) for treatment. During construction before the PWTP is operational waste water will be stored onsite and removed by a licensed contractor and treated offsite at an approved existing facility.

During operation, process water will be provided from a central water supply unit fed by a new pipeline connection to the existing Astrakham to Mangyslak pipeline. All the process water used within the Project will be recycled to reducing the water demand for the Project. The increased abstraction required during operation is considered to be insignificant compared to the existing flows in the Kigach river where the water will be sourced.

Potential risks will be managed by the pollution prevention measures set out in the Environmental and Social Management Plan (ESMP) for both construction and operation of the Project.

3.2.7 Materials and Waste Management

The Project will generate a number of waste streams during both construction and operation which will be classed as hazardous, non-hazardous and inert. The Project will have specific waste management practices to store and handle waste and it will be only be transported and disposed of by suitable external contractors. All waste will be stored in segregated containers located in specific storage areas within the

IPC prior to its final disposal. Where possible waste will be reused or recycled either within the IPC or by third parties. Any waste that cannot be reused or recycled will be sent to landfill.

All materials and chemicals required for the operational phase of the Project will be delivered by licenced contractors and stored in appropriate containers in specific storage areas. All the storage areas will have environmental controls such as bunds to prevent any potential leaks or spills reaching the ground or surface water. Spill kits will be located at each of the storage areas in the event of any accidents.

Following the implementation of the mitigation measures of the potential impacts from waste and materials handling is predicted to be insignificant.

3.2.8 Traffic and Transportation

The main potential impacts associated with traffic from the Project will be from increased number of vehicles on the road, potential transboundary effects, additional wear and tear on the roads, disruption due to abnormal loads and increased risks associated with road safety. In addition the construction and operation of the Project will increase the number of rail movements passing through Karabatan station.

A Construction Traffic Management Plan (CTMP) and subsequent Operational Traffic Management Plan (OTMP) will be produced. These will set out mitigation measures to enhance the efficient transport of any materials to site, whilst minimising congestion and disruption which could affect general traffic and the local population. In addition, any damage caused to the local road network will be repaired via a voluntary agreement that the contractors will enter into. Following mitigation, the potential effects from traffic and transport are not considered to be significant.

Additional rail movements associated with the project are not expected to be exceed four per day during the operational period and will be lower during construction and are therefore it is not considered that these additional trains would cause a significant impact.

3.2.9 Noise and Vibration

During the construction phase, noise will be generated by construction equipment and the movement of materials in and out of the site. During the operational phase noise will be generated by the process units themselves and transportation of products from the site. The closest receptors are the burial site and Karabatan station to the south and are located further than 5 km from the Project. Given the incorporated mitigation built within the Projects design and the distance between the IPC and the closest receptors increases in existing noise levels are predicted to be insignificant.

3.2.10 Greenhouse Gas Assessment

The Project has been carefully designed to minimise greenhouse gas emissions by maximising the efficiency of the processes involved through equipment choice and where possible using excess heat to generate steam and by reusing recovered process gas as a fuel. In addition the Project design minimises

releases of fugitive gases and instead any fugitive emissions from storage tanks will be collected and combusted within the Projects flare.

The total amount of CO_2 emissions generated from the proposed Project have been quantified using best practice current guidance and are anticipated to be approximately 707,000 tCO_2 per year. This is equivalent to 0.26 % of total annual emissions in Kazakhstan. As part of the requirements of the international standards applied to the Project emissions of greenhouse gases will be reported annually to Lenders and published on the KPI website.

3.2.11 Cultural Heritage

KPI undertook an archaeological survey which identified no historical or cultural remains were located with the actual Project site. There are however three known cultural heritage features within the wider study area that include a burial site, which is a monument of local value, and two cemeteries. None of the project infrastructure or construction activities will occur within 200m of these cultural heritage features and there will be no direct impact during construction or operation if the Project.

However, there is the potential that cultural heritage assets could be found during the construction phase as ground is dug up and moved and as such a 'Chance Finds' procedure will be developed which will instruct the contractor what to do should an archaeological find be found.

3.3 Interactions with other Projects

Cumulative impacts are those impacts that may result from the combination of past, present or future actions of existing or planned activities in a project's area of influence. While a single activity may not result in a significant impact, it may when combined with other impacts in the same geographical area and occurring at the same time, result in a cumulative impact that is significant.

The ESIA takes account of the IPC's shared facilities which will contribute to emissions to air and greenhouse gas emissions. In addition the assessment has taken into account cumulative effects of the other proposed process plants including the proposed developments of: an ethylene and polyethylene production plant, a butadiene production plant, and the plastic bag production plant that will be located within the IPC. The ESIA has also considered the Bolashak Onshore Processing Facility (commonly called the Karabatan Refinery), operated by AGIP KCO which is located 16 km to the south of the IPC.

Potential cumulative impacts may occur in relation to emissions to air, greenhouse gas emissions, construction traffic, construction and operational noise, water abstraction and loss of grazing land. However, the ESIA assessments have concluded that the Project, in combination with the other developments in the area, will not result in any significant impacts following mitigation.

3.4 Managing the environmental and social impacts

An Environmental and Social Management Plan (ESMP), which includes an Environmental and Social Action Plan (ESAP) that draws upon the management and mitigation measures which have been defined

within the ESIA, has been prepared. The ESMP/ESAP is presented as Volume IV of the ESIA documentation. The primary objective of an ESMP/ESAP is to provide a framework for the effective management of potential environmental and social issues in order to safeguard the environment, site staff and the local population from site activity that may cause harm or nuisance. The ESMP/ESAP, which also covers monitoring, is the basis of the environmental and social protection measures to be implemented by KPI and its contractors during the construction and operational phases of the Project. Compliance of the Project during its construction and operational phases will be closely monitored by the Projects lenders through regular reporting by KPI and construction and operational monitoring visits by the Lenders.