Republic of Panama

Environmental Impact Study
Category II

Type of project: Commercial
Project Name:

"Project of receipt, storage, regasification,
Distribution and marketing of natural gas, and construction
In a thermal power plant"

The project promoter: LNG GROUP PANAMA, S.A.
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1.0. Index

Observation N/A - Not Applicable

2.0 EXECUTIVE SUMMARY

2.1 General Data Of The Company

The project sponsor is **LNG GROUP PANAMA, S.A.**, whose legal representative is **JOSÉ DAPELO BENITES,** with passport No. C488000. The company is written in the Public Registry of Panama in 674296, 1643967 Document tab.

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2.2 Description of the project; Estimate budget to be developed

It is very important to note that in the EsIA presented is only and exclusively the liquefied natural gas terminal and the central heat shield. For the other infrastructure to support the development of this project will be presented the respective environmental impact studies.

The project will consist in the installation of a terminal to exploit and develop the activity of reception, storage and regasification, distribution and marketing of natural gas, as well as to exploit and develop the activity of electricity generation through the construction, installation, operation, and maintenance of a 150MW combined cycle power plant using natural gas as a fuel, with their respective lines of connection to the transmission networks, processing equipment and fuel handling facilities, in order to produce and sell power and energy, and all that is contemplated and planned for the areas free of oil. The project is located with the following coordinates in UTM: 1031911 E

0620402 N (polygon 04-01 of 7,033.23 ha + 40 m²) and 1032359 E 0620112 N (Lot B of 7 ha + 8, 911, 85 m²).

The Liquefied Natural Gas (LNG) - Telfers Island, in the province of Colon, will occupy an area of approximately 40 hectares in which you will build the main components of the project and will be located in the plot No. 3 The plan prepared by the Administrative Unit of goods reversed.

For the design of the capacity of the Thermal power station and the commercial strategy of the business, takes into consideration the current conditions of the Panamanian Electricity Market, market projections for the short and medium term, and the projection of the demand in the area of the plant to supply the new industries that are installed.

The plant will be located in the area Telfers Island, in the plot No. 1 The plan prepared by the Administrative Unit of goods reversed. In the first phase of the project, the plant will consist of two natural gas turbines with a capacity of 45 MW each, with their respective generators. The fuel necessary for the generation of these two turbines will be the natural gas. For the second phase will be installed a boiler to generate steam and a steam turbine of 40 MW of capacity and two heat recovery systems.

In the planning stage, perform a variety of activities, among which we can mention: Collection of existing information, the conduct of preliminary field studies and final designs, studies of current capacity and feasibility of drinking water systems, sanitary service, electrical service and communications, preparation of the Environmental Impact Study and its approval, obtaining all permits with the corresponding authorities.

The construction of the project involves activities such as the rethinking of the area, movement of land, demarcation of spaces, excavations for foundations, construction of the infrastructures designed, installation of equipment. Will be used in the construction materials of first quality and will comply with the technical standards of quality materials and construction of structures and services.

The activities mentioned above, the field work is relevant from an environmental point of view, since the actions that will be taken for the physical works of the project, constitute potential sources of impact.

The operation phase includes the operation of the Liquefied Natural Gas Terminal and the operation of the thermal power station.

In this study we analyze only the construction of the Liquefied Natural Gas Terminal and Thermoelectric Power Plant.

Liquefied Natural Gas Terminal

In the Liquefied Natural Gas Terminal will be carried out several operations and for each one will be built the necessary structure and appropriate equipment will be installed.

- ***Reception of the liquefied natural gas***

The receiving dock of Liquefied Natural Gas (LNG) is designed to download methane tankers of 70,000 - 180,000 m^3 of capacity. You will have 800 m long and may receive a

capacity between 70 thousand and 180 thousand m^3. Once the ship docks at the pier, five special download arms that are cooled gradually until the temperature of the LNG (-160° Celsius) to proceed with the operation. Three of these arms deal for the download, one only for the return of the gases of evaporation, and the remaining arm may be interchangeably both functions. Each arm is designed for a normal discharge capacity of 3 thousand m^3/h, liquefied natural gas is pumped from the ship to the cryogenic tanks for storage of the Terminal. The download time of a boat with LNG is 10 to 12 hours.

- ***Storage***

The terminal will have two high-security cryogenic tanks with a total capacity to store 150 thousand m^3 of LNG in two tanks of 75 thousand m^3 (with a diameter of 61 m and 41 m in height). The cryogenic tanks are designed to withstand earthquakes adjusted to international standards.

The Liquefied Natural Gas (LNG) is stored without pressure to -160° Celsius in special cryogenic tanks sealed. These tanks have a system of two compartments, the main nickel steel and aluminum, which is designed to hold the LNG at low temperatures, and the secondary concrete, designed to ensure that any leakage is contained and isolated. The storage facilities used advanced monitoring systems to detect immediately spills, leaks or leakage of gas liquid or gaseous. All piping that goes in and out of the tanks on the top and on the level of the gas stored, so as to avoid leaks through valves and connections. In addition, these tanks have various security systems such as alarms, emergency closings and controlled atmosphere.

- ***Gasification***

Once you need Natural Gas, LNG is removed from the tanks by means of a pumping system, to be warmed in vaporizers to the temperature at which returns to its gaseous state. Starts the process of making it back to the gaseous state. This operation is performed through pumps that carry the LNG to pressure from the tanks to the regasification plant area, where you will find the best vaporizers. The Terminal considers

2 vaporizers of open panel (ORV), which will operate in, each of them with a regasification capacity of 3 million m3 per day. In descriptive terms, the vaporizers Open Rack Panel Vaporizers, ORV) consist of pipes that are bathed with a film of sea water at room temperature. As the sea water temperature is very higher than the temperature of the LNG (between 18 and 20 ° Celsius depending on the time of year, against -160° Celsius), the Natural Gas in liquid is heated with sea water, returning to its gaseous phase. The exchange of temperature vaporizes the LNG, sending the Natural Gas to the pressure and temperature to the transportation pipelines.

- ***Distribution of natural gas***

The distribution of Natural Gas, already in a gaseous state, will be carried out through a system of pipeline to the facilities of the large consumers and to the Natural Gas deposits (gasometers) to be installed on the Atlantic coast and in the pacific coast. In these deposits of natural gas will be compressed gas to enable their transport by trucks and rail cars to those areas of consumption where there is economic transport by pipeline.

Thermoelectric

The project of the Central Heating is carried out in two phases.

In the first phase of the project, the plant will consist of two natural gas turbines with a capacity of 45 MW each, with their respective generators. The fuel necessary for the generation of these two turbines will be the natural gas.

For the second phase will be installed a boiler to generate steam and a steam turbine of 40 MW of capacity and two heat recovery systems. The water required for the generation of steam will be taken from the Lemon Bay. The water of the bay will be carried out through a pipe of 30 inches in diameter and will be buried in all the way from the Lemon Bay to the Central Heat Shield. The plant will have an installed capacity of 130 MW. The annual generation will be approximately 1,120 GW/h/year.

The marketing of the electrical energy generated will be carried out through contracts of sale (Power Purchase Agreements, mainly to large industry of Panama, to large consumers in the area of the Atlantic and the Pacific, energy distributors at the national level and the remaining power will be negotiated in the Telfers Island area with the new industries that are installed. The 65% of the energy produced, in term contracts (PPP's) to five or ten years placed the great industries of Panama, and to industries installed within the area Telfers Island. The 35% of the energy produced, in the Wholesale Electricity Market, in contracts for the sale of electrical energy to the casual market or “Spot Market".

The panel is composed of:

- 2 natural gas turbines of 45 MW capacity each;
- 2 Heat Recovery Systems;
- 1 steam turbine of 40 MW of capacity;
- The corresponding processing equipment;
- Beach maneuvers;
- High Voltage Line (LAT) to a remote substation of the interconnected system;
- Upgrade of the remote substation in order to receive the power generated by the plant;
- Facilities for the reception of natural gas
- Aqueduct
- Maintenance Workshops

It is not considered stage of **abandonment** in this project, however, once the construction phase will leave the place totally clear of debris and completely clean.

The project will be developed in three stages. In the first stage will be built the Liquefied Natural Gas Terminal, in the second stage, will build the plant, which in turn will have two phases. In the first phase two turbines will be installed in the second phase, a boiler and turbine.

According to what is established in the lease and investment, the implementation of the project will be carried out according to the schedule attached.

PHASES	DURATION	DESCRIPTION	AMOUNT (B/.)
PHASE 1	3 years after the date of the order to proceed	Reception, storage and regasification of Liquefied Natural Gas	300,000,000.00
PHASE 2	2 years counted from the expiration of the Phase 1	Vehicular Natural Gas Infrastructure	45,000,000.00
		Distribution Infrastructure for Domestic Use	115,000,000.00
		Pipeline System	160,000,000.00
		Thermal	130,000,000.00
		TOTAL	**750,000,000.00**

With all the assumptions listed above would be a daily flow or spending estimated at 220,000 m^3 of sea water, which with 20 days of productive hours give a design flow of 11,000 m3/h (3 m^3/sec).

During the **construction** materials of construction typical: sand, cement, iron, concrete, steel plates with special alloy steel pipes, thermal insulation materials.

During the **implementation and operation** , is based on the provision of LNG as a fuel, sea water for the warming in the regasification process (previous data), diesel as an alternative fuel, electric power generation, water usually drinking water for human consumption of staff and demineralized water for generation turbines (emission control). The Liquefied Natural Gas (LNG) is difficult to ignite or explode and is non-toxic and non-corrosive. It is a colorless and odorless element that does not contaminate the soil or water, and that in the event of a spill evaporates and leaves no residue.

The project will require sea water for the generation of steam in the boiler and to the process of regasification plant at the Terminal will be taken from the area of Puerto Cristobal. The water will be carried out through a pipe of 30 inches in diameter and will be buried in all the way from the area of Port of Cristobal until the location of both projects. The implementation of this project will not have significant impacts in greater demand for drinking water in the region of influence. The project will not affect the distribution of water in the area where it is located.

In the **construction phase you** will need the following staff (skilled and unskilled): a Structural Engineer, Civil Engineer with specialty in health care, Civil Engineer, Architect, Technicians, Electricians, Plumbers, Carpenters, Masons, Surveyor, painters, inspectors, Administrative Staff (Manager, secretary, etc.), Foreman, Electrician.

In the stage of **operation** will need to be skilled and qualified: Plant Manager, Supervisors, Operators, Assistant Operations, Mechanical Engineer, Electrical Engineer, Assistant Manager, cleaning staff, security, Drivers, General Manager, responsible for contracts, Chief of Finance, Personnel, Technical Support Engineer, Accountant, Assistant Accountant, Secretary, Clerk.

In the **construction phase,** the solid waste that this project is going to produce are diverse composition (vegetation and land) extracted from the land levelling, household

waste generated in places of rest and feeding of workers (food, paper, cans, plastics and other), remains of construction materials, packaging equipment.

In the **operation stage of** the solid waste generated in the project are domestic type waste (paper, packaging, office materials, remains of food, plastics) from the administrative offices and generated by the employees, packaging, paper, packaging, pieces from the maintenance of the equipment installed in the Terminal and the thermoelectric plant, material type of sludge resulting from the demineralization of sea water, which will be used in the boilers for the operation of the steam turbines in the power plant.

In the **construction phase,** it is expected that the proposed project will generate the following liquid waste: spills of hydrocarbons and fuels from the equipment used in the construction of the infrastructure, liquids from the physiological needs of the workers who will work in the construction of the project. Provide staff with portable toilets, waste will be collected by a contractor who meets the standards of disposal of waste water and sludge.

In the **operation stage of** liquid wastes that are generated are: wastewater generated by the employees and from health services and sink installed in the administrative office of the terminal and in the Thermoelectric Power Plant.

In the **construction phase,** the gaseous waste that are generated are the gases of the combustion products of the operation of the equipment used, such as trucks, tractor, backhoe, shovel, etc. These emissions are minimal, since this team consists of systems of control of exhaust gases.

In the **operation stage of** the main source of gaseous emissions will be the Thermoelectric Power Plant.

The emission of waste into the atmosphere and the own combustion processes that occur in the thermal power plants have a significant impact on the environment. In any case, to a greater or lesser extent, all of them emitted to the atmosphere carbon dioxide, CO_2. Depending on the fuel, and assuming a return of 40% on the primary energy consumed, a thermal power plant emits approximately:

Fuel	**Emission of CO_2 Kg/kWh**
Natural Gas	0.44
Fuel oil	0.71
Biomass (Wood)	0.82
Coal	1.45

In the case of the project is to be developed, l as natural gas plants can be operated with the so-called combined cycle, which allows higher yields (up to a little over 50%), it would still take the plants that work with this fuel less polluting. The combined cycle natural gas are much cheaper (reaching the 50%) than a conventional thermoelectric, increasing the thermal energy generated (and hence profits) with the same amount of fuel, and lowering emissions cited above in a 120%, 0.35 kg of CO_2 , for each KW produced.

The gaseous emissions in a center that uses natural gas as a fuel in the process of power generation have the following composition:

Load Condition		BASE	BASE	BASE
NOx	ppmvd @ 15% O2	42.	42.	42.
CO	ppmvd	10.	10.	10.
UHC	ppmvw	7.	7.	7.

EXHAUST ANALYSIS % VOL.

Argon	0.86	0.88	0.85
Nitrogen	72.05	72.66	70.73
Oxygen	12.86	12.94	12.63
Carbon Dioxide	3.27	3.31	3.20
Water	10.97	10.22	12.59

Hazardous waste will not be generated during the construction and operation of the project.

The area where the Terminal and the Thermal corresponds to an area where there are already established companies with operations similar to our project as are Atlantic Pacific, S.A. (APSA) in the storage of fuel from the Atlantic Coast and the PETROPORT with the storage of Liquefied Petroleum Gas which are neighbors of the area selected in the Telfers Island.

The estimated investment of the work is of B/. 750,000,000.00.

2.3 Summary of the characteristics of the areas of influence of the project.

The plains of the coast of Colon, where the project, belong to the group Aguadulce training Rio Hato (QR - Aha) and lithological composition is characterized by the presence of conglomerates, sandstones, shales, tobas, sandstones are not consolidated and pumice. These materials belong to the group of sedimentary rocks, which for the training Rio Hato and Gatun Locks sediment at the end of the Quaternary period (approximately 10.000 years ago), within the recent period, known as the Holocene epoch of the Cenozoic Era.

The lithological conformation of the area has been influenced by the volcanic processes of the activity of the "Valle de Anton", which can be seen through the presence of tuff and pumice; the participation of mechanical and chemical processes that have developed sedimentary rocks of the place.

The stratigraphy of the area of the development of the project, in the top[1], is characterized by non-consolidated sediments, filled with sand and corals. Underlying in addition, formations of lacustrine sediments [2] (sediments Holocenos), made up mainly of silty sand, silt and organic clays.

The soil has a use of operations similar to our project as are Atlantic Pacific, S.A. (APSA) in the storage of fuel from the Atlantic Coast and the PETROPORT with the storage of Liquefied Petroleum Gas which are neighbors of the area selected in the Telfers Island. We also develop activities of the authority of the Panama Canal and Panama Ports Company.

The area is made up of **LOT B** , of 78,911.85 m^2 , with 30106-118990 Approved Level, and the **polygon 04-01** of 400,000.00 m^2 , with 30106-118989 Approved Level, which together have an area of 478,911.85 m^2 , which are part of the Farm No. 12875, inscribed in the roll 18.598 1 document, in the section of the Interoceanic Region, Province of

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1 Geological Map, Republic of Panama, Ministry of Trade and Industry, Mineral Resources, 1991

2 Geologic Map of the Panama Canal and Vicinity, Republic of Panama, 1980

Colon, of the Public Registry, located in the sector of Telfers, township of Cristobal, district and province of Colón. (See Appendix No. 1. Disclaimer The property).

The agrological capacity in the area of the project, corresponds to soils of class V, VI and VII (according to the classification of the Soil Conservation Service of U.S.A**.** The project area has traditionally been used for activities related to the adjacent port facilities and distribution of liquefied gas.

L as terrain elevations, where the project is located, in meters above sea level range from 0 to 2 meters above sea level in the lower elevation sites located in the coastal areas of the Caribbean Sea.

The climate that is presented in the study area, is determined by the influence of the oceanic masses, mainly in this case, the Caribbean Sea. The high humidity is an example of this, determining the properties of temperature of the air masses circulating between the oceans. According to the Köppen classification system, of the three (3) Climatic zones that exist in the Canal Watershed in the project area is considered to be tropical wet climate (AWI), which is characterized by a higher average annual rainfall of 2.500 mm, a summer of three (3) months and an average annual temperature between 24° C and 26° C.

The meteorological features of the area of influence of the project, described for the elements: temperature, precipitation, and wind. This information is useful for establishing basic conditions for the design, construction and operation of the project must have.

The average annual temperature registered is of 26.88° C (80.4° F), with an absolute minimum temperature that goes up to 18.88° C (66° F) between the months of November and December, and an absolute maximum temperature of 52.5° C (95°F), registered in the months of May and October. However, the minimum and maximum averages for the year are located at 24.55° C (76.2° F) and 29.33°C (84.8° F), respectively, which shows a

thermal gradient averaged approximately ± 2.4 °C.

In general, the rainy season is beginning in the month of April and ends in the month of November to December; but is mainly concentrated between the months of October and November.

The currents are linked closely to the movements of the earth and the exposure of the oceans to the solar rays. In turn, the sea-atmosphere interaction determines the properties of heat and humidity of the air masses that circulate through the oceans, affecting heavily the meteorology which is manifested on the earth.
The hydrometeorological information is presented below:

Average tides in the area of Columbus
(With reference to the data of the precise level of the Panama Canal)

Averages	Height in feet
Monthly of the highest high tide	+1.022
High Tide	+0.453
Sea Level	+0.016
Low Tide	-0.405
Monthly of the lowest tide	-0.818

Source: Department of Meteorology of the Panama Canal Authority, 1994

There are no wells drilled within the project area. The activities to be developed will affect groundwater.

The characteristics of the air quality are modified by the presence of sources of pollutants, of which in the project's area of influence, are distinguished only the corresponding to mobile sources of existing landfill and vehicles that circulate in the area and on the access roads.

Now the area is characterized with certain levels of noise by reason that the path that limits the field is used by heavy equipment transports grain or other goods to the interior of the country.

It was a timely noise sampling using a sound level meter digital brand Radio Shack 33-2055 model, with a range of manual operation of 50 to 126 decibels (db), with factory calibration.

The project will be implemented in stages and levels of noise generated will vary depending on the activities to be carried out in each one. The phase that will generate greater amount of noise will be the movement of land due to the machinery used. In the stage of operation noise is generated in the thermoelectric plant by the operation of the turbines.

During the visit in the project area were perceived characteristic smells of the garbage dump located in the area.

According to the "Map of areas of life of Panama [3] ", the project is located in an area of tropical moist forest (BH-T), which is reinforced with the plant characteristics described by Tosi in the book "Forest Inventories and Demonstrations, Panama, Areas of Life" observed in the field.

We can conclude that the vegetation present in the project area consists of a mixture of different stages of vegetation, in which you can clearly see a transition from secondary forest and young forest. From a low vegetation height that ranges between 3 and 7 m.

Then a preliminary list of the most notable species recorded in these types of vegetation or vegetative covers.

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[3] (3 http://www.anam.gob.pa)

Species of flora characteristic of the area of the Project

Family	Common Name	Scientific Name	T O	H	L	Ar
Cecropiaceae	Guarumo	Cecropia peltata	X			
Boraginaceae	Language of ox	Cordia curassavica				X
Polygonaceae	Uvillo	Coccoloba sp	X			
Malvaceae	Brush	Aids sp,				X
Rubiácea	Uvito	Palicourea guianensis				X

Legend: where A= Tree; Ar= shrub; H= Grass; L= Liana

Indicator species were observed in the project area of scrub bush (*Byittneria aculeata)* and the indicator species of nutrient-poor soils not suited for agricultural crops. There were no species in danger of extinction or endemic species whose populations may be affected by the project. The identification of the wildlife of the area of the project was done through inspections of the area, in which we had the opportunity to observe and identify the species of birds, and reptiles. During the tour there was a lot of smoke from a fire in the existing landfill, which resulted in the absence of animals in the area, except turkey vultures that remained at the site of the landfill. We can mention that there are species identified by the inhabitants, among which we can mention smoke it could be observed that some ñeques ***(Dasyprocta punctata)***, lazy two fingers ***(Choloepus hoffmanni)*** and three-toed sloth ***(Bradipus variegatus)*** . They also identify the presence of reptiles. Observed ***Caiman crocodilus, Boa constrictor, Ameiba ameiba, Iguana iguana*** *and* ***Basiliscus basiliscus***.

In the area of influence of the project, are not representative ecosystems of significant ecological importance.

The current use of adjoining sites of the project, as we have indicated above the area where the Terminal and the Thermal corresponds to an area where there are already

established companies with operations similar to our project as are Atlantic Pacific, S.A. (APSA) in the storage of fuel from the Atlantic Coast and the PETROPORT with the storage of Liquefied Petroleum Gas which are neighbors of the area selected in the Telfers Island.

According to figures from the National Population and Housing Censuses in the year 2000, the province of Colón has a population of 204.208 inhabitants and a population density of 41.8 inhabitants per km^2. By comparing these figures with those of 1990, when the total population of the province was of 168.294 inhabitants with a population density of 34.4 inhabitants/km^2, there has been a growth of 32.514 inhabitants in 10 years. The Index of masculinity is referred to the relationship between the number of men and women in a given population, which is expressed as the number of males per 100 females. At the level of district, Cristobal for the 2000 an increase has been observed in the male population, with a number of 312 men over the total number of women.

In relation to the percentage of unemployed in the province, there is a 17.60% across the province, on the other hand, in the district the 17.94% is also unoccupied. To observe these percentages, it is concluded that the unemployment of Colon is not so high and that the increasing opening of labor markets in the region is able to absorb the labor potential. The median monthly income in the home of the province is of B/ 377.6 and B/.416.8 district. With these figures can be perceived that the income of the inhabitants of Colon is quite acceptable, but as specified in the previous paragraph, these figures are presented as median and cannot determine other income higher or lower.

Currently, in the city of Colon and the surrounding area, including the community of Sabanitas, the management system of the wastewater consists basically in the sanitary sewer of the I.D.A.A.N. In the city of Colón and its surroundings, including the communities of Sabanitas, Cativa, Puerto Pilon, Villa Alondra and Cristobal, the management system of the wastewater consists basically in the sanitary sewer system and primary treatment in septic tanks and percolation Imhoff and seagrass beds. The

predominant productive activity of the community is oriented toward commercial, industrial, transport, storage.

2.4 More relevant information about the critical environmental problems generated by the project

The project consists of the construction of a liquefied natural gas terminal and a thermoelectric power plant. The area where the aim is to develop the project is an area designated for industrial use, where there is already operating a liquefied natural gas terminal.

The construction of the project will affect the landscape partially, the existing vegetation and fauna present. Affected the air quality in the construction stage by contamination with dust, produced by the movement of soil and traffic of heavy equipment, and in the operation stage by gaseous emissions of thermoelectric power plant. You can register vibrations and noise from the operation of turbines and generators of electric energy and for the operation of the gold teams involved in the activities. Being the gas a volatile substance and with explosive powers, there is the possibility of a fire and explosion hazard.

2.5 Short of scrimption of positive and negative impacts generated by the project

The potential **positive impacts** are: employment generation, improvement of the quality of life of the population, development and intensification of economic activities, increase in the value of the land, changes in the division and possession of the property, uses compatible with the territorial planning.

The following are the possible **negative impacts** that can be generated in the middle by the actions of the project.

Potential Impact	Description
Increased levels of emission of particulate material	Is produced by the generation or increase of particulate emissions, the effect of the movements of land, loading and transport of materials, movement of equipment in the work, fixed machinery operation and traffic. You can directly affect the quality of the air in the immediate area of influence of the project.
Increased levels of emission of combustion gases	Corresponds to an increase in greenhouse gas emissions resulting from the combustion of fuels (mainly carbon monoxide, oxides of nitrogen, sulfur dioxide and organic gases), due to the movement and movement of machinery, vehicles and aircraft. You can directly alter the quality of the air in the direct area of influence of the project.
Alteration of the geological material Formations (Gatun and Aguadulce)	Is the scarification or destruction of formations, product of the movement of earth, rocks for the obtaining of stone material for fills and achieve grade level.
Modification of the topography or shape of the highlight current	This impact is originating with the actions of movement of earth and rock, leveling and compaction of the soil, which involve the court of wavy and fill areas of sites with depressions, to obtain a flat topography for the construction of the civil works of the project.
Soil Erosion	This impact would be produced by the elimination of vegetation cover and land movement that exposes the soil to the effects of the rain water runoff, intensified by the existence of slopes of fillers is not protected, with slopes or inclines.
Soil loss	It consists in the removal and total or partial burial of the soil horizons product of the occupation of the land for the construction of the project works.
Alteration of the physical properties of the soil	This is the physical modification of the soil, in terms of their apparent density, permeability and structure by the compaction.
Alteration of the quality of soils	Would take place by the accidental contamination or bad practices, by the dumping of substances or solid and liquid wastes during the construction and operation of the project works.

Potential Impact	Description
Alteration of the quality of the waters	Would correspond to a variation of physical-chemical concentrations that have the waters with respect to the base line, due to the movement of earth and rock, loading and transport of materials, movement and operation of equipment, machinery and vehicles, waste management, use and management of hazardous substances or contaminants. These actions can produce the contribution of pollutants by inappropriate practices or accidental spills.
Risk of damage to the people, by the increase of the levels of noise	This impact would occur when, in the presence of sensitive receptors, the emission of noise exceeds the value set by the legislation in force.
Risk of damage to the fauna, by the levels of noise generated	This impact would be submitted when the elements of the fauna present in the project areas and its surroundings, are affected in their habits due to an increase in the levels, frequencies and durations of noise. This can affect the habits, migration, reproductive rights, among others.
Risk of loss of biodiversity through the removal of vegetation and flora	It would be up to the elimination of the existing vegetation in the area and the possible, or not, replacement of the same by natural or anthropogenic processes.
Risk of loss of habitat for wildlife	Triggered by the disappearance and subsequent replacement of a habitat for wildlife, due to the removal of the vegetation cover, leveling and compaction of the soil, paving, stabilization and revegetation.
Generation of jobs	The implementation and operation of the Project works will require a direct way the hiring of labor and indirectly induced employment, due to the multiplier effect of economic activities that would lead to a fundamentally strong modification of the labor market in the district of Columbus.
Risk of accidents	Would consist in the possibility of a worker suffering a certain damage resulting from their work activity. Are considered diseases, diseases or injuries with reason or on the occasion of the work.
Migration of population	The generation of expectations for work in other areas of the country, can cause displacement of people in search of jobs that the development of the project demand or induces, altering the demographic structure and the population of the District of Columbus.
Improving the quality of life of the population	The generation and development of economic activities, increased employment, creating sources of income for the population and the State, the establishment of services, improvement of the environment and other externalities of the project may contribute to the improvement in the living conditions of the population.

Potential Impact	Description
Development and intensification of economic activities	The creation of a thermal power plant and the distribution and marketing of natural gas, would result in the creation of externalities that encourage investment and multiplication of complementary activities or support, as well as other similar or specialized, aimed at different markets.
Changes in the division and possession of the property	The project considers the use of the plots of land in concession to develop the project. In this way, the state-owned land are delivered in concession to a private for the installation and development of economic activities
Increase in the value of the land	The establishment of the project involves the establishment of basic services that require industries to be able to carry out its work (sewers, roads, electricity, telephone, etc.), along with the area of value added activities. Each of these items adds value to the ground, since there would be a demand for the areas that they plan to develop by third parties for commercial-industrial uses.
Involvement of the system of collection and disposal of solid waste, increase in his generation	Would be generated by the increase in demand and coverage of basic services for collection and disposal of waste and construction, affecting their availability and quality.
Alteration of the traffic	During the stages of construction and operation would be an alteration of the traffic, by an increase in vehicular movement on main roads. These have a volume flow schedule, which will increase with the entry and exit of freight transport and other minor vehicles that will accede to the project.
Deterioration of the road network	Would be produced by the movement of trucks and heavy equipment on the tracks, product of the transport of materials and other products, without complying with the standards that can support each way. This impact can cause indirect effects such as damage to vehicles, vehicle maintenance costs and increased costs in maintenance of the roads by the competent institution.
Uses compatible with the territorial planning	Within the areas that can intervene the project, there are zoning with land uses that correspond to the activities that the project will develop.

Source: Prepared by the consultant. 2010

2.6 Description of mitigation measures, monitoring, surveillance and control provided for in respect of each type of environmental impact identified.

The following are recommended mitigation measures:

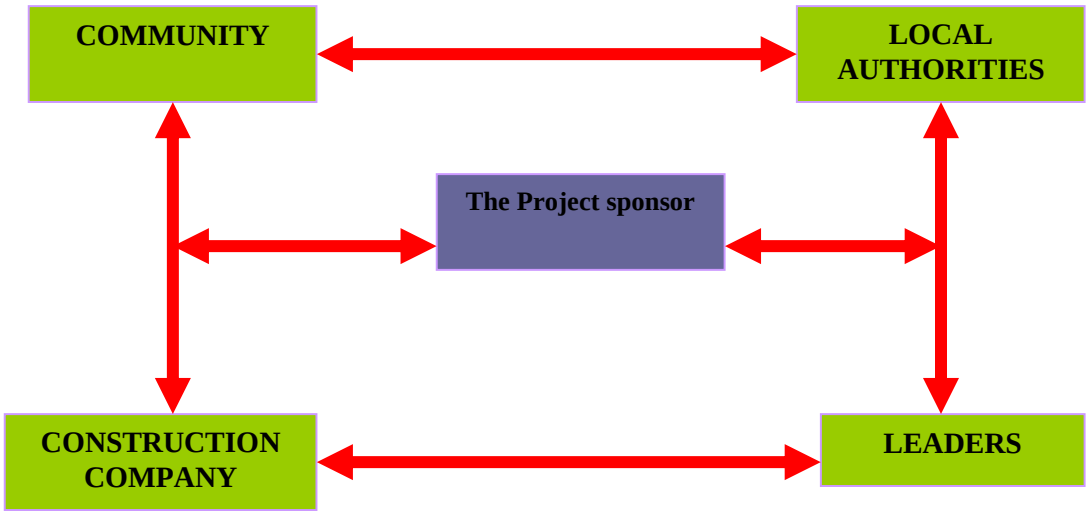
- Require contractors´machinery in good mechanical condition. Check that the machines are in good state of maintenance during the work to be done in the project.
- The equipment and machines will receive regular maintenance and will remain in good working order to avoid and prevent excessive emissions and noise.
- Silencers or other noise control mechanisms will be used and maintained in good condition.
- The trucks traveling on public roads will be equipped with a canvas cover to prevent dust and the fall of materials during transport.
- These trucks must be in perfect operating condition to ensure public and occupational health and safety during operations.
- With regard to the emissions into the atmosphere of the different machinery to be used, must be permanent maintenance (fortnightly) in order to avoid pollution.
- All equipment must comply with the established noise limits for residential areas. Noise monitoring will be carried out with the aim of determining remedies and enforcement of environmental standards. In the case of detected levels of noise outside permissible limits, corrective measures will be necessary, such as vehicle maintenance, noise mitigation barriers, etc.

2.7. Description of the citizen participation plan.

Depending on the scope of the Executive Decree 123 of 14 August 2009, in its Chapter II: The Citizen Participation Plan, Article 30, we describe as developed by the consultant team in this area.

A. Identification of key actors within the area of influence of the project, work or activity (communities, authorities, organizations, community boards, environmental advisory councils, other).

The actors involved in the project which is the subject of study, can be clearly observed in the structure below.



The relationship that must exist between the different actors involved in the implementation of the project is broadly reflected in the figure. This implies a close relationship between the different actors, which allows an absolute communication and trust between them, which ensures continuity of the project. The fundamental actor of the work, is identified with the community to avoid misunderstanding and mistrust.

B. Participation techniques employed to key stakeholders (surveys, interviews, workshops, assemblies, meetings, etc.), the results obtained and its analysis.

Within the participatory techniques employed, we have the implementation of survey, informal interviews. Everything was led by a document attached in the annex. The results in our view were satisfactory and can be seen clearly in point 8.3 (local perception on the project, work or activity (through the Citizen Participation Plan). An objective

analysis of the results of the Plan of participation, the acceptance of the work but, with some apprehensions that are no more than a reflection of lack of information and domain on the subject of the work proposal.

C. Techniques of dissemination of information employees. Given the complexity and dominion of the topic to be discussed, was used as the diffusion technique, the open conversation. This allowed a direct relationship with the main actors of the project. This discussion was allowed in the first place, trust between them and, on the other hand, a comprehensive explanation of the scope of work proposal for its development. In the annex is an informative document of Notice of Public Consultation, which was used as a guide to inform the community about the scope and development of the work proposal.

D. Information request and response to the community. One of the concerns presented by the community is the contamination of the environment, fauna, flora and people. If it is true, was expanded in some way the explanation of the scope of the work, it is recommended that the implementation of alternatives that permit the increase, to the extent possible, the degree of knowledge of the community on the proposed project. This will help to avoid any disagreement about the project, once the implementation of the same. This is the best means of responding to the requests for information and response to the same.

E. Input from key stakeholders. For the phase that involved the community in the Citizen Participation Plan, one of the greatest contributions, was offered by the consultant team. The contact between the two sides, cleared my doubts with the daily live and evolve in the area you have chosen to run the project. In the analysis of point b (participatory techniques employed to key stakeholders (surveys, interviews, workshops, assemblies, meetings, etc.), the results obtained and its analysis, with clarity, the latent concern of the inhabitants of the area of influence of the project and the mechanisms that the consultant team poses to settle the differences indicated by them.

F. Identification and resolution of possible conflicts generated or strengthened by the project. A fundamental aspect that must be considered by the managers of the work, is to maintain a direct and permanent communication with the community, so that if it were ever to be some inconvenience, this can be remedied by means of dialog and understanding between the parties. It is advisable and prudent, provide all possible opportunities to those who express affectation or disagreement around the project, as well as delivering answers that satisfy the nonconformity of the affected.

To occur some incident in this regard, we must not lose sight of the three fundamental characteristics for the resolution of conflicts and which we quote below: Focus the dispute to apply a solution, the negotiations must be based on the interest and can be supported with the existence of a third of impartial type.

It is the responsibility of the Company, strict compliance with the agreements established with the Community, prior to the start of the construction of the work or any that may arise during the process or when it is to start operations. This will help to ensure the strengthening of the relations that should prevail between the Community and the promoter of the project.

2.8. Sources of Information Used

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3.0 INTRODUCTION

3.1 Scope, objectives and methodology of the study presented.

The document that was prepared and presented for the evaluation of the ANAM has as **objective to** analyze the impacts that can cause the different activities of the project in its four stages of development (planning, construction, operation and abandonment) and recommend measures for the minimization of the negative effects. Another objective of

the document submitted is to obtain the permission of the ANAM for the development of the project. To achieve these objectives has been developed the **scope** of the study presented: a detailed evaluation of the area where the aim is to develop the project, an analysis of the activities of the project and its consequence (impacts that may cause) for the natural environment, development of Environmental Management Plan which will minimize the negative effect that you will be able to have the development of the project for the natural environment. The **methodology** used consists of:

- Development of a work schedule.

- Visits, travel to the area where the aim is to develop the project by the interdisciplinary team, collection of field information related to natural environmental factors: physical, biological and socioeconomic aspects.

- Socio-economic data collection and application of adjacent to the population survey on the acceptance of the project, interviews with persons representing the community and the government sector, in compliance with the regulatory process.

- Collection of statistical data on the population of the area, climate, geology or other bibliographic aspects.

- Interview with professionals who know the construction sector and the energy, and the problems that may arise with the development of the project.

- Consultations on the internet.

- Analysis of the activities of the project in its different stages, the infrastructure build, financial data and other information relevant to this.

- Analysis of the activities of the project versus factors of the natural environment made by each team.

- Discussion of the impacts identified and recommended mitigation measures.

- Development of the document.

- Are the recommendations or suggestions needed to achieve the goals proposed to the project promoter. At the time of delivery of the final document, is aware of all the commitments made to the developer and responsible for the environmental part of the project. .

3.2. Categorization: Justification of the category of the EsIA in function of the environmental protection

During the assessment of the environmental impact of the project, it was identified that this affects the criterion 1 (one) of environmental protection in their paragraphs b, c, and e., so a study **category II.**

The Condition 2 is defined when the project generates or presents a risk to the health of the population, flora and fauna and the environment in general. To determine the level of risk, consider the following factors:

B. The generation of flowing liquid, gaseous emissions, solid waste or their combinations whose concentrations exceed the maximum permissible limits established in the regulations of environmental quality;

C. The levels, frequency, and duration of noise, vibration and/or radiation;

E. The composition, quality and quantity of fugitive emissions of gases or particles generated in the different stages of development of the proposed action.

4.0 GENERAL INFORMATION

The Panamanian energetic reality requires urgently undertake an important development in the electricity generation capacity to support the desired growth in its economy. Very important projects such as the expansion of the canal, the development of the reverted areas (Telfers Island, Davis, Sherman, Howard) and give the energy needed to make Panama a country with capacity-building for industrial development with a view to exportation, require reliable power and competitive in the international framework. In addition there is a potential for export of electricity to the countries of the region.

The generation projects must be efficient to achieve levels of international competition in costs and environmental requirements. Thermal generation projects are necessary in order to guarantee the supply of energy when the hydrology does not supply the demand. The project based on the use of diesel and fuel oil as a fuel are not competitive because of its high cost and possible penalties for their emissions. The use of technology generation from coal is severely observed by the Kyoto Protocol.

With this reality, the first world economies have developed projects of Generation from Natural Gas (NG) to more than into the vehicular, industrial and domestic uses.

With the introduction of the cryogenic liquefaction technology methane is developing an entire industry of cryogenic storage and transport to meet the demand for this fuel in countries that do not have deposits of methane or are distant from the areas of exploitation and production without being able to have access to pipelines. Hundreds of reception facilities and storage of liquefied natural gas (LNG) have been built in the last twenty years, with a remarkable growth in Europe and in several countries of America, such as Brazil, Canada, Chile, USA, Mexico, Puerto Rico and the Dominican Republic.

Several countries with clear vision of the future of energy storage projects have been undertaken of this nature such as Argentina, Uruguay, El Salvador, among other projects that are promoted at the global level.

It is the opportune moment to consider the introduction of natural gas in the Republic of Panama as a fundamental part of the country's energy development.

The company's LNG GROUP Panama, has been studying the construction of the infrastructure necessary for the introduction of the GN to be used in the generation of electricity. In addition, the arrival of this fuel to the country would replace other fossil fuels currently used in electricity generation and large industries in Panama, as well as venture into the automotive market and domestic use.

The GN has the lowest environmental impact of all fossil fuels for its high content of hydrogen. Spills of natural gas are dissipated in the air and does not contaminate the soil or water. As a vehicular fuel, reduces emissions of nitrogen oxides (NO_x) in a 70%, and does not produce sulfur compounds or particles. For power generation emissions of sulfur dioxide, SO_2 practically are eliminated, and CO^2 emissions are reduced by at least 40%.

This change of fuel in the energy matrix will generate a significant improvement in the environmental conditions of the Republic of Panama measures as a base line.
Users of the gas (generators and industries), shall be entitled to issue certificates of emissions reductions that can be traded on the international stock market with very significant contributions to the economic model of the business.

The current conditions of the sector of the GN allow to have this fuel in a practical, economic and security of supply.

The liquefied natural gas (LNG) is natural gas that has been processed to be transported in liquid form. It is the best alternative to monetize reserves in secluded places, where it

is economic to carry the gas to market directly either by pipeline or by the generation of electricity. Natural gas is transported as a liquid at atmospheric pressure and to -161°C where the liquefaction reduces in more than 600 times the volume of gas transported.

The large natural gas producers have invested in the past 15 years in the construction of liquefaction of natural gas, LNG carriers that can carry the gas to consumption centers and trains of regasification plants.

To ensure the supply of GN the company LNG GROUP Panama has signed letters of intent with leading companies in projects of this size and specialty, which are supported by a provision of LNG in the long term.

In Panama, there is no specific legislation to regulate the construction of a terminal for reception, storage and LNG regasification, although there are strict rules for the protection of the environment and for the construction of hydrocarbon facilities in the Isthmus of Panama.

Interactions with officials of the Directorate of Hydrocarbons and Legal Advice of the Ministry of Commerce and Industry of the Republic of Panama, the company's LNG GROUP Panama has compiled a list of requirements for the approval of the project, which is provided in general terms, as an element of information.

By the nature of the project and the concurrence of several public entities in the same, the company's LNG GROUP Panama has referred to the contract for the construction and operation of the project is carried out under the figure of Contract-Law which includes the construction and operation of zones free of oil on the ends of the Panama Canal, with a pipeline connecting both zones, which would be considered an extension of the area of fiscal protection. The 30-year contract, with the possibility to renew for 30 more years in the conditions originally agreed upon, will clearly set out the obligations of the parties, including the fiscal responsibilities of the project to the State and the municipalities

through which to build the pipeline, while at the same time the rights-of-way and the use of national lands to be incorporated into the project, including the uses of the sea and the coast to the port facilities.

4.1 The Promoter

The project sponsor is **LNG GROUP PANAMA, S.A.**, whose backgrounds are detailed below:

- Public Register : 674296 Tab, Doc. 1643967
- Legal representative : **JOSÉ DAPELO BENITES**
- Passport : No. C488000
- Telephone : +507 391-6995 / +507 263-2084
- Fax : +507 263-0284
- E-mail: : jfabrega@fs-consultores.com
- Physical Address: :
- Contact person: **Lic. Julio Fábrega**

The company signed with the Panamanian State a lease and investment with an option to purchase 48 hectares of 5945.08 m^2, divided into two lots, for a term of 40 years (Cabinet Resolution No.7 of 19 January 2010). The land is located in the Telfers area, Corregimiento de Cristobal, district of Colon, province of Colon.

4.2 Peace and issued by the Department of Finance of ANAM

On the next page is attached, Peace and safe and the receipt of payment of the assessment of the EsIA.

5.0 PROJECT DESCRIPTION

The Liquefied Natural Gas (LNG) - Telfers Island, in the province of Colon, will occupy an area of approximately 40 hectares in which you will build the main components of the project and will be located in the plot No. 3 The plan prepared by the Administrative Unit of goods reversed.

- After obtaining the corresponding authorizations, will be built at the southern limit of the use of the seabed in **PANAMA PORTS** a pier of 700 meters long and 12 meters above the water level, which will allow the docking of LNG carriers, endowed with all the facilities for unloading and transport the LNG in a cryogenic pipeline of an approximate length of 1,500 meters to be built up to the storage tanks
- In the Plot No. 3 will be built two cryogenic storage tanks that will allow the download of the LNG and storage on the ground. Both LNG tanks will have a capacity of 75 thousand tons (ton). From these tanks, LNG is lead to the LNG regasification plant to GN.
- A regasification plant with three vaporizers that allows you to process 2.8 million tons per year of LNG, producing up to 5.5 million cubic meters per day of natural gas on the basis (and up to 7.5 million cubic meters per day) which injected into the gas pipeline network to use in electricity generation from most of the distribution in the central area of the country.
- A terminal for storage of natural gas (gasometers) on the Pacific Coast, whose location is determined.
- Compression Plant with islands of truck loading and/or wagons specially adapted for the transport of compressed natural gas in Telfers Island.

For the design of the capacity of the thermal power station and the commercial strategy of the business, takes into consideration the current conditions of the Panamanian

Electricity Market, market projections for the short and medium term, and the projection of the demand in the area of the plant to supply the new industries that are installed.

The plant will be located in the area Telfers Island, in the plot No. 1 The plan prepared by the Administrative Unit of goods reversed.

In the first phase of the project, the plant will consist of two natural gas turbines with a capacity of 45 MW each, with their respective generators. The fuel necessary for the generation of these two turbines will be the natural gas.

For the second phase will be installed a boiler to generate steam and a steam turbine of 40 MW of capacity and two heat recovery systems.

5.1. Objective of the project, work or activity and its justification.

The objective of the project is to build a Terminal of Liquid Natural Gas (LNG) for commercial purposes, as well as a thermoelectric power plant based on natural gas as fuel and the sale of electrical energy produced.

The justification of the project can be summarized in the following:

- The promoter with the Panamanian State signed a lease and investment with an option to purchase a plot of land in the Telfers Island of 48 Hectares + 5,945.08 m^2.
- The field has access throughout the year and sufficient area for the development of the project.
- The construction of the project will bring benefits to the country in the field of energy.

- The development of the project will generate a considerable number of working places, so necessary for the district of Colon.
- With the construction of the project there will be demand for construction materials and this will benefit the local and national economy.

5.2. Geographical location including map in scale 1:50.000 and UTM coordinates or geographic polygon from the project.

The project will be developed in the land, given in concession, the company's **LNG GROUP PANAMA, S.A.**, in the corregimiento of Cristobal, district and province of Colon.

See Annex No.2. Map of geographical location.

The project is located with the following coordinates in UTM: 0620402E and 1031911N; 0620112 E and 1032359 N and N (lot of 8 hectares).

5.3. Legislation, standards, techniques and instruments of environmental management and its relationship with the project, work or activity.

This information is presented in the following table:

Legislation and technical and environmental standards that regulate the Sector and the project, work or activity

Legislation	Topic	Comments
Act No.1 of 3 February 1994, the Forestry Law	To establish the forestry legislation of the Republic of Panama and other provisions.	Establishes the procedure for the felling of trees. Resolution AG-0054-20004, which establishes the procedure for the clearing of grasslands.
Law 24 of 7 June 1995, Wildlife Law	."By establishing the Wildlife Legislation in the Republic of Panama". Published in the Official Gazette No.22801, of 9 June.	Establishes sanctions for those who kill, capture, retain, trade or traffic in wildlife species.
Executive Decree No. 2 of 21 April 1997	Creates the Inter-Agency Technical Committee of Health, Occupational Health and Safety	Health, Hygiene and Occupational Safety for chemical substances.
Law No. 41 General of Environment, 1 July 1998	Establishes the basic principles and norms for the protection, conservation and restoration of the environment, promoting the sustainable use of natural resources.	Law that governs everything related to environment and natural resources in general
Executive Decree 255 of 18 December 1998	Regulates Law No. 36 of 1996 (ART.7, 8 and 10) and introducing other provisions. Regulates the parameters of pollutants for motor vehicles and the measurement of opacity for diesel vehicles	Control Vehicular Emissions. Control of paints, lacquers, varnishes and other substances with lead content. Biological Exposure Index and allowable levels of pollution. Management and control of wastes.
Resolution No. 506 of 6	By which the Minister of	

Legislation	Topic	Comments
October 1999	Commerce and Industry, approves the technical regulation DGNTI COPANIT 44--2000 Industrial Health and Safety. Conditions of health and safety at work environment where noise is generated.	
Technical Regulation 35-2000 COPANIT DGNTI -	"Amending Resolution No. 351 of 26 July 2000, which Approves the Technical Regulation 35-2000 COPANIT DGNTI -. Water. Liquid Effluent Discharge DIRECTLY TO BODIES AND BODIES OF WATER Surface and groundwater"	
Technical Regulation DGNTI-44-2000	Industrial Health and Safety, Hygiene and Safety Conditions in work environments where noise is generated.	
Decree No. 306 of 4 September 2002	By adopting the regulations for the control of noise in public spaces, residential areas or room, as well as in occupational settings.	
Decree No. 1 of 15 January 2004	Which is determined by the noise levels for residential and industrial areas.	
Executive Decree No. 209 of 5 September 2006.	Which regulates the Chapter II of Title IV of the Act 41 of 1 July 1998, General of Environment of the Republic of Panama.	
Executive Decree No. 123 of 14 August 2009.	Which regulates the Chapter II of Title IV of the Act 41 of 1 July 1998, General of Environment of the Republic of Panama.	

5.4. Description of the phases of the project, work or activity.

The project in its development includes four phases: planning, construction, operation and abandonment. As it is a commercial building, which is a civil works with a long useful life, the stage of abandonment is unlikely; however, it should be analyzed.

5.4.1. Planning.

In the stage of lifting of the information of field activities, among which we can mention:

- Collection of existing information and the conduct of preliminary field studies.
- The second stage consists of field studies of topography, among others.
- The research work includes studies of current capacity and feasibility of drinking water systems, sanitary service, electricity and communications.
- The preliminary geotechnical study produced an overview of the conditions of the soil.
- The collection of documents and data required through the National Geographic Institute Tommy Guard, for the field work, which includes the compilation of maps, research of existing utilities and identification of limits of artificial and natural project.
- Preparation of the environmental impact study and approval.
- Obtaining all permits with the corresponding authorities.

5.4.2. Construction/implementation.

The construction of the project involves activities such as the rethinking of the area, movement of land, demarcation of spaces, excavations for foundations, construction of the infrastructures designed, and installation of equipment. Will be used in the

construction materials of first quality and will comply with the technical standards of quality materials and construction of structures and services.

The main tasks in the construction phase of the project, are the following:

- Preparation of the final engineering project
- Development and management of procedures to ensure quality control.
- Activities in the field.

The activities mentioned above, the field work is relevant from an environmental point of view, since the actions that will be taken for the physical works of the project, constitute potential sources of impact.

Activities or actions of the project and duration in the Construction Stage

Actions	Duration of its Effects (Permanent or Temporary)
Hiring of labor	Temporary and Permanent
Clearing of plant material	Permanent
Movement of earth	Permanent
Loading and transport of construction materials	Temporary
Movement of equipment in work (heavy and light)	Temporary/Permanent
Fixed machinery operation	Temporary
Construction of infrastructures	Temporary
Physical protection of soils (erosion control)	Permanent
Revegetation with native trees, ornamental trees, shrubs and grass	Permanent
Fetching water for domestic use	Temporary
Signaling	Permanent
Domestic solid waste management	Temporary
Domestic liquid waste management	Temporary
Industrial liquid waste management	Temporary
Install / Generation of Activities and Services	Temporary
Vehicle traffic entering the project	Permanent

Hiring of labor

For the implementation of the project works (construction and operation), will require temporary labor and permanent. The first referred in particular to working positions offered for the construction of the project and the estimation of indirect jobs that this will lead, which have been estimated in total 5.000 new jobs, direct and indirect, and during the operation stage of the Project 2.000 new jobs direct and indirect jobs.

Removal of vegetation and cleaning

The first activity in the construction stage is the removal and cleaning of the first layer of the floor of the working area (0.10 m of the surface of the natural terrain), composed mainly of plant cover and soil organic matter.

Loading and transport of construction materials and equipment

Be used trucks of various sizes. The fuel in the diesel equipment is usually. However, they will also be used computers to gasoline.

Vehicle traffic entering the project

The traffic of vehicles that will access the project will increase the volume to that existing in the area of community activities, and at the present time do not hinder the track and the daily circulation of the sector, do not cause danger, injury or unnecessary inconvenience to persons, or damage to property.

Fixed machinery operation

Special care will be taken in controlling the potential emissions and spills liquids or solids, so as to ensure the safe operation and non-polluting. Be established in areas that allow for the containment and treatment of spills in the event occurs, which is provided for in the Contingency Plan.

Physical protection of soils

Also during the construction mitigation measures will be taken against erosion, in some sectors will be stabilized with grass or vegetation.

Revegetation

Concerning the control of erosion, it should be noted that the Project proposes to revegetate with shrubs and grass for physical protection of the soil.

Arborization

Does not apply

Fetching water for domestic use

The system of aqueduct of the project to interconnect to the existing network of I.D.A.A.N.

Signaling

It marked the areas of work and those that are risky, indicating the precautions and safety measures which must be met.

Informational signs, such as the name of your site. Preventive measures, such as signals the signals from hazardous areas.

Management of storm water drainage and rainwater

Does not apply

5.4.3. Operation.

This stage comprises the operation of the Liquefied Natural Gas Terminal and the operation of the thermal power station.

Liquefied Natural Gas Terminal

The operation of the liquefied natural gas terminal includes reception of natural gas regasification, storage, and distribution of natural gas:

- ***Reception of the liquefied natural gas***

Once the ship docks at the pier, five special download arms that are cooled gradually until the temperature of the LNG (-160° Celsius) to proceed with the operation. Three of these arms deal for the download, one only for the return of the gases of evaporation, and the remaining arm may be interchangeably both functions. Each arm is designed for a normal discharge capacity of 3 thousand m^3/h, liquefied natural gas is pumped from the ship to the cryogenic tanks for storage of the Terminal.

The navigation of the LNG carriers when approaching the bay and the pier is guided by channels and shall conform to the requirements of the Panama Canal Authority and its operations.

The download time of a boat with LNG is 10 to 12 hours.

- ***Storage***

Natural gas is stored in two high-security cryogenic tanks with a total capacity to store 150 thousand m^3

- ***Gasification***

Once you need Natural Gas, LNG is removed from the tanks by means of a pumping system, to be warmed in vaporizers to the temperature at which returns to its gaseous state.

Starts the process of making it back to the gaseous state. This operation is performed through pumps that carry the LNG to pressure from the tanks to the regasification plant area, where you will find the best vaporizers. The Terminal considers 3 vaporizers of open panel (ORV), which will operate in, each of them with a regasification capacity of 3 million m3 per day.

As the sea water temperature is very higher than the temperature of the LNG (between 18 and 20 ° Celsius depending on the time of year, against -160° Celsius), the Natural Gas in liquid is heated with sea water, returning to its gaseous phase. The exchange of temperature vaporizes the LNG, sending the Natural Gas to the pressure and temperature to the transportation pipelines.

- ***Distribution of natural gas***

The distribution of Natural Gas, already in a gaseous state, will be carried out through a system of pipeline to the facilities of the large consumers and to the Natural Gas deposits (gasometers) to be installed on the Atlantic coast and in the pacific coast.

In these deposits of natural gas will be compressed gas to enable their transport by trucks and rail cars to those areas of consumption where there is economic transport by pipeline.

For the purposes of this preliminary estimate, it is considered the following parameters:

- 20 hours of operation of regasification units.
- System performance 98.5 %
- LNG storage temperature -160ºC

- Target temperature for the natural gas gasified 10ºC
- Local sea water density 1035 Tn/m3
- Specific Heat local marine water 0.954 kcal/kgºC
- Sea water temperature is 25ºC
- Sea water outlet temperature 5ºC
- Lng with 95% or more of methane

With all the assumptions listed above would be a daily flow or spending estimated at 220,000 m^3 of sea water, which with 20 days of productive hours give a design flow of 11,000 m3/h (3 m^3/sec).

Thermoelectric

The project of the Central Heating is carried out in two phases.

In the first phase of the project, the plant will consist of two natural gas turbines with a capacity of 45 MW each, with their respective generators. The fuel necessary for the generation of these two turbines will be the natural gas.

For the second phase will be installed a boiler to generate steam and a steam turbine of 40 MW of capacity and two heat recovery systems. The water required for the generation of steam will be taken from the Lemon Bay. The water of the bay will be carried out through a pipe of 30 inches in diameter and will be buried in all the way from the Lemon Bay to the Central Heat Shield. The plant will have an installed capacity of 130 MW. The annual generation will be approximately 1,120 GW/h/year.

The marketing of the electrical energy generated will be carried out through contracts of sale (Power Purchase Agreements, mainly to large industry of Panama, to large consumers in the area of the Atlantic and the Pacific, energy distributors at the national level and the remaining power will be negotiated in the Telfers Island area with the new industries that are installed. The 65% of the energy produced, in term contracts (PPP's) to

five or ten years placed the great industries of Panama, and to industries installed within the area Telfers Island. The 35% of the energy produced, in the Wholesale Electricity Market, in contracts for the sale of electrical energy to the casual market or “Spot Market".

5.4.4. Abandonment.

It is not considered stage of abandonment in this project, however, once the construction phase will leave the place totally clear of debris and completely clean.

5.4.5. Schedule and time of execution of each phase

The project will be developed in three stages. In the first stage will be built the Liquefied Natural Gas Terminal, in the second stage, will build the plant, which in turn will have two phases. In the first phase two turbines will be installed in the second phase, a boiler and turbine.

According to what is established in the lease and investment, the implementation of the project will be carried out according to the schedule attached.

PHASES	DURATION	DESCRIPTION	AMOUNT (B/.)
PHASE 1	3 years after the date of the order to proceed	Reception, storage and regasification of Liquefied Natural Gas	300,000,000.00
PHASE 2	2 years counted from the expiration of the Phase 1	Vehicular Natural Gas Infrastructure	45,000,000.00
		Distribution Infrastructure for Domestic Use	115,000,000.00
		Pipeline System	160,000,000.00
		Thermal	130,000,000.00
		TOTAL	**750,000,000.00**

For the implementation of the different activities, was developed based on the following schedule of implementation.

Implementation Schedule

	Tasks	Duration Days	Home	End
1	**Government permits and authorizations**	90	01/10/2009	31/12/2009
2	**Financing**			
	2.1- Negotiation Conditions	120	01/01/2010	30/04/2010
	2.2- Signing Contracts	60	01/05/2010	30/06/2010
3	**Engineering**			
	3.1- Spring and Port Works	90	01/07/2010	30/09/2010
	3.2- Thermal	180	01/07/2010	31/12/2010
	3.3- Storage Tank	180	01/07/2010	31/12/2010
	3.4- regasification plant	150	01/08/2010	31/12/2010
	3.5- pipeline and complementary works	120	01/09/2010	31/12/2010
4	**Supplies**			
	4.1- Spring and Port Works	150	01/01/2011	31/05/2011
	4.2- Thermal	540	01/01/2011	30/06/2012
	4.3- Storage Tanks	360	01/01/2011	31/12/2011
	4.4- regasification plant	240	01/01/2011	31/08/2011
	4.5- pipeline and complementary works	180	01/07/2011	31/12/2011
5	**Construction and Mounts**			
	5.1- Spring and Port Works	270	01/06/2011	31/03/2012
	5.2- Thermal	450	01/10/2011	31/12/2012
	5.3- Storage Tanks	540	01/07/2011	31/12/2012
	5.4- regasification plant	540	01/07/2011	31/12/2012
	5.5- pipeline and complementary works	450	01/10/2011	31/12/2012

Note: Information from the promoter. 2010

5.5. To develop infrastructure and equipment to be used

In this study we analyze only the construction of the Liquefied Natural Gas Terminal and Thermoelectric Power Plant.

Liquefied Natural Gas Terminal

In the Liquefied Natural Gas Terminal will be carried out several operations and for each one will be built the necessary structure and appropriate equipment will be installed.

- ***Reception of the liquefied natural gas***

The receiving dock of Liquefied Natural Gas (LNG) is designed to download methane tankers of 70,000 - 180,000 m^3 of capacity. You will have 800 m long and may receive a capacity between 70 thousand and 180 thousand m^3. The download of the gas is carried out by means of five special arms with gradually cooled to the temperature of the LNG (-160° Celsius) to proceed with the operation. Each arm is designed for a normal discharge capacity of 3 thousand m^3/h.

- ***Storage***

Two high-security cryogenic tanks with a total capacity to store 150 thousand m^3 of LNG in two tanks of 75 thousand m^3 (with a diameter of 61 m and 41 m in height). The cryogenic tanks are designed to withstand earthquakes adjusted to international standards. Have a system of two compartments, the main nickel steel and aluminum, which is designed to hold the LNG at low temperatures, and the secondary concrete, designed to ensure that any leakage is contained and isolated. The storage facilities used advanced monitoring systems to detect immediately spills, leaks or leakage of gas liquid or gaseous. All piping that goes in and out of the tanks on the top and on the level of the gas stored, so as to avoid leaks through valves and connections. In addition, these tanks have various security systems such as alarms, emergency closings and controlled atmosphere.

- ***Gasification***

This operation is performed through pumps that carry the LNG to pressure from the tanks to the regasification plant area, where you will find the best vaporizers. The Terminal considers 2 vaporizers of open panel (ORV), which will operate in, each of them with a regasification capacity of 3 million m3 per day.

In descriptive terms, the vaporizers Open Rack Panel Vaporizers, ORV) consist of pipes that are bathed with a film of sea water at room temperature.

- ***Distribution of natural gas***

The distribution of Natural Gas, already in a gaseous state, will be carried out through a system of pipeline to the facilities of the large consumers and to the Natural Gas deposits (gasometers) to be installed on the Atlantic coast and in the pacific coast. In these deposits of natural gas will be compressed gas to enable their transport by trucks and rail cars to those areas of consumption where there is economic transport by pipeline. Has been taken as a reference of sizing the amount of 250 million cubic feet a day contained in the received document "NATURAL GAS PANAMA premises".

Thermoelectric

The panel is composed of:

- 2 natural gas turbines of 45 MW capacity each
- 2 Heat Recovery Systems
- 1 steam turbine of 40 MW of capacity
- The corresponding processing equipment
- Beach Maneuvers

According to the provisions, the designs of the buildings associated with the project must comply with the provisions of the Panamanian codes for civil works and in the gaps that are, to conform to the standards contained in the following codes:

- API RP 2th - (American Petroleum Institute, Recommended Practice 2A) - General Design and Planning.
- AISC - (American Institute of Steel Construction). Steel construction.
- ACI (American Concrete Institute). Concrete Construction.
- API (American Petroleum Institute). Pipes.
- ASTM - American Society for Testing and Materials). Materials.
- NFPA - National Fire Protection Association). Protection.

5.6. Input requirements during the construction/implementation and operation.

During the **construction** materials of construction typical: sand, cement, iron, concrete, steel plates with special alloy steel pipes, thermal insulation materials.

During the **implementation and operation**, is based on the provision of LNG as a fuel, sea water for the warming in the regasification process (previous data), diesel as an alternative fuel, electric power generation, water usually drinking water for human consumption of staff and demineralized water for generation turbines (emission control). The Liquefied Natural Gas (LNG) is difficult to ignite or explode and is non-toxic and non-corrosive. It is a colorless and odorless element that does not contaminate the soil or water, and that in the event of a spill evaporates and leaves no residue.

5.6.1. Needs of basic services (water, energy, sewage, roads, public transport, others).

The project will require sea water for the generation of steam in the boiler and to the process of regasification plant at the Terminal will be taken from the area of Puerto Cristobal. The water will be carried out through a pipe of 30 inches in diameter and will

be buried in all the way from the area of Puerto Cristobal until the location of both projects.

The project does not require drinking water to more than the necessary for people who work in the construction and operation of the project. The implementation of this project will not have significant impacts in greater demand for drinking water in the region of influence. The project considers the construction and commissioning of a plant for drinking water and wastewater treatment plant when it comes into operation, which will comply with the parameters established by the Institute of National Aqueduct and Sewer Authority (I.D.A.A.N.). For these projects the company must submit the respective environmental impact studies.

The project will not affect the distribution of water in the area where it is located.

Transport and communications

It will carry out the works required for the connections of the telecommunication systems and data transmission.

The project also includes the construction of the infrastructure necessary for the normal development of the activities, such as internal streets and its connections with the public means of communication.

The project will provide all the easements that require neighboring projects.

The distribution by pipelines of natural gas is carried out using the bondage of track that occupies the project storage of liquid fuels (Atlantic Coast) of APSA.

Aqueducts

There are facilities for the supply of potable water in the area and the I.D.A.A.N. is responsible for providing the system.

Electricity

During the process of building self-supplied energy is used more than the available in the public network. During the life of the project the electric power will be provided by the Thermal power plant to be built.

5.6.2. Labor (during construction and operation), direct and indirect employment generated.

In the **construction phase you** will need the following staff (skilled and unskilled):

- Structural Engineer
- Civil Engineer with specialty in health care
- Civil Engineer
- Architect
- Technicians
- Plumber
- Carpenter
- Moving Companies
- Surveyor
- Painters
- Inspectors
- Administrative Staff (Manager, secretary, etc.)
- Foreman

- Electrician

In the stage of **operation** will require the following personnel:

Plant personnel

Plant Manager	1
Supervisors	3
Operators	6
Assitetentes OF OPERATIONS	3
Mechanical Engineer	1
Electrical Engineer	1
Assistant Manager	1
Cleaning Staff	2
Security	6
Drivers	2

Office and managing

General Manager	
In charge of contracts	1
Head of Finance	1
Personnel Officer	1
Technical Support	
Engineer	1
Counter	1
Wi zard counter	1
Secretariat	1
Clerk	1
Condustor	1

5.7. Handling and disposal of wastes in all phases.

5.7.1. Solid.

In the **construction phase,** the solid waste that this project is going to produce are:

- Material of diverse composition (vegetation and land) extracted from the leveling of the ground
- Household waste generated in places of rest and feeding of workers (food, paper, cans, plastics, and others). These waste will be deposited in the nearest garbage dump.
- Remains of construction materials, packaging equipment.

These Waste s and removed on a daily basis, of the place of work, construction debris, waste materials, packaging materials and other similar. Any dirt or mud that has fallen on the road will be cleaned. No one will be allowed to burn as a method of waste disposal. It will comply with the laws of the Republic of Panama concerning transport and waste disposal. The solid waste produced by the staff of the contractor shall be transported daily from the site of the work to the nearest landfill.

In the **operation stage of** the solid waste generated in the project are:

- Domestic type waste (paper, packaging, office materials, remains of food, plastics) from the administrative offices and generated by the employees.
- Packaging, Paper, Packaging, pieces from the maintenance of the equipment installed in the Terminal and the Thermoelectric Power Plant.
- Material type sludge resulting from the demineralization of sea water, which will be used in the boilers for the operation of the steam turbines in the power plant.

It is not considered the stage of **abandonment** by the magnitude of the project.

5.7.2. Liquid

In the **construction phase,** it is expected that the proposed project will generate the following liquid waste:

- Possible spills of hydrocarbons and fuels from the equipment used in the construction of the infrastructure.
- Fluid from the physiological needs of the workers who will work in the construction of the project. Provide staff with portable toilets, waste will be collected by a contractor who meets the standards of disposal of waste water and sludge. These will be removed in accordance with the contractor for this task and waste generated is deposited in authorized areas that comply with the standards of wastewater disposal.

In the **operation stage of** liquid wastes that are generated are:

- The wastewater generated by the employees and from health services and sink installed in the administrative office of the terminal and in the Thermoelectric Power Plant.
- Lubricants from the maintenance of the equipment installed in the Terminal and the Thermoelectric Power Plant.
- Hot water from the turbines.

It is not considered the stage of **abandonment** by the magnitude of the project.

5.7.3. Gaseous

In the **construction phase,** the gaseous waste that are generated are the gases of the combustion products of the operation of the equipment used, such as trucks, tractor, backhoe, shovel, etc. These emissions are minimal, since this team consists of systems of control of exhaust gases.

In the **operation stage of** the main source of gaseous emissions will be the Thermoelectric Power Plant.

The emission of waste into the atmosphere and the own combustion processes that occur in the thermal power plants have a significant impact on the environment.

In any case, to a greater or lesser extent, all of them emitted to the atmosphere carbon dioxide, CO_2. Depending on the fuel, and assuming a return of 40% on the primary energy consumed, a thermal power plant emits approximately:

Fuel	**Emission of CO_2 Kg/kWh**
Natural Gas	0.44
Fuel oil	0.71
Biomass (wood, wood)	0.82
Coal	1.45

In the case of the project is to be developed, l as natural gas plants can be operated with the so-called combined cycle, which allows higher yields (up to a little over 50%), it would still take the plants that work with this fuel less polluting. The combined cycle natural gas are much cheaper (reaching the 50%) than a conventional thermoelectric, increasing the thermal energy generated (and hence profits) with the same amount of fuel, and lowering emissions cited above in a 120%, 0.35 kg of CO_2 , per kWh produced.

The gaseous emissions in a center that uses natural gas as a fuel in the process of power generation have the following composition:

Load Condition		BASE	BASE	BASE
NOx	ppmvd @ 15% O2	42.	42.	42.
CO	ppmvd	10.	10.	10.
UHC	ppmvw	7.	7.	7.

EXHAUST ANALYSIS	% VOL.		
Argon	0.86	0.88	0.85
Nitrogen	72.05	72.66	70.73
Oxygen	12.86	12.94	12.63
Carbon Dioxide	3.27	3.31	3.20
Water	10.97	10.22	12.59

It is not considered the stage of **abandonment** by the magnitude of the project.

Advantages

Are the cheaper to build (taking into account the price per megawatt installed), especially coal, due to the simplicity (comparatively speaking) of construction and the energy generated on a massive scale.

5.7.4. Dangerous

Hazardous waste will not be generated during the construction and operation of the project. It is not considered the stage of **abandonment.**

5.8 Consistent with the land use plan

The area where the Terminal and the Thermal corresponds to an area where there are already established companies with operations similar to our project as are Atlantic Pacific, S.A. (APSA) in the storage of fuel from the Atlantic Coast and the PETROPORT with the storage of Liquefied Petroleum Gas which are neighbors of the area selected in the Telfers Island.

It requires the authority of the Administrative Unit of goods reversed, that the land of Telfers Island located in the boundaries of the area requested by LNG GROUP PANAMA are considered to be of industrial use which are compatible with plans for the storage of fuels that are settled in the area of TELFERS how PETROPORTS (liquefied petroleum gas) and APSA (liquid fuels).

5.9 Overall amount of investment.

The estimated investment of the work is of B/. 750,000,000.00.

See Annex No. 3. Study and Financial Analysis.

6. Description of the physical environment

This chapter contains the history of the area of influence or baseline of the project, in accordance with the provisions laid down in Article 27, *"Minimum Contents/Terms of Reference, the Environmental Impact Study"*, Studies Category II, of the Executive Decree No. 123 of 14 August 2009 [4] .

The base line describes the components and environmental elements considering the positive and negative environmental impacts significantly adverse effects that may be associated with the project, as a result of activities and actions to be executed for the construction and operation of the project.

The description of the area of influence is systematized by the environment and environmental component that is being analyzed, considering the following classification:

Environmental components that govern the environment

East	Components
Physical	Climate
	Meteorology
	Hydrometeorology
	Air Quality
	Geology
	Geomorphology
	Soil Science
	Noise
Biological	Flora
	Fauna
Human and Cultural	Socio-economic

[4] decree which regulates the Chapter II of Title IV of the Act 41 of 1 July 1998, General of Environment of the Republic of Panama."

East	Components
	Economic Activities
	Land use
	Property, Land Tenure and Land Value
	Basic equipment and infrastructure
	Territorial
	Protected Areas
	Cultural Heritage

The environmental components and elements are described for the whole of the cartographically project, identifying each one of them when possible.

The bibliography and other sources of information, detailed in Section B - Executive Summary.

For the purposes of analysis, is identified as an area of study, formed by the Project Area (location of the project) and its area of influence, the latter subdivided into area of direct and indirect influence.

6.1. Regional geological formations

The plains of the coast of Colon, where the project, belong to the group Aguadulce training Rio Hato (QR - Aha) and lithological composition is characterized by the presence of conglomerates, sandstones, shales, tobas, sandstones are not consolidated and pumice. These materials belong to the group of sedimentary rocks, which for the training Rio Hato and Gatun Locks sediment at the end of the Quaternary period (approximately 10.000 years ago), within the recent epoch, known as the Holocene epoch of the Cenozoic Era.

The lithological conformation of the area has been influenced by the volcanic processes of the activity of the "Valle de Anton", which can be seen through the presence of tuff

and pumice; the participation of mechanical and chemical processes that have developed sedimentary rocks of the place.

The most abundant types of sedimentary rocks belong to the group of "Terrigenas Clastic", which are made up of fragments that come mainly from the disintegration of silicate rocks. To this group belong the Terrigenas clastic rocks shales, sandstones and conglomerates present in the area. The most plentiful type of these rocks are shales, which are formed mainly by microscopic particles of silt and clay, in this way, depending on the content of organic matter and iron oxides, shale present a variety of colors including black, purple, red, brown, green and gray (as can be seen in the area). The shale is not a rock and by the time has not been removed much value from it; with the exception of its industrial importance as added ground coffee in the manufacture of concrete.

The presence of conglomerates and sandstones is given by the existence of pebbles cemented of fine materials, such as silt, sand and gravel. The CEMENTITIOUS are usually the iron oxide, carbonate, and loamy materials sometimes silica. It should be noted that some types of sandstones are very resistant and are used as construction materials.

6.1.2 local geological units

The stratigraphy of the area of the development of the project, in the top[5], is characterized by non-consolidated sediments, filled with sand and corals. Underlying in addition, formations of lacustrine sediments [6] (sediments Holocenos), made up mainly of silty sand, silt and organic clays. Underlying lacustrine sediments, we find the rock mother, specifically of the Gatun Formation, which is made up of sandstone of medium to fine grain, shales, siltstones, hardboard, sandy clay and tuff. This Training "Gatun" is the one

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5 Geological Map, Republic of Panama, Ministry of Trade and Industry, Mineral Resources, 1991

6 Geologic Map of the Panama Canal and Vicinity, Republic of Panama, 1980

that predominates in the project area. At the top of this stratum, the rock is characterized by being of hardness soft to medium soft and at greater depth the rock is moderately hard. It is a rock of low resistance to the simple compression and due to its low hardness, can you dig with relative ease.

6.2. Geomorphology

Does not apply to EsIA Category II.

6.3 Characterisation of the soil

6.3.1 Description of the use of the soil

The soil has a use of operations similar to our project as are Atlantic Pacific, S.A. (APSA) in the storage of fuel from the Atlantic Coast and the PETROPORT with the storage of Liquefied Petroleum Gas which are neighbors of the area selected in the Telfers Island.

We also develop activities of the authority of the Panama Canal and Panama Ports Company.

6.3.2 Demarcation of the property

The area is made up of LOT **B**, of 78,911.85 m^2, with 30106E-118990N Approved Level, and the **polygon 04-01** of 400,000.00 m^2, with 30106E-118989N Approved Level, which together have an area of 478,911.85 m^2, which are part of the Farm No. 12875, inscribed in the roll 18.598 1 document, in the section of the Interoceanic Region, Province of Colon, of the Public Registry, located in the sector of Telfers, township of Cristobal, district and province of Colon. (See Appendix No. 1. Disclaimer The property).

6.3.3 Capacity of use and fitness

The agrological capacity in the area of the project, corresponds to soils of class V, VI and VII (according to the classification of the Soil Conservation Service of U.S.A.), and based on this classification is the ability to use is described below:

Class V:

With gentle slope, soils erodibility severe flood hazard, frequent, shallow soil depth, flooded with poor drainage, ease of tillage of soil salinity, regular moderate to severe, adverse weather (very wet), the practices of crops are possible on an occasional basis or are not possible, stoniness low.

This kind of soil is not suitable for crops, but it is appropriate to maintain permanent vegetation as natural forests, reforestation, grassland and maintenance of wildlife. They are soils almost plains with one, or more of a limitation of the following type:

- Standing Hydromorphic, even with drains.
- Frequent flooding by water courses.
- Severe climatic conditions.

Class VI:

Suitable soils to support a permanent vegetation, being able to devote to pastures or forests with moderate restrictions. They are not suitable for cultivation, and the severe limitations that restrict their use to grazing, forest masses and maintenance of wildlife.

They are soils with uncorrectable permanent constraints such as:

- Susceptible to several erosion.
- Acute effects of erosion in the past.
- Shallow rooting zone.

- Excessive humidity or flood
- Low water retention capacity.
- High salinity or alkalinity.
- Severe weather factors.

It is usually necessary to implement improvement measures for pastures, such as seeds, fertilizers, whitewashed, drainage practices, such as furrows to level, named pipes, or practices of both types at the same time. The poor state of these soils can lead to depletion of the vegetation.

Class VII:

They are soils appropriate to maintain a permanent vegetation with severe restrictions. Have very severe limitations that make them unsuitable for crops and restrict their use, grazing, to the forest masses or to the maintenance of wildlife. The restrictions are more severe than those of the soils of the Class VI. Permanent limitations is difficult to correct such as the following:

- Very high flood.
- Surface soils of very thin.
- Stoniness high.
- Standing Hidromorphy.
- Very high salinity or alkalinity.
- Unfavorable weather.
- Other very severe limitations.

These soils may not be used with freedom for grazing, except that apply management practices such as fertilization, careful regulation of grazing, re-vegetations of protection. It is recommended that most of these soils are intended for forests, more than to pastures,

in which case it shall exclude livestock and prevent fires. Are not appropriate for agricultural crops, pasture or commercial reforestation. To be classified as areas of natural protection.

The project area has traditionally been used for activities related to the adjacent port facilities and distribution of liquefied gas. Prior to and during the Second World War, specialized initially for management of solid waste.

He was abandoned by the Navy of the United States about 1.950 and since then operates a landfill without the conditions of treatment.

Except this type of activities, it had not been given another use to the soils in the project area until, once transferred by effect of the Canal Treaties, the State assigned to use, as described in land use.

6.4 Topography

The description of the topography of the terrain where it will locate the project indicates that elevations in meters above sea level range from 0 to 2 meters above sea level in the lower elevation sites located in the coastal areas of the Caribbean Sea.

6.4.1 Topographic Map

See Annex 4. Topographic map 1:50.000, 4243 IV - Gatun, The IGNTG - MOP.

6.5 Climate

The climate that is presented in the study area, is determined by the influence of the oceanic masses, mainly in this case, the Caribbean Sea. The high humidity is an example

of this, determining the properties of temperature of the air masses circulating between the oceans.

According to the Köppen classification system, of the three (3) Climatic zones that exist in the Canal Watershed in the project area is considered to be tropical wet climate (AWI), which is characterized by a higher average annual rainfall of 2.500 mm, a summer of three (3) months and an average annual temperature between 24° C and 26° C.

The meteorological features of the area of influence of the project, described for the elements: temperature, precipitation, and wind. This information is useful for establishing basic conditions for the design, construction and operation of the project must have.

Factors that determine the climate

- Geographical situation and relief
- Oceanography
- Meteorology

Climate classification according to W. Copen

Rainfall regime by region

Pacific Region: It is characterized by abundant rains, moderate to strong, accompanied by electrical activity that occur especially in afternoon hours. The rainy season starts in the month of May and lasts until November, with the months of September and October the rainiest; within this season is often presented a dry period known as summer, between July and August.

The period between December and April is the dry season. The highest rainfall in this region are usually associated with atmospheric systems well organized, such as waves and cyclones tropical depressions, tropical storms and hurricanes), and the ITCZ. (Http://www.hidromet.com.pa/descripcion_gen_clima.html).

Temperatures in Panama respond to the geographical position of the isthmus, whose low latitude places in regions with tropical climate.

The most outstanding feature common climate in these regions is the absence of a cold season, a condition which is reflected in the annual difference between the temperature of the warmest month and the month more fresh. This denotes a great thermal uniformity between the various months of the year and between one place and another.

In the tropics, the lift is the only factor capable of producing large temperature differences over short distances between two places, seriously affecting the predominant thermal uniformity.

Weather and meteorology

General Information

In the last two decades, the weather has been presenting major changes in his behavior, such is the case, for example, of the more frequent occurrence of phenomena such as El Niño, and droughts.

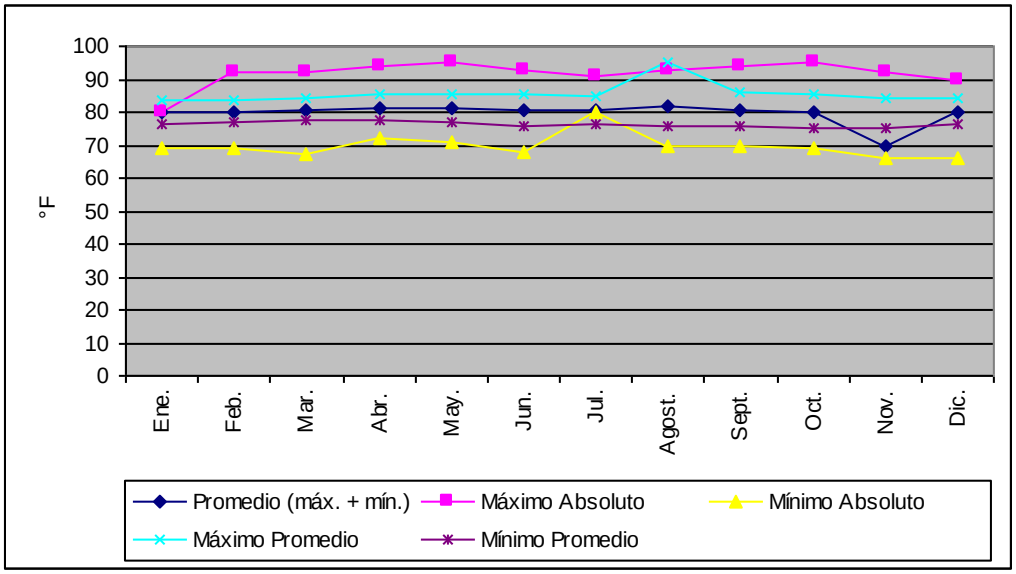
Temperature

The temperature is a meteorological element that influences the different atmospheric processes and in the ecosystem. Extreme temperatures, i.e. the maximum and minimum,

present a variability that depends on atmospheric elements, of the topographic settings and oceanographic and atmospheric conditions (dry and rainy seasons, cloud cover, wind direction atmospheric stability, surface temperature of sea water and soil moisture, etc.), usually the minimum temperature it occurs around the time of sunrise and the maximum temperature after noon.

With regard to the temperature that is recorded in the area of Colon, the data available [7] indicate that on average there is very little fluctuation throughout the year (Figure 1).

Figure 1: Annual Behavior of the Temperature – Colon (1908-1965)



Source: the former Panama Canal Commission, 1994

The average annual temperature registered is of 26.88°C (80.4°F), with an absolute minimum temperature that goes up to 18.88° C (66°F) between the months of November and December, and an absolute maximum temperature of 52.5°C (95°F), registered in the months of May and October. However, the minimum and maximum averages for the year are located at 24.55°C (76.2°F) and 29.33°C (84.8° F), respectively, which shows a thermal gradient averaged approximately ± 2.4 °C.

[7] Data obtained from the Panama Canal Commission. Information collected between 1908 and 1965.

Air Temperatures °F - Columbus (1908-1965)

Jan.	Feb.	Sea.	Apr.	May.	Jun.	Jul.	Agost.	Sept.	Oct.	Nov.	Dec.	Annual
Average (max + Min.)												
80.3	80.3	80.8	81.4	81.1	80.8	80.5	81.9	80.7	80.3	69.5	80.1	80.4
Absolute maximum												
80.0	92.0	92.0	94.0	95.0	93.0	91.0	93.0	94.0	95.0	92.0	90.0	95.0
Absolute minimum												
69.0	69.0	67.0	72.0	71.0	68.0	80.0	70.0	70.0	69.0	66.0	66.0	66.0
Maximum Average												
83.9	83.8	84.4	85.2	85.6	85.5	84.9	94.9	85.8	85.6	84.0	84.1	84.8
Minimum Average												
76.6	76.7	77.3	77.6	76.7	76.0	76.2	75.9	75.5	75.0	75.0	76.1	76.2

Source: the former Panama Canal Commission, 1994

Precipitation

In general, the rainy season is beginning in the month of April and ends in the month of November to December; but is mainly concentrated between the months of October and November.

Relative humidity

In this region, the value of the Relative Humidity, indicates the degree of "saturation" of atmospheric humidity in the air, which is mainly related to the temperature of the air.

Evaporation

In this area the evaporation occurs in every moment and in every type of surface.

Evaporation is conditional upon the following factors:

- The temperature: very important factor, being the amount of evaporated water a direct function of the temperature.
- Degree of saturation: the ability of the air to support steam; the evaporation will be faster in a dry air and slower in moist air.

- The wind: the air to move drag the evaporated water and maintains the degree of saturation at low levels, which favors the continuity of the evaporation.
- Evaporation Surface: the higher the evaporative surface area, the greater the evaporation.
- Composition of water: water quality intervenes in the evaporation, if the water is pure, evaporation will be higher; if the water contains solutes evaporation is less comparatively.

During the occurrence of El Niño episodes of moderate or high intensity, or in the event of a warming of sea water, the temperatures are increased in 2°C or 3°C more of magnitude. On the other hand, when the girl episodes occur or there is a cooling of the sea, the air temperature decreases depending on the intensity of cooling the temperature of the sea.

6.6 Hidrology

In the project area will not be affected constant sources of water, the existing drains are oriented toward an existing ditch, which channeled the rain waters; therefore there will be no use of natural waters.

6.6.1 Quality of surface waters

Within the field where the aim is to develop the project there is no surface water courses, so this point does not apply.

6.6.1. a. Flow rates (maximum, minimum and average annual)

Within the field where the aim is to develop the project there is no surface water courses, so this point does not apply

6.6.1. b. Tidal currents and waves

The currents are linked closely to the movements of the earth and the exposure of the oceans to the solar rays. In turn, the sea-atmosphere interaction determines the properties of heat and humidity of the air masses that circulate through the oceans, affecting heavily the meteorology which is manifested on the earth.

The hydro-meteorological information is presented below:

Figure 2: Sea Temperature °F - Cristobal (Radar) (1908-1965)

Jan.	Feb.	Sea.	Apr.	May.	Jun.	Jul.	Agost.	Sept.	Oct.	Nov.	Dec.	Annual
Average (2 hours)												
80.8	80.6	81.2	83.2	83.6	83.2	83.1	83.7	83.6	82.5	81.6	82.1	
Absolute maximum												
86.4	85.0	87.0	88.0	88.00	88.0	87.0	88.0	88.0	89.0	86.0	89.0	
Absolute minimum												
75.0	76.0	76.0	76.0	77.0	78.0	77.0	79.0	74.0	75.0	75.0	74.0	
Maximum Average												
83.0	82.9	83.6	85.8	86.0	85.6	85.5	86.0	86.0	85.3	83.9	84.9	
Minimum Average												
78.6	78.6	79.0	80.4	81.1	80.7	80.3	81.3	80.8	79.1	78.9	79.9	

Source: Former Panama Canal Commission, 1994

Figure 2: Average tides in the area of Colon

(With reference to the data of the precise level of the Panama Canal)

Averages	Height in feet
Monthly of the highest high tide	+1.022
High Tide	+0.453
Sea Level	+0.016
Low Tide	-0.405
Monthly of the lowest tide	-0.818

Source: Department of Meteorology of the Panama Canal Authority, 1994

Table 1: Data of tide of Colon (Atlantic Coast)

	Data for the records of the Tide of the Panama Canal (Feet)	Navigation data for tables and table of tide (Feet)	Data of the precise level of the Panama Canal (Feet)
Data for values of tides in Cristobal			
Zero tide indicator	-0.000	-1.616	-2,000
Average Low Tide	+1.616	0,000	-0.384
Data from the precise level	+2.000	+0.384	0,000
Average of 19 years (1916 - 1934)			
Monthly average of the highest high tide	+3.022	+1.406	+1.022
Average high tide	+2.453	+0.837	+0.405
Average sea level	+2.016	+0.400	+0.016
Average low tide	+1.595	+0.021	+0.405
Monthly average of the lowest low tide	+1.182	+0.434	+0.818
Ends of 42 years (1909 - 1950)			
Highest High Tide	+3.800	+2.184	+1.800
Lowest low tide	+0.750	+0.866	+1.250

Source: Department of Meteorology of the Panama Canal Authority, 1994

6.6.2 Groundwater

There are no wells drilled within the project area. The activities to be developed will affect groundwater.

6.6.2. a. Characterization of aquifer

Does not apply.

6.7 Air Quality

The characteristics of the air quality are modified by the presence of sources of pollutants, of which in the project's area of influence, are distinguished only the corresponding to mobile sources of existing landfill and vehicles that circulate in the area and on the access roads.

6.7.1 Noise

Now the area is characterized with certain levels of noise by reason that the path that limits the field is used by heavy equipment transports grain or other goods to the interior of the country.

It was a timely noise sampling using a sound level meter digital brand Radio Shack 33-2055 model, with a range of manual operation of 50 to 126 decibels (db), with factory calibration.

The results of the measurements, date and time of the sample, the sampling site and the type of activity in the area are shown in the following Table 6.7.1-1.

Table 6.7.1-1: Measurements of noise in the Project Area

Date	Time	Intensity audible (db)	Site	Existing activity in time.
1 February 2010	9:37 a.m.	50 -68	Entry to the area	Normal Movement
	9:55 a-m.	53 - 77	Corner	Normal Movement
	10:05 a.m.	52 - 57	Parking area via main	Without movement of trucks
	10: 35 a.m.	68 - 78	Parking facilities of Petro Port	Movement of trucks
	4: 12 p.m.	< 50	Herbaceous, 150m from the ground	No
	4: 12 p.m.	< 50	Herbaceous, 150m from main street and entrance to the project	No
	4: 22 p.m.	< 50	Vegetation	No
	4: 26 p.m.	65 - 68	Vegetation	He spent a truck load or container
	8:30 p.m.	< 50	Vegetation	No

Source: Study on the measurement of noise for the EsIA, 2010

In the table above it may be noted that the area of vegetation, where the project will be developed, it is noisy and only increase the levels of noise when a truck or containers in transit on the area.

The project will be implemented in stages and levels of noise generated will vary depending on the activities to be carried out in each one. The phase that will generate greater amount of noise will be the movement of land due to the machinery used. In the stage of operation noise is generated in the thermoelectric plant by the operation of the turbines.

To such effects will be scheduled hours of work for the noise level does not impact to occupied dwellings in the surrounding land. To avoid the adverse effect that might have the increased traffic of trucks and the production of noise, you will work during the working hours and days only, between 6:30a.m. Up to 5:30 p.m., but this may change according to the needs of the project and apply the appropriate permissions to the competent authorities, in such a way as to avoid impacting the hours of greater peace of mind. The accessories provided by the manufacturer for the control of noise, shall be maintained in good conditions; in addition, the staff will have the necessary equipment to avoid health risks.

Standards for Noise

As a reference to this regulation is cited the Executive Decree No. 306 that adopts the regulations for the control of noise in public spaces, residential areas or room, as well as in occupational settings, issued by the Ministry of Health dated 04-09-2002, published in the Official Gazette No. 24635 Date: 10-09-2002, Chapter III, Article 7, noise produced by industries and neighboring shops to homes or rooms. Article 7 was amended by the Executive Decree No. 1, issued by the Ministry of Health dated 15-01-2004. In the Article No.1 are determined by the following noise levels for residential and industrial areas, as shown below:

Noise levels for Residential and Industrial Areas (Source: Article 1, Official Gazette, Tuesday 20 January 2004).

The maximum sound level schedule

From 6:00 a.m. to 9:59 p.m. 60 decibels (in scale)
From 10:00 p.m. to 5:59 a.m. 50 decibels (in scale)

6.7.2 Smells

During the visit in the project area were perceived smells of the existing landfill.

In the area of influence are perceived smells that disturb the environment. Both in the construction phase as in the phase of operation does not provide for the existence of nuisance odors, as due to the characteristics of the project do not constitute sources of bad smells.

6.8. Background information on the vulnerability to natural hazards in the area.

There is no evidence of natural hazards that might affect the project.

6.9. Identification of the sites prone to flooding.

There is no evidence of flood risks that might affect the project.

6.10. Identification of the sites prone to erosion and slippage.

There were no sites affected by soil erosion, by the flat topography of the land will not be identified sites prone to landslides.

During the construction will be implemented the Plan for the Control of Erosion and sedimentation, which includes mitigation measures such as:

Plan of Management of Runoff during the construction and operation of the project.

The exposed areas will be paved or planted grass as soon as possible to prevent the erosion or excessive sedimentation.

Landscape treatment will be given to all exposed areas as erosion control.

Install protective measures on the slopes created during construction such as the planting of fast-growing grass.

7. Description of the biological environment

7.1 Characteristics of the flora

There were tours by car and on foot in the area of the project, which included a tour day. During the tours they took notes and observations of the state of the vegetation, observation of animals in general, including amphibians, reptiles, birds and mammals; using for identification the support of zoological and botanical literature.

The field work was supplemented with a bibliographic review and analysis, which served to establish a preliminary characterization of the area, check the field ids and obtain the scientific nomenclature for species of flora and fauna found.

According to the "Map of areas of life of Panama [8] ", the project is located in an area of tropical moist forest (BH-T), which is reinforced with the plant characteristics described by Tosi in the book "Forest Inventories and Demonstrations, Panama, Areas of Life" observed in the field.

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[8] (8 http://www.anam.gob.pa)

We can conclude that the vegetation present in the project area consists of a mixture of different stages of vegetation, in which you can clearly see a transition from secondary forest and young forest. From a low vegetation height that ranges between 3 and 7 m.

In other words, the composition of the vegetation (humid tropical forest and mangroves specifically), is made up of secondary vegetation, middle and old forest vegetation (or late). This refers to what is commonly known as secondary forest.

Then a preliminary list of the most notable species recorded in these types of vegetations or vegetative covers.

Table 7.1-1: Species of flora characteristic of the area of the Project

Family	Common Name	Scientific Name	TO	H	L	Ar
Cecropiaceae	Guarumo	Cecropia peltata	X			
Boraginaceae	Language of ox	Cordia curassavica				X
Polygonaceae	Uvillo	Coccoloba sp	X			
Malvaceae	Brush	Sida sp,				X
Rubiaceae	Uvito	Palicourea guianensis				X

Source: Study of Flora of the area of the project for the EsIA. february, 2010
Legend: where A= Tree; Ar= shrub; H= Grass; L= Liana

7.1.1 Characterization of plant, forest inventory (apply forestry techniques recognized by ANAM).

In the project is not considered the implementation of a forest inventory for the dispersity of the species on the site. If it is recommended that the permit application logging of some of the species, which will be removed to condition the access road, to the Department of Forestry of the Regional Administration of the ANAM in Colon, before starting the first phase of the project.

7.1.2 Inventory of exotic species, threatened, endemic and in danger of extinction

Indicator species were observed in the project area of scrub bush (*Byittneria aculeata)* and the indicator species of nutrient-poor soils not suited for agricultural crops.

The following is the record of the flora cultivated, or entered, found in the project area. It should be noted that this type of vegetation owes its presence mainly to anthropogenic sources. Then the preliminary list of exotic flora or cultivated species present in the study.

Table 7.1.2-1: Exotic Flora or entered

Family	Common Name	Scientific Name	Utility
Verbenaceae	Melina	*Gmelina arborea*	Construction Pulp
Arecaceae	Palma Real	*Roystonea regia*	Ornamental, Avenues
Arecaceae	Coconut Palm	*Cocos nucifera*	Power.Trade
Anacardiaceae	Mango	*Manguifera indica*	Power supply.

Source: Study of the exotic flora or entered for the EsIA project of receipt, storage, Regasification, distribution and marketing of natural gas, and the construction of a thermal power plant. February, 2010.

There were no species in danger of extinction or endemic species whose populations may be affected by the project.

7.1.3 Map of vegetation cover and land use on a scale of 1:20.000

See Annex 4.

7.2 Characteristics of the Fauna

Wildlife

The identification of the wildlife of the area of the project was done through inspections of the area, in which we had the opportunity to observe and identify the species of birds, and reptiles.

During the tour there was a lot of smoke from a fire in the existing landfill, which resulted in the absence of animals in the area, except turkey vultures that remained at the site of the landfill.

They also identify the presence of reptiles. ***Ameiba Ameiba were observed,*** *and* ***Basiliscus basiliscus***.

It should be noted that the ***boa constrictor*** is a species that falls on Appendix I of CITES, which indicates that it is a species in danger of extinction and their marketing is only allowed in exceptional circumstances, can be found in the mangroves as in the humid tropical forest.

Table 7.2-1: List of mammals present in the project's area of influence.

Common Name	Scientific Name	Habits
Two fingers	***Choloepus hoffmanni***	Daytime

Source: Study on mammals for the EsIA, 2010

Table 7.2-2: List of birds present in the project's area of influence.

Common Name	Scientific Name	Habits
Chango	*Cassidix mexicanus*	Daytime
Black Vulture	*Coragyps atratus*	Daytime
Gavilan	*Bidentate Helanio*	Daytime
Torcasa	*Columba oenops*	Daytime
Tortolita reddish	*Columbina talpacoti*	Daytime
Pelican	*Pelecanus occidentalis*	Daytime
Tijereta	*Fregata magnificens*	Daytime

Source: Study on birds for the EsIA, 2010

Table 7.2-3: List of Reptiles present in the project's area of influence.

Common Name	Scientific Name	Habits
Borriguero	*Ameiba Ameiba*	Daytime
Meracho	*Basiliscus basiliscus*	Daytime

Source: Study on birds for the EsIA, 2010

Table 7.2-4: List of amphibians present in the project's area of influence.

Common Name	Scientific Name	Habits
Tungara	*Physalaemus pustulosus*	Night
Toad	*Bufo typhonius*	Night
Common Toad	*Bufo marinus*	Night

Source: Study on birds for the EsIA, 2010

7.2.1 Inventory of species endemic, vulnerable, threatened or in danger of extinction.

The Republic of Panama, by Act No. 14 of the 28 of October of 1977, adopted in all its parts the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), thus established the country's obligation to protect and safeguard the internationally established species as endangered or threatened with extinction. Also by Act No. 23 of the 23 of January of 1967 and Resolution Directive No. 002-80, urgent measures for the protection and conservation of wildlife and protected species are seriously threatened.

For the above reasons, did not encounter the species endemic, vulnerable, threatened or in danger of extinction.

7.3 Fragile Ecosystems

7.3.1 representativeness of ecosystems

In the area of influence of the project, are not representative ecosystems of significant ecological importance.

8. DESCRIPTION OF THE SOCIO-ECONOMIC ENVIRONMENT

Through the lifting of field information, information was obtained on the socio-economic characteristics of the communities under study and the existing structures.

In addition, general statistical data were obtained of the corregimiento and populated places of influence of the project.

8.1 Current land use in neighboring sites

The current use of adjoining sites of the project, as we have indicated above the area where the Terminal and the Thermal corresponds to an area where there are already established companies with operations similar to our project as are Atlantic Pacific, S.A. (APSA) in the storage of fuel from the Atlantic Coast and the PETROPORT with the storage of Liquefied Petroleum Gas which are neighbors of the area selected in the Telfers Island.

8.2 Characteristics of the Population (Cultural and Educational Level)

Demographic Aspects

The demographic situation of the area of influence of the project is defined by various aspects that comprise in the first place, the population and its density, and secondly, their masculinity, birth and death rates to determine their population growth.

According to figures from the National Population and Housing Censuses in the year 2000, the province of Colon has a population of 204.208 inhabitants and a population density of 41.8 inhabitants per km^2. By comparing these figures with those of 1990, when the total population of the province was of 168.294 inhabitants with a population density of 34.4 inhabitants/km^2, there has been a growth of 32.514 inhabitants in 10 years.

Population of the Province of Colon: Censuses of 1990 and 2000

Province District District	Surface (Km^2)	Population		Density (inhab./km^2)	
		1990	2000	1990	2000
Colon	4,890.5	168.294	204.208	34.4	41.8
Colon	1,504.8	140.908	174.059	93.6	115.7
Cristobal	728.0	15.178	37.426	20.8	51.4

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. Panama in figures, the year 2000 . Panama, 2001.

The increase in population in the corregimiento of Cristobal is clearly noted in the above table, when comparing the figures of the census of 1990 with regard to the census of 2000. Cristobal shows the highest increase of the population, that in a period of 10 years, the population of this district increased by 22.248 inhabitants, that is to say, more than doubled its population of 1990.

With regard to the occupied dwellings, for 1990 the district of Colon had 34.082 homes. For 2000, their number increased to 42.830, i.e. 8.748 new houses were built. Comparing the corregimiento of Cristobal where the project will be implemented, it should be noted

that Cristobal has a higher number of houses. The following table illustrates the situation of the houses in the district of Colon and in the corregimiento under study.

Houses and people, according to the type of housing in the Corregimiento of Cristobal.

Type of housing	Housing	People	Average Inhabitants By Housing
Individual Housing	7.141	26.356	3.7
Permanent	6.837	25.396	3.7
Semi-permanent	229	807	3.5
Improvised	75	153	2.0
Departure	2.347	7.976	3.4
Room in house in the neighborhood	265	809	3.1
Collective housing	422	181	51.9
Local not intended for room	9	25	2.8
People without housing		1	
Victims		57	
Seals		21	

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. Preliminary figures of Population and Housing, the Year 2000. Panama, 2000.

8.2.1. Demographics, social and economic.

Index of masculinity

According to the definition of the Comptroller General of the Republic (*Social Indicators 1994-98*), the Index of masculinity is referred to the relationship between the number of men and women in a given population, which is expressed as the number of males per 100 females.

According to this definition, shows the relationship man-woman in the district of Colon and the corregimiento of Cristobal during the period 1990 - 2000. The figures indicate that for the district of Colon, in general, the population showed a greater number of men during the period of 1990, although this difference was barely noticeable (0.3%). For the year 2000, the male population showed a domain of 1.6% with respect to the female (an increase of 1.3% over the period of 1990).

At the level of district, Cristobal presented for the year 1990 a total of 350 women over the amount of men, which could be considered as a moderate figure. For 2000, however, the figures change drastically and there is an increase in the male population, with a number of 312 men over the total number of women. This change could occur due to the increase in the number of industries and economic activities that took place in Colon with the process of transfer of the Canal to Panama. The increase in the male population is 3%.

The following table provides more detail of the relationship of the male and female population of the area under study.

Index of masculinity: 1990 and 2000

District District	Population						Index of Masculinity	
	1990			2000				
	Total	Men	Women	Total	Men	Women	1990	2000
COLON	140.908	70.545	70.333	170.870	86.108	84.762	100.3	101.6
Cristobal				37.426	18.990	18.436		

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. Preliminary figures of Population and Housing, the Year 2000 . Panama, 2000.

Rate of Growth

With regard to the birth rates and mortality, is presented in the following table reflects the situation of the city of Colon. On the one hand the totals are provided by year of birth and its rate, as well as the totals and fetal mortality rates. It also presents the general mortality, infant (less than one year) and maternal mortality. Finally, it is stated the natural growth of the population of the city.

Birth rates and mortality of the city of Columbus: 1996-2000

1 City of Colon	Birth Control (Births Alive)		Mortality Fetal		2 Mortality						Natural growth [4]	
					General		Child Labor		Maternal [3]			
Year	Total	5 Rate	Total	6 Rate	Total	5 Rate	Total	6 Rate	Total	6 Rate	Total	Rate
1996	1.652	28.3	503	304.5	390	6.7	52	31.5	1	0.6	1.262	21.6
1997	1.889	32.2	356	188.5	426	7.3	43	22.8	1	0.5	1.463	24.9
1998	1.333	22.6	669	501.9	342	5.8	20	15.0	-	-	991	16.8
1999	1.160	19.5	811	699.1	350	5.9	39	33.6	1	0.9	810	13.6
2000	1.205	20.2	817	678.0	348	5.8	33	27.4	1	0.8	857	14.4

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. Panama in figures, 1996-2000**.** Panama, 2001.

Note:

1 It refers to the residency of the mother for the births and the late for the deaths.
2 Exclude fetal deaths.
3 Refers to deaths due to complications of pregnancy, childbirth and the puerperium.
4 Refers to the difference between birth and death rates.
5 By 1.000 inhabitants, based on the estimate of the population by 1 July of the respective year.
6 By 1.000 births.

These figures indicate a significant decline in the birth rate of the city of Colón, comparing the total number of births for the year 1996 with the total of the years 1999 and 2000 (difference of 492 and 447 births, respectively). Fetal mortality, on the contrary, it has had a dramatic increase of 503 for the year 1996 to more than 800 in the years 1999 and 2000, an increase of 300 individuals.

Finally, the natural growth per year shows a significant decline, of 1.262 individuals in 1996 to 857 for 2000. Even with this decline, the population of the city of Columbus presents an increase, due to the fact that in the past 5 years, there have been more births than deaths.

Surface and density of population

The population of the district of Colon is very fragmented, the following table shows that there is a population density of 115.7 inhabitants/km^2.

Surface and density of population

Province District District	Surface (Km²)	Population		Density (inhab./km ^{2})	
		1990	2000	1990	2000
Colon	4,890.5	168.294	204.208	34.4	41.8
Colon	1,504.8	140.908	174.059	93.6	115.7
Cristobal					

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. Panama in figures, the year 2000 . Panama, 2001.

8.2.3. Index of employment and other similar to provide relevant information on the quality of life of the affected communities.

Economic distribution of the population

The socio-economic situation of the population for this study (Table 8.2.3-1), has been determined by both the labor indicators such as the presence of basic public services with the district of Colon.

Table 8.2.3-1: Indicators of Work

Province District District	Population				
	Total	Busy		Unoccupied	Not Economically Active
		In agricultural activities	In other sectors of the economy		
Colon	204.208	5.653	58.981	13.804	76.980
Colon	174.059	1.655	54.415	12.254	65.579
Cristobal					

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. National Population and Housing Censuses, Year 2000 . Panama, 2000

The indicators that appear in the table 8.2.3-1include the total population of the province of Colon, the population of the district of Colon and the population of the corregimiento of Cristobal where you will find the site of the proposed project.

The table presents three distinct groups of the population and whose definitions are given by the Comptroller General of the Republic:

1) **Population:** includes persons who:

   a) Have an occupation or paid work in money or in kind, during the reference period;

b) Work on a regular basis in a business or company of a member of his own family, during 15 hours or more, even when you do not receive a wage or salary (Family Worker);
c) Have a fixed occupation remunerated, but do not put any day of the reference period by a transient circumstance: due to an illness or accident; by conflict; for temporary interruption of work or due to bad weather or breakdowns in machinery; to be in use of your holiday, permit or license.

2) **Unemployed population:** includes people who:

a) They had no occupation or job during the reference week of the survey, but had worked before and were looking for employment;
b) Had worked or were looking for their first job in the reference week.
c) They were not looking for a job in the reference week, but sought work three months prior to the survey;
d) They were not looking for a job in the reference week, but have sought work before and are waiting for news;
e) They were not looking for a job in the reference week, but claim that it is impossible to find a job.

3) **Population Not Economically Active**: includes housewives and other categories such as students, people who do not work and do not seek employment, retirees, pensioners, rentiers and withdrawn. Within the population not economically active noted the definition of "housewife", which it considers as such to the person who is exclusively dedicated to the care of your own home and do not receive retirement, pension, nor is RENTIER.

- Table 8.2.3-2 conclusions such as the following:
- The district of Columbus holds the largest population of the province of Colon, equivalent to 85% of the total of the province.

- The Corregimiento of Cristobal where the project will be developed, has a greater amount of population.
- The secondary sector and the tertiary sector of the economy has the largest number of people employed in the province, in the district and in the two districts.
- The number of people engaged in agricultural activities, Cristobal presents 129 people.
- The unemployed population is relatively low. The population not economically active, for its part, reported significant figures, although you must take into account the groups that compose it (see definition).

Table 8.2.3-2: Social and Economic Indicators: Census 2000

Province and District	Average number of inhabitants per housing	Median age of the population	Average number of years approved (highest grade approved	Percentage of the population was illiterate (10 and over)	Percentage of unemployed (population 10 years and over)	Median monthly income of the population aged 10 years and over)	Median monthly income in the home
Colon	4.0	23	7.8	3.74	17.60	277.0	377.6
Colon	4.0	24	8.2	2.87	17.94	314.4	416.8

Source: Department of Census and Statistics of the Office of the Comptroller General of the Republic. National Population and Housing Censuses, Year 2000 .

With the purpose of obtaining a complete vision of the social and economic situation in which is the population of the province of Colon, specifically the district of Colon, which is the responsibility of the present study, it is necessary to examine the indicators described above.

The indicators are defined by averages, percentages, and medium-sized enterprises of different aspects such as: inhabitants per housing, level of education, degree of illiteracy, levels of unemployed population and finally levels of monthly income. The above table you can obtain the following conclusions:

- The average number of inhabitants per housing unit, both in the province and in the district of Colon, it is 4.0. This means that the average number of families that reside in the region do not live in overcrowded conditions.
- The median of the population is between 23 years for the province and 24 years for the district of Colon. This leads to the fact that this area of the Republic consists of a young population, with a supply of labor for investment projects.
- With regard to the average number of years of school approved, it is noted that the residents of the province have 7.8 years of schooling and the district have 8.2 years. These numbers mean that the population has completed at least six years of primary school and have come to the end between one and two years of basic cycle.
- In attention to the level of illiteracy, statistics indicate that in the province of Colon the percentage of illiterate people is 3.74, while the district the percentage falls to 2.87. Despite the fact that the percentages presented are low, you can still find the illiterate population in the region, which is a potential problem in relation to the obtaining jobs.
- In relation to the percentage of unemployed in the province, there is a 17.60% across the province, on the other hand, in the district the 17.94% is also unoccupied. To observe these percentages, it is concluded that the unemployment of Colon is not so high and that the increasing opening of labor markets in the region is able to absorb the labor potential.
- In response to the figures presented in the median monthly income of the population, is that the income of the province is of 277.7 B/ and b/ 314.4, meaning this, that income is relatively low. However, we must not lose sight of the fact that this figure is only a medium, which means that certain sectors may be receiving income much higher or lower.
- The median monthly income in the home of the province is of B/ 377.6 and B/.416.8 of district. With these figures can be perceived that the income of the inhabitants of Colon is quite acceptable, but as specified in the previous paragraph, these figures are presented as median and you cannot determine other income higher or lower.

For the support of the movement of the ports, there is a concession located in the Telfers Island (now connected to the mainland), operated by the Petroport, S.A., a local company supplier of liquefied gas, occupying an area of 10.4 hectares near the pier 16 at the port of Cristobal. Its facilities include 12 tanks with a total capacity of 1.44 million gallons of fuel. This fuel is intended to supply ships at Pier 16 and to export to other markets.

Are the areas of industrial use related to the operation of the Canal, specifically the Industrial Division of the Atlantic, located at Gatun. In addition, there is an area of light industry in the Processing Zone of Davis and in development plans another area next in Davis, who will be dedicated to the development of software and computer equipment.
The Interoceanic Region Authority (ARI) is promoting projects of port development and maritime services in the area of Mindi and eco-tourism projects in the old Fort Sherman, west of the Panama Canal.

There is a concession to the company APSA - Gatun to operate oil terminals in the area of Mount Hope. The company also operates terminals oil tankers in the Pacific. At Gatun features 30 fuel storage tanks with a total capacity of 1,207,000 barrels. The operation of receipt and dispatch of fuel is carried out in the spring 16 of the port of Cristobal.

In the tourism sector also runs major projects, the conversion of the premises of the School of the Americas in a tourist complex of 8.5 hectares, projected on the banks of the Gatun Lake and that counts with 306 rooms, marina and 17 units of time. The hotel is operated by the international chain Melia.

Within the economic activities that are developed in the district, include those associated with the Colon Free Zone (ZLC), with its commercial and industrial activity of storage, processing and re-export, including textiles, leather, plastics technology, jewelry, and treatment of many raw materials.

As part of this Free Zone, are also important financial and banking activities, the activities of transport, both by their movement as for its territorial expression, as they occupy important areas of the Project.

The commercial activity of the Colon Free Zone, generates approximately 8.000 jobs and trade above the B/6.0 billion a year. The jobs in this area are characterized by medium and high wages.
The strong commercial movement generates, in turn, an important flow of commercial vehicles (trucks and trailers) and in the same way, an important flow of passengers to the Free Zone.

Land Transport Terminal, in the area of Bamboo Lane, generates an average of 1.750 operations of arrival and departure of buses and 60.500 passengers per day.

The port of Cristobal, which serves especially to the Free Zone and its areas of older tank located in the area of France Field, generates a moderate traffic volume, reaching a movement of containers in 1999, of 69.510 units, of which approximately 54% corresponded to landings and the remaining 46% of shipments. The port of Cristobal in conjunction with the Port of Balboa in the Pacific Ocean, are part of a concession operated by a new company, Panama Ports Company, S.A., a subsidiary of Hutchison Port Holding Ltd., which it expects to operate 900.000 TEU's per year.

The Port of Manzanillo, operated by Manzanillo International Terminal Panama, S.A. (MIT), which is in the process of expansion, has estimated a movement of containers for the year 2000 more than one million Teus. In 1999 the movement of containers totaled 536.040 units, including embarked and disembarked (Table D.4.9).

In addition, operating concessions for the ports of Coco Solo and Colon Container Terminal (CCT), operated by the shipping company Evergreen, which are expected to have an operation more than 2 million TEU's for the year 2002. The granting of CST is

the largest and occupies an area of 24 hectares, and includes areas for trans-shipment, storage and handling of containers

Demographics, social and economic

The demographic, social and economic data are presented in tables shown previously, according to what is established by the Directorate for Statistics and Census of the Comptroller General of the Republic.

Demographic Characteristics

Under provincial, district, township and populated place

The province of Colon, according to figures from the 2000 census, it has a surface area of 1,504.8 km^2, of which has a total population estimated at 1 July 2008 of 243.115 inhabitants. Its density is estimated at 51.4 inhabitants per km^2.

Table No. 8.2. 3-3: Land Area, Population and Density of the population of the Republic according to province, district and township: Census 2000

Province, District, Township	Area (Km^2)	Population	Density (inhabitants/km^2)
Colon		174.059	115.7
Colon	1,501.9 1,504.8		14,528.6
Cristobal	728 131.926	37.426	51.4

Source: Province of Panama and its statistics. From 1996 to 2000. The Comptroller General of the Republic

With regard to the number of women and men in the province was estimated at 1 July 2008 a total of 120.032 123.083 men and women in the district. See Table No. 8.2.3-3.

2 Index of mortality and morbidity

Does not apply to EsIA Category II.

8.2.3 Employment Index

The rate of employment of the townships studied is represented in the following table, according to data from the 2000 census.

According to a survey conducted in March 2009, the difference in the participation by sex, registering a rate of participation in economic activity of 82.2 percent compared to 47.9 percent reflected by women; at the same time, relate the evolution of this indicator between March 2008 and March 2009, there was a small increase in the participation of men of 2.2 percent, while women registered an increase of 1.7 per cent.

At the domestic level, the urban area concentrates the 66.8 percent of the population of 15 and more years of age; that is to say, 1,592,917 people. Of this group, 1,035,947 people actively participate in the labor market; generating a participation rate of 65.0 percent, which represents compared to March 2008, an increase of 2.3 percentage points.

The same situation occurs in the rural area, to relate the size of the population of 15 years of age and over (791.136 people), with the population engaged in economic activity (504.314 people), it generates a participation rate of 63.7 percent, which represents an increase during the aforementioned period of 1.4 percentage points.

8.2.4 Equipment, services, infrastructure and economic activities

Transport and communications

There is access to public transport and the selective so prevalent in the area.

Aqueducts

Currently, in the city of Colon and the surrounding area, including the community of Sabanitas, the management system of the wastewater consists basically in the sanitary sewer of the I.D.A.A.N. and primary systems of septic tanks and Imhoff.

The sanitation coverage in regard to the disposal of excreta and wastewater for the province of Colon is high, at the provincial level only 4.77 % of the dwellings are not a solution to health care. In the urban areas of the district of Colon, except in the Barrio Sur, which is the percentage of houses without facilities for sanitary disposal of excreta is below the average of the province, on the contrary in the rural districts the percentage of houses without coverage is relatively high.

The responsibility of the sanitation of the excreta and wastewater in urban areas is the responsibility of the I.D.A.A.N., sewer systems are built by the own I.D.A.A.N. or by private companies that develop projects of residential, commercial and industrial applications such as part of the projects, which are then transferred to the I.D.A.A.N. The rural areas are served by the Ministry of Health directly or through the Social Investment Fund (FIS), See Table 8.2.4-1 The percentage of houses without health services.

Table 8.2.4-1: sanitation coverage in the Province and Districts of Colon

Province, District, Township	N° Homes	Without Health	%

		Service	
Province of Colon	49.715	2.373	4.77
District of Colon	5.308	272	5.12
Cristobal township	8.549	127	1.46

Source: Department of Census and Statistics of the Office of the Comptroller General of the Nation. (Censuses of population and housing, 2000)

Currently, in the city of Colón and its surroundings, including the communities of Sabanitas, Cativa, Puerto Pilon, Villa Alondra and Cristobal, the management system of the wastewater consists basically in the sanitary sewer system and primary treatment in septic tanks and percolation Imhoff and seagrass beds.

Electricity

In the community there is electricity that comes from the Company of distributor Elektra Noreste, S.A.

Religious centers

There is no header in the religious centers Catholic, evangelical and Protestant, Jehovah's Witnesses, and others.

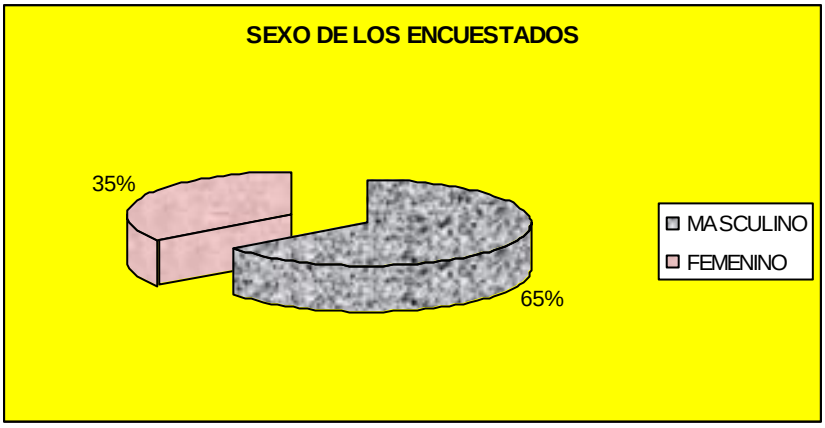
The predominant productive activities

The predominant productive activity of the community is oriented toward commercial, industrial, transport, storage.

8.3. Local perceptions about the project, work or activity (through the Citizen Participation Plan).

In this section, special emphasis is placed on the results obtained through the application of the different techniques of citizen participation. The consultant team undertook two tours of the site or area of influence of the project. These were developed during the 21 days of January, 2 to 4 June 2010.

The sex of the respondents, was reflected in the following way: a 35 % of the female sex and the remaining 65% of the male sex.

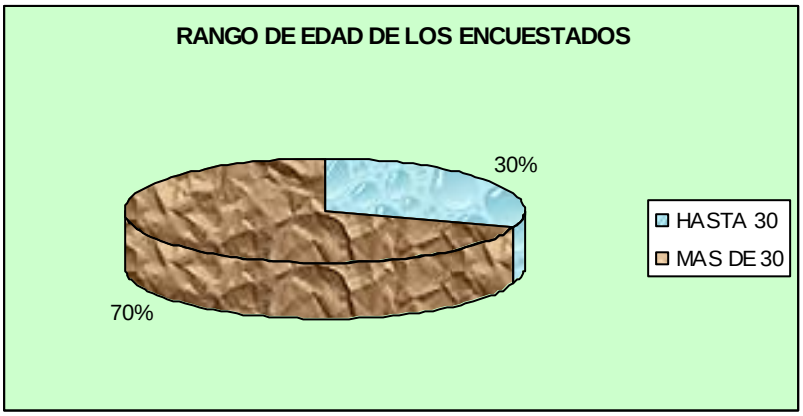


The activities they carry out the respondents are summarized as follows:

- Sellers
- Merchants
- Dockers
- Carriers
- Heavy equipment operators
- Safety Officers
- Directors of Institutions
- Officials of the Corregiduria
- Housewives
- Mechanical
- Secretariats

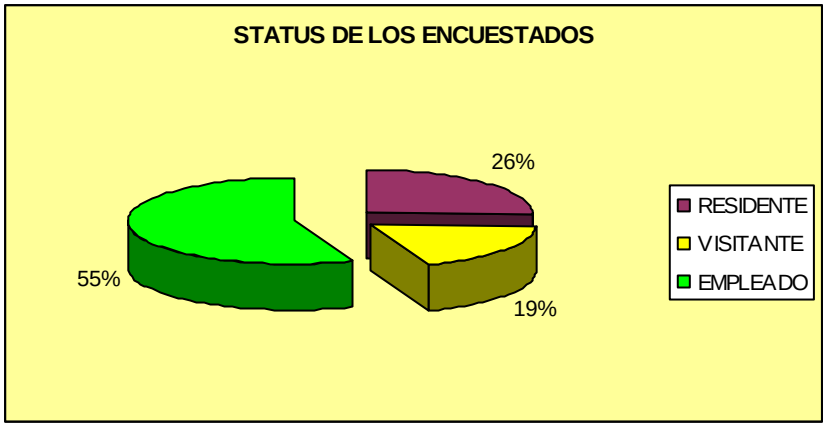
- Street vendors
- Officials of the local private enterprise

The age of the respondents is defined as: 13 with age until 30 years ago and the rest, 30 with more than 30 years.

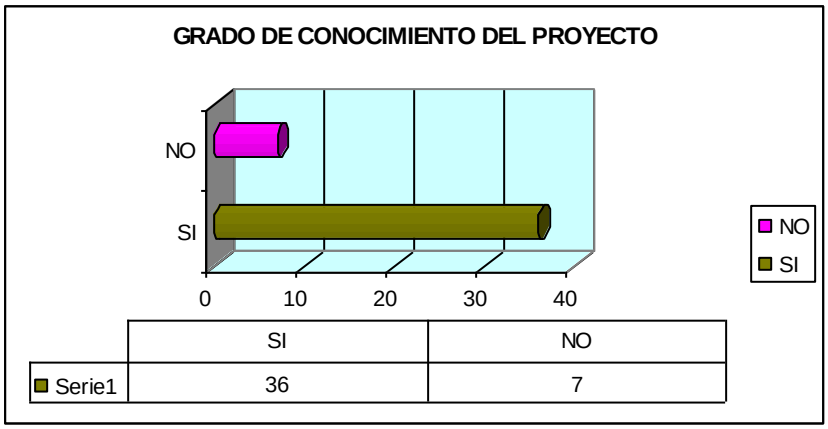


Respondents who expressed be residents, they claim to have from 2 to 22 years of residence in the corregimiento of Cristobal, area in which they are applied the survey of citizen participation.

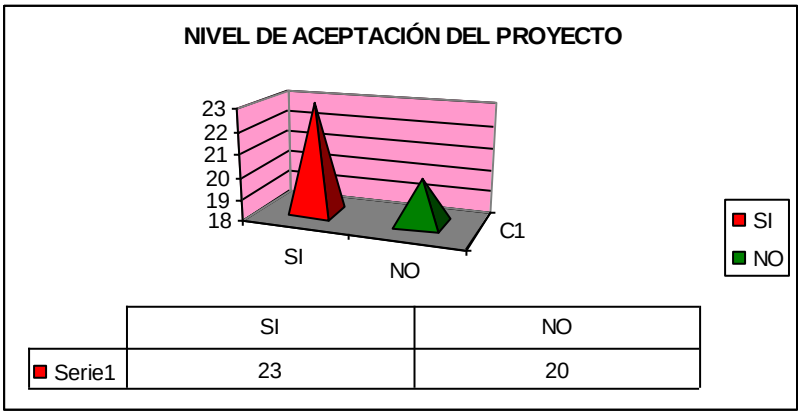
The status of the respondents, was defined as follows: 11 (26%) residents, 8 (19%) visitors and 24 (55%) employees of the area.



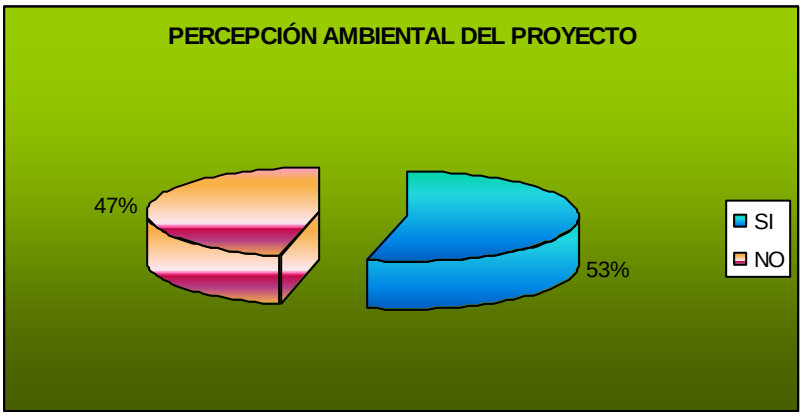
As to the degree of knowledge of the project on the part of the community, this was thrown: 36 7 If you know and did not know of the topic.



With regard to the acceptance of the project, 23 are in agreement and the remaining 20 do not share with the development of the work.



As to whether this type of projects can cause negative impacts to the health of the population of the community, 23 said yes and the remaining 20, they think that it causes no problems.

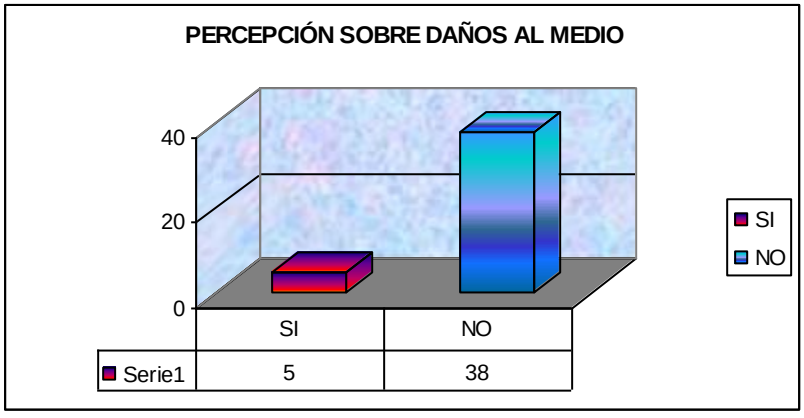


Among the negative impacts identified by respondents, we have:

- Skin diseases
- Generation of toxic gases
- Damages to the flora and fauna
- Damages to the health of the population
- Generation of noise
- Generation of gases into the atmosphere

The respondents unanimously expressed that he had no knowledge of the existence of archaeological findings during construction in the corregimiento of Cristobal.

Of the total number of interrogated, 5 feel that this project will cause damage to the activity developed by them in the area, and the remaining 38 consider that the project which is the subject of evaluation, will not cause damages to your everyday life.



Between the damages pointed out, we have:

- Death and disease in the human and animal populations
- Contamination of the environment with toxic gases
- Date of deseases.

Among other aspects of interest, respondents made no statements in this regard.

8.4 Historical Sites, Archaeological and Cultural declared

Presents the Report of Archaeological Assessment.

Archaeological Assessment Report

From MAYTOR S.A. for
LNG. GROUP PANAMA

1.- Location and physical description of the landscape

The area to be evaluated in this report is one of the two plots of land owned by the Republic of Panama leased to the company's LNG. GROUP PANAMA, S.A. for the installation of a liquefied natural gas terminal and a thermal power plant for generating electricity through the processing of natural gas. The land is located in the district and province of Colon (Figure 1).

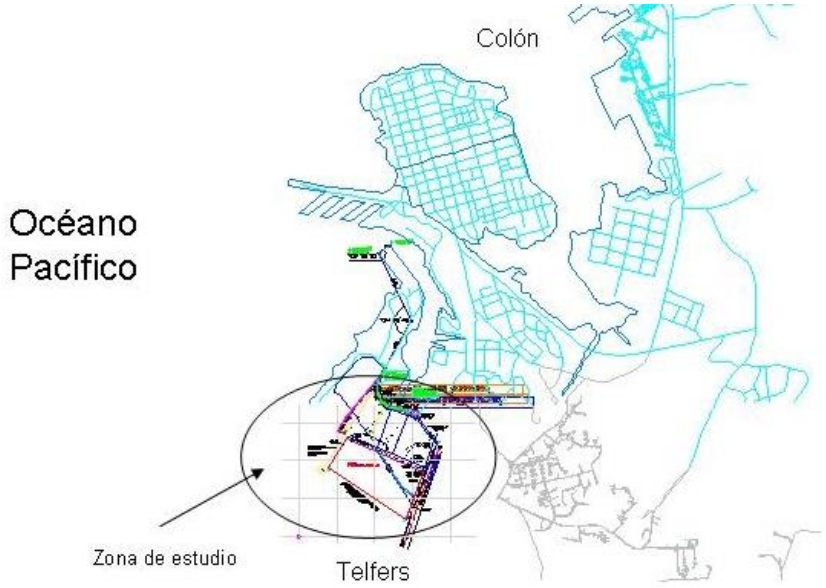


Fig.1: Regional localization of the study area

The balloon field (TE04-01), extends over 40 hectares. 7,033 m^2 and in which there is vegetation except canal straw and small areas of mangrove. The area of the polygon has been used as illegal dumping in these last 10 years once the area was reversed. Like the city of Colon is an area without uneven product fills the time of the construction of the first transoceanic railway line from the mid-19th century and subsequent expansions under the administration of the government of the United States in which he was gradually gaining land to the sea.

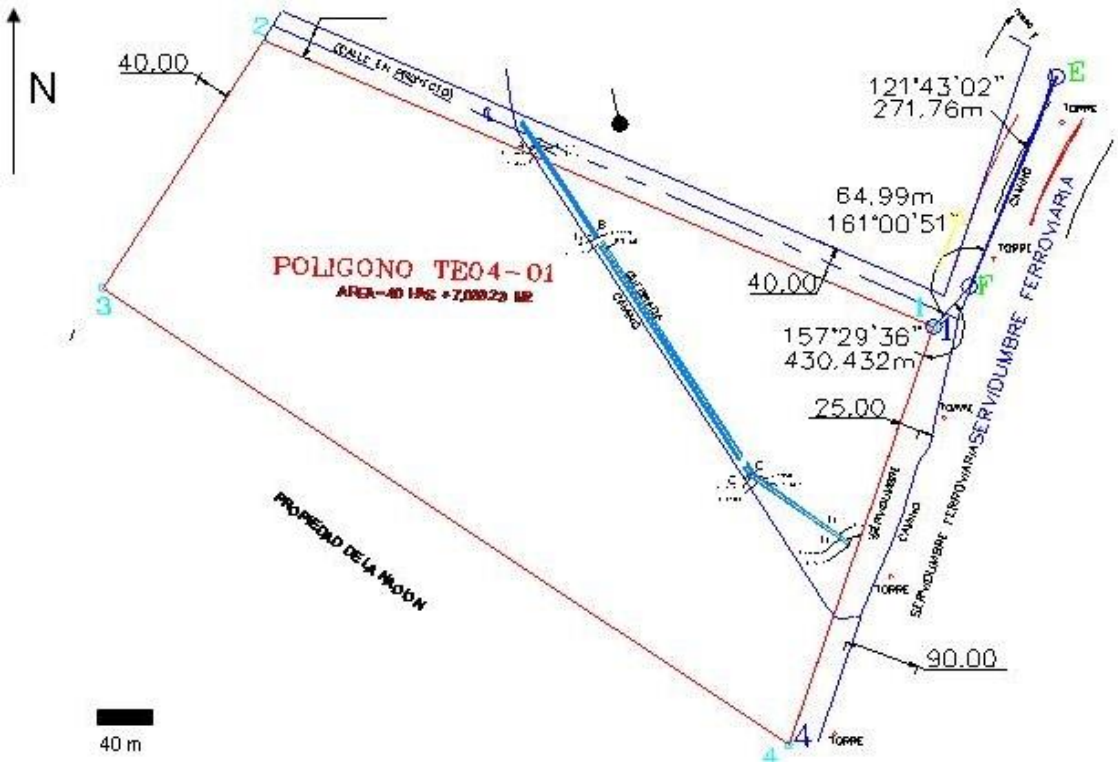


Fig.2: Polygon (TE04-01) of the study area.

2.- Introduction to archeology in the city of Colon.

Columbus was founded in the mid-19th century as a city terminal of the transoceanic railroad in the sector of the Atlantic Ocean. The discovery of gold mines in California caused a great migration between the two coasts. The path chosen by the majority of the miners was the Isthmus of Panama, this being the shortest path. The construction of a railway was a need to unite the two shores. Until that time travelers were still using the old colonial road between Panama and the mouth of the Chagres River. Part of this route was river and communicated the villages of Las Cruces, and Chagres.

The construction of the railway was the first golden age of the city. There was a great internal migration from the villages to the city and also international with the arrival of a large number of Afro-Caribbean and Eastern. Diseases such as malaria and yellow fever caused a large number of casualties among the workers as in the second golden age of the city during the construction of the canal water by the French. The French plans of a sea-level canal failed to materialize and the challenge of opening an interoceanic

waterway from 1904 under the American administration. One of the keys to the success of the construction of the work, sanitation measures were directed by Dr. Gorgas identified the problem of the diseases mentioned above and could combat them with what the dead among the workers of the work decreased dramatically.

Once the work of the construction of the Canal concluded a large part of the labor from other countries was unemployed, which resulted in a large number of unemployed with all the social problems that this entails. Only during the years of the Second World War, Colon resurfaced economically. After that Colon never returned to know moments of splendour and today is one of the poorest cities in the Republic with about rates of crime concern.

3. - Archaeological assessment and recommendations.

The balloon to prospect is as stated earlier of some 40 hectares. To the south of the field we find an area that has been used as illegal dumping over the past 10 years. Both the accumulation of wastes as toxic fumes that his burning causes, made unviable any type of archaeological survey in the area (Figure 3). The balloon of land to the Northwest is a filled area covered by a dense straw canal region. This is a fill area it is unlikely that are buried archaeological deposits (Figure 4).

To be a modern landfill area, where it is not feasible to any type of archaeological survey and is unlikely to find archaeological sites, the work to be done by the company LNG GROUP PANAMA may be performed without these affect the national archaeological heritage.

Fig.3: Illegal dumping in the southeast of the study area. The accumulated garbage as well as Toxic fumes and vapors make it impossible for any type of prospecting in the area.

Fig.4: Northwest area of the polygon of prospecting. Fill on which you can observe The thickets of the straw on the canal zone.

8.5 Description of the Landscape

The landscape within the area of the project, corresponds to a rural type of landscape, semi-urban (industrial and services).

9. Identification of specific environmental and social impacts

9.1 Analysis of the Environmental Situation (Baseline) in comparison with the expected environmental transformations.

For the present study shall be the identification and qualitative assessment of the potential impacts both positive and negative effects on the construction and operation phases of the project, on the different components of the environment, indicating under criteria also qualitative criteria and on the experience of those of greater or lesser significance.

The identification of the environmental impacts allows you to predict the environmental effects that will be given in each of the environmental components, which will result in a design of specific measures through its implementation will minimize the negative environmental impacts or encourage the positive.

Because the project will need to have buffer areas, especially the reception, storage and regasification of LNG. Be included in the calculations of land needs a factor of 20% of the total of the built surface area as a buffer zone. The project shall comply with the requirements of forced withdrawal between batches with other projects.

9.2. Identification of specific environmental impacts, their character, degree of disturbance, environmental importance, risk of occurrence, extent of the area, duration and reversibility, among others.

The identification and assessment of impacts is developed through the comparative analysis of the current status of the elements of the components of the environment that have been described, characterized and analyzed with the potential alterations that will be presented on the attributes of those elements during the execution of the project, which is listed in the description of the project.

The methodological steps followed for the identification, prediction, analysis, assessment and organization of impacts are the following:

- Identification of potential sources of impact
- Identification and description of potential impacts and affected components, and
- Rating and Ranking of impacts.

The following table illustrates the foregoing:

Identification and description of Potential Impacts

Environmental component	Code	Potential Impact	Description
Fauna	FA-1	Loss of habitat for terrestrial wildlife	The potential consequences of the activity of the landfill in the area causes loss of habitat that may be the cause of the decline in abundance; the decline of the species richness or the displacement of individuals toward neighboring habitat. It could also lead to the death of copies in the case of: (a) Species with limited capacity of adaptation to the replacement of the habitat, or (b) Species with limited ability to shift toward the surrounding areas (amphibians, micro mammals, immature specimens including eggs and larvae).
Noise	RU-1	Risk to the health of the population by increasing levels of noise	This impact occurs when, in the presence of sensitive receptors, the emission of noise exceeds the value set by the regulations in force or the reference standard.

The process of qualifying impacts is developed from the analysis of the following aspects:

- The characteristics and activities of the project,
- The elements identified in the area of influence of each environmental component,
- The potential sources of impact (actions associated with project activities) in each sector identified,
- Environmental protection measures referred to by the project itself.

The environmental rating of impacts (ISC) is a tool that facilitates the ranking of impacts, in order to prioritize and plan the implementation of mitigation measures, compensation or restoration.

The definition, rank and rating for each of these parameters is presented below:

The criteria for evaluation of impacts

Parameter	Definition	Range	Qualification
Ca= Character	Defines if the action is beneficial or positive (+) or negative (-), or neutral	Negative Positive Neutral	-1 +1 0
RO= Risk of occurrence	Describes the probability that the impact is likely to occur during the life of the project.	Very Likely Likely Unlikely	1 0.9 - 0.5 0.4 - 0.1
GP= degree of disturbance	Expresses the degree of intervention on the environmental component.	Important Regular Low	3 2 1
E= Extension	Defines the area affected by the impact, with respect to its spatial representation.	Wide (AII) Media (AID) The Project Area (Local)	3 2 1
Du= Duration	Evaluates the time period during which the impact will be felt or resentful.	Permanent (> 5 years) Media (5 years - 1 years) Short (<1 year)	3 2 1
Re= Reversibility	Evaluates the capacity that has the effect of be reversed naturally or through actions considered in the project.	Irreversible Partially reversible Reversible	3 2 1
IA = Environmental Importance	Defines the importance of the environmental element that can be affected, from the point of view of their quality	High Media Low	3 2 1

The CAI calculations for each environmental element, are made in arrays, a specimen of which is attached at the end of this annex.

Identification of Environmental Impacts

Environmental Components

The elements of the environment potentially affected by the execution of works and actions of the project, are the following:

Physical natural environment

It is considered the Air, and the earth (ground)

Natural biotic environment

It has been considered the flora and fauna in the project area goes from low to zero practically.

Socio-economic and cultural environment

This component includes the population and employment (Welfare and Human Health)

<u>Actions of the Project</u>

Movement of earth

The company that will be in charge of the activity of the movement of earth will comply with all environmental control measures necessary to ensure strict compliance with applicable laws and regulations.

Civil works

The main civil works will be the conditioning of the land, construction of infrastructure, conditioning rain and health project, conditioning of the access roads, etc.

Organic and inorganic waste production

The solid waste that will be generated in this project, at this stage, non-hazardous nature. It is expected that are generated debris, such as pieces of wood, stone, blocks, rods and others. Will be installed several trash containers as a method of storage of the same.

There are several private entities that are dedicated to recycle certain materials from the construction. Contact some of these companies to recycle these materials.

The final disposal method for these wastes will be the municipal dump in Colon. The contractor in charge of the construction will be responsible for managing and obtain from the municipality of Colon prior to the start of the construction a permission to perform this activity.

It is expected that during the operation phase of the project will generate non-hazardous solid waste. The same may be channeled as paper, plastic, cans, glass bottles, plastic bags, food waste and other. Be used trucks to transport the same to the municipal dump in Colon.

Method of storage, transport, treatment and disposal of waste mentioned above.

The above-mentioned waste will be temporarily accumulated in piles near the place where you generate and/or will be recycled through those entities that are engaged to process this type of waste of construction where it is used as a raw material.

It will keep track of the accumulation of solid waste to prevent contamination in runoff waters, which are generated in the project area.

The contractor for this project will be responsible for the handling, storage, transport and disposal. The method of transportation will be by trucks. They will carry the waste to the municipal dump in Colon.

During the operation phase of the project is to be used by lorries of private companies, which will have to be contracted for the collection of solid waste that are generated in this project. Non-hazardous solid waste that will be generated, some will be recycled and others will be stored in the garbage containers, which will be placed in a specific area intended for that.

Finally, the waste that cannot be recycled will be arranged in the municipal dump in Colon.

Recycling

Recycling is the process by which, used materials that would otherwise be discarded, are used as manufacturing products or raw materials.

Recycling allows you to re-use materials that were discarded and are still suitable for other products.

The company contracted for the collection and transportation of recyclable materials will provide the containers where users of the commercial project will go by placing these materials.

Among the materials to be recycled, without limiting the recovery of these, will be the glass, plastic, paper, cardboard and aluminum among others.

Transport of materials

The materials for the construction of the civil works can cause small impacts, which can be controlled with the implementation of security measures during the transport of the same.

Traffic Control

During the construction will generate an average of 300 trips per day. This as a result of the vehicles that are used in the construction and all the personnel associated with the same. During this phase will travel to and from the project to carry, in addition, the materials necessary for the construction.

Prepare a plan of maintenance of traffic to reduce the effect that will bring this project in the transit of the access roads to the same. All this will be coordinated with the Transit Authority (A.T.T.T.).

During the operation stage of the Project, the increase in vehicular traffic is estimated at an average of 200 trips per day. The project has adequate access roads, which will contribute greatly to absorb the impact and/or collaborate in the improvement and/or additional disclosures will be performed for the completion of this project.

You will comply with all requirements of the A.T.T.T., for which all road design must be adjusted to the control of access to public roads.

The construction of the main works of the project, as well as its operation, it comprises the execution of actions which, by their nature, may generate some degree of alteration of the environment with respect to their baseline characteristics. These actions, which are common to several works, allow you to develop a matrix which summarizes the main causes that combine to cause a certain effect on the environment.

Below is the general matrix with all sources of impact that the project, which were identified by each impact on the arrays of rating of Impacts.

POTENTIAL SOURCES OF IMPACT AT CONSTRUCTION PHASE

CONSTRUCTION WORKS	Hiring of labor (permanent and temporary)	Logging and clearing of plant material	Movement of earth	Loading and transport of construction materials		Movement of equipment (heavy and light)	Fixed machinery operation	Leveling and compaction of the soil		Soil Stabilization	Paving of land	Physical protection of soils (erosion control)	Revegetation	Use of water for domestic activity.	Signaling	Domestic solid waste management	Solid Waste Management	Domestic liquid waste management	Industrial liquid waste management	Install / Generation of Activities and Services	Vehicle traffic entering the project
Installing or enabling transitional works (camps, plants, ways of working)	X	X	X	X		X		X	X	X		X			X		X			X	
Operation of camps, facilities and ways of working	X			X		X	X			X		X		X	X	X	X	X	X		X
Operation of asphalt plant and/or concrete	X			X		X	X							X	X		X		X		X
Construction Stormwater Drainage System	X	X	X	X		X		X	X	X	X	X	X		X		X		X		X
Construction system of collection and treatment of sewage	X	X	X	X		X		X	X	X	X		X				X				X
Drinking water system construction (piping, tanks and pumps)	X	X	X	X		X		X	X	X	X		X		X		X		X		X
Construction system of storage and distribution of fuels	X	X	X	X		X		X	X	X	X				X		X		X		X
Construction of taxiway and ramps	X	X	X	X	X	X	X	X	X	X	X	X			X		X		X		X
Enabling land project	X	X	X	X	X	X	X	X	X	X		X	X		X		X				X
Construction and empowerment of street and road access (interior and exterior)	X	X	X	X		X	X	X	X	X	X	X	X		X		X		X		X
Thick construction and installation of structures (infrastructures and varying structures)	X		X	X		X	X	X			X						X		X		X
Construction electrical system and telephone and other communication networks	X	X	X	X		X		X	X	X	X	X	X		X		X		X		X

CONSTRUCTION WORKS	**Hiring of labor (permanent and temporary)**	**Logging and clearing of plant material**	**Movement of earth**	**Loading and transport of construction materials**		**Movement of equipment (heavy and light)**	**Fixed machinery operation**	**Leveling and compaction of the soil**		**Soil Stabilization**	**Paving of land**	**Physical protection of soils (erosion control)**	**Revegetation**	**Use of water for domestic activity.**	**Signaling**	**Domestic solid waste management**	**Solid Waste Management**	**Domestic liquid waste management**	**Industrial liquid waste management**	**Install / Generation of Activities and Services**	**Vehicle traffic entering the project**
Restoration of areas audited	X			X		X		X	X	X		X	X				X				
Collection and disposal of household and industrial waste	X			X		X										X	X	X	X		X
Stormwater Management (drains)	X	X	X			X											X		X		
Storage and distribution of fuel in construction	X			X		X	X	X							X		X		X		X
Storage and use of hazardous materials in construction	X			X		X		X							X		X		X		

Source: Prepared by the consultant. 2010

Potential sources of Impact Stage of Operation

	ACTIONS													
WORKS OF OPERATION	**Hiring of labor (permanent and temporary)**	**Revegetation**	**Obtaining water for industrial and domestic use**	**Signaling**	**River drainage management and water rain**	**Domestic solid waste management**	**Industrial solid waste management**	**Domestic liquid waste management**	**Industrial liquid waste management**	**Movement and trajectory of Traffic**	**Internal circulation of and service vehicles**	**Vehicle traffic entering the project**	**Install / Generation of Activities and Services**	**Transport of goods**
The project facilities operation	X		X	X		X	X	X	X	X	X	X	X	X
	X		X	X		X		X		X	X	X	X	X
Maintenance of equipment	X		X				X		X		X			
Operation of the central	X	X	X	X		X	X	X	X			X	X	X
Road transport (internal and external)	X			X								X	X	X
Stormwater management system operation				X	X		X		X					
Operation of the system of storage and distribution of fuel	X			X			X		X	X	X			
Collection and disposal of household and industrial waste	X			X		X	X		X			X	X	
Storage and use of hazardous materials	X			X			X		X					
Operation rescue system and extinction of fire	X		X	X			X		X	X	X			

Source: Preparation of the 2010 consulted.

Identification and description of potential environmental impacts

From the analysis of the nature and magnitude of the actions of the project, identifies the impacts that could be developed during construction and operation.

Below are the impacts recognized, according to environmental components affected:

Identification and description of potential environmental impacts

Environmental component	Code	Potential Impact	Description
Air	AI-1	Increased levels of emission of particulate material	Is produced by the generation or increase of particulate emissions, the effect of the movements of land, loading and transport of materials, movement of equipment in the work, fixed machinery operation and traffic. You can directly affect the quality of the air in the immediate area of influence of the project.
	AI-2	Increased levels of emission of combustion gases	Corresponds to an increase in greenhouse gas emissions resulting from the combustion of fuels (mainly carbon monoxide, oxides of nitrogen, sulfur dioxide and organic gases), due to the movement and movement of machinery, vehicles and aircraft. You can directly alter the quality of the air in the direct area of influence of the project.
Geology	GL-1	Alteration of the geological material Formations (Gatun and Aguadulce)	Is the scarification or destruction of formations, product of the movement of earth, rocks for the obtaining of stone material for fills and achieve grade level.
Geomorphology	GM-1	Modification of the topography or shape of the highlight current	This impact is originating with the actions of movement of earth and rock, leveling and compaction of the soil, which involve the court of wavy and fill areas of sites with depressions, to obtain a flat topography for the construction of the civil works of the project.
Soil Science	ED-1	Soil Erosion	This impact would be produced by the elimination of vegetation cover and land movement that exposes the soil to the effects of the rain water runoff, intensified by the existence of slopes of fillers is not protected, with slopes or inclines.
	ED-2	Soil loss	It consists in the removal and total or partial burial of the soil horizons product of the occupation of the land for the construction of the project works.

Environmental component	Code	Potential Impact	Description
	ED-3	Alteration of the physical properties of the soil	This is the physical modification of the soil, in terms of their apparent density, permeability and structure by the compaction.
	ED-4	Alteration of the quality of soils	Would take place by the accidental contamination or bad practices, by the dumping of substances or solid and liquid wastes during the construction and operation of the project works.
Water Resources	RH-1	Alteration of the quality of the waters	Would correspond to a variation of physical-chemical concentrations that have the waters with respect to the base line, due to the movement of earth and rock, loading and transport of materials, movement and operation of equipment, machinery and vehicles, waste management, use and management of hazardous substances or contaminants. These actions can produce the contribution of pollutants by inappropriate practices or accidental spills.
Noise	RU-1	Risk of damage to the people, by the increase of the levels of noise	This impact would occur when, in the presence of sensitive receptors, the emission of noise exceeds the value set by the legislation in force.
	RU-2	Risk of damage to the fauna, by the levels of noise generated	This impact would be submitted when the elements of the fauna present in the project areas and its surroundings, are affected in their habits due to an increase in the levels, frequencies and durations of noise. This can affect the habits, migration, reproductive rights, among others.
Vegetation and Flora	FL-1	Risk of loss of biodiversity through the removal of vegetation and flora	It would be up to the elimination of the existing vegetation in the area and the possible, or not, replacement of the same by natural or anthropogenic processes.
Fauna	FA-1	Risk of loss of habitat for wildlife	Triggered by the disappearance and subsequent replacement of a habitat for wildlife, due to the removal of the vegetation cover, leveling and compaction of the soil, paving, stabilization and revegetation.

Environmental component	Code	Potential Impact	Description
Socio-economic	SE-1	Generation of jobs	The implementation and operation of the Project works will require a direct way the hiring of labor and indirectly induced employment, due to the multiplier effect of economic activities that would lead to a fundamentally strong modification of the labor market in the district of Colon.
	SE-2	Risk of accidents	Would consist in the possibility of a worker suffering a certain damage resulting from their work activity. Are considered diseases, diseases or injuries with reason or on the occasion of the work.
	SE-3	Migration of population	The generation of expectations for work in other areas of the country, can cause displacement of people in search of jobs that the development of the project demand or induces, altering the demographic structure and the population of the District of Colon.
	Is-4	Improving the quality of life of the population	The generation and development of economic activities, increased employment, creating sources of income for the population and the State, the establishment of services, improvement of the environment and other externalities of the project may contribute to the improvement in the living conditions of the population.
Economic Activities	AE-1	Development and intensification of economic activities	The creation of a thermal power plant and the distribution and marketing of natural gas, would result in the creation of externalities that encourage investment and multiplication of complementary activities or support, as well as other similar or specialized, aimed at different markets.
Property, Land Tenure and Land Value	PT-1	Changes in the division and possession of the property	The project considers the use of the plots of land in concession to develop the project. In this way, the state-owned land are delivered in concession to a private for the installation and development of economic activities

Environmental component	Code	Potential Impact	Description
	PT-2	Increase in the value of the land	The establishment of the project involves the establishment of basic services that require industries to be able to carry out its work (sewers, roads, electricity, telephone, etc.), along with the area of value added activities. Each of these items adds value to the ground, since there would be a demand for the areas that they plan to develop by third parties for commercial-industrial uses.
Basic equipment and infrastructure	EI-1	Involvement of the system of collection and disposal of solid waste, increase in his generation	Would be generated by the increase in demand and coverage of basic services for collection and disposal of waste and construction, affecting their availability and quality.
	EI-2	Alteration of the traffic	During the stages of construction and operation would be an alteration of the traffic, by an increase in vehicular movement on main roads. These have a volume flow schedule, which will increase with the entry and exit of freight transport and other minor vehicles that will accede to the project.
	EI-3	Deterioration of the road network	Would be produced by the movement of trucks and heavy equipment on the tracks, product of the transport of materials and other products, without complying with the standards that can support each way. This impact can cause indirect effects such as damage to vehicles, vehicle maintenance costs and increased costs in maintenance of the roads by the competent institution.
Territorial	OT-1	Uses compatible with the territorial planning	Within the areas that can to intervene the project, there are zoning with land uses that correspond to the activities that the project will develop.

Source: Prepared by the consultant. 2010

Assessment of Potential Environmental Impacts

With the objective of valuing and rank the environmental impacts identified, these are characterized considering quantitative parameters, set out in relative scales. These are combined in an index of Environmental Impact Rating (ISC), which allows for a comparative analysis of the potential alterations of the Project, assigning levels of importance to each of them.

The evaluation will consider the potential sources of impact (works and actions of the project), its location, the potentially affected elements of each environmental component and the environmental protection measures contained in the draft.

The rating is performed by environmental component, characterizing the impacts that could potentially affect each of the elements identified in the area of influence.

Impacts on the Physical Environment

The Table 9.1.7 summarizes the scores obtained for the Physical Environment.
In this environment would affect only negative impacts.

At this stage, the most relevant would be on, the quality of the air (-21.0), the quality of the soil (-21.0) and noise levels with regard to persons (-21.0).

While, during the operation of the project would impact to the noise levels that could perceive animals (-30.0 and -27.0, respectively), and the quality of the air emissions of gases (-27.0).

Of lower rating, are those who act on the capacity of use and suitability of the soil (-8.0), at the stage of operation.

Physical Environment: Rating of environmental impacts according to Item Affected

Code	Potential Impact	Affected element	Environmental Impact Rating (CAI)	
			Construction	Operation
AI-1	Increased levels of emission of particulate material	Air Quality	-21.0	-18.9
AI-2	Increased levels of emission of gaseous pollutants	Air Quality	-12.6	-27.0
GL-1	Alteration of the geological material formations (Gatun and Aguadulce)	Geological Formations	-12.0	-
GM-1	Modification of the topography or shape of the highlight current	Highlight (topography)	-18.0	-
ED-1	Soil Erosion	Soils	-12.0	-
ED-2	Soil loss	Soils	-18.0	-
ED-3	Alteration of the physical properties of the soil	Soils	-18.0	-
ED-4	Alteration of the quality of soils	Soil quality	-21.0	-9.0
RU-1	Risk of damage to the people by increasing levels of noise	Noise levels	-21.0	-30.0
RU-2	Risk of damage to the fauna by increasing levels of noise	Noise levels	-18.0	-27.0

Source: Prepared by the consultant. January 2010

Impacts on the Biological Environment

In the Biological Environment, the impacts occur during the construction phase, all are negative and high rating (from -33.0 to -30.0), since the implementation of the project permanently change the baseline conditions, on an environmental element of high importance.

In this sense, it would be very likely that there is a risk of loss or decline in biodiversity, by the removal of vegetation, the loss of habitat for wildlife (-30.0) on a permanent basis, in conditions which are not feasible to reverse.

Biological Environment: Rating of environmental impacts according to Item Affected

Code	Potential Impact	Affected element	Environmental Impact Rating (CAI)	
			Construction	Operation
FL-1	Risk of loss of biodiversity through the removal of vegetation and flora	Grasslands, and trees	-33.0	-
FA-1	Risk of loss of habitat for wildlife	Wildlife	-30.0	-

Source: Prepared by the consultant.

Impacts on the Human Environment and Cultural

On the Human Environment and Cultural take place most of the positive impacts of the project, product of the economic and social impact. In this way, practically all capitalize with the operation of the project, which is transformed into a generator and inducer of jobs, activities and business. Similarly, construction activities also act as generators of employment, which in turn contributes to the improvement of the quality of life.

For the operation of the project, the qualification of the positive impacts varies between 30.0 and 36.0, while the negative impacts vary with grades of -33.0 to -12.0.

On the negative, of greater weight affect the territorial occupation or neighborhood of the project uses standardized incompatible with his aeronautical transport activity and industrial-commercial (-33.0). Next in importance the population migration, which can bring consequences such as: maintenance of high rates of unemployment in the district.

The environmental impacts that affect the human environment are shown in the following table:

Human and Cultural Environment: Rating of environmental impacts according to Item Affected

Code	Potential Impact	Affected element	Environmental Impact Rating (CAI)	
			Construction	Operation
SE-1	Generation of jobs	Population	27.0	36.0
SE-2	Risk of accidents	Population	-10.5	-12.0
SE-3	Migration of population	Population	7.217	-29.7
AE-1	Development and intensification of economic activities	Transport, Commerce, Industries, Services, Tourism, Financial, Banking	-	33.0
PT-1	Changes in the division and possession of the property	Land tenure	-	30.0
PT-2	Increase in the value of the land	Value of the soil	-	33.0
EI-1	Involvement of the system of collection and disposal of solid	Collection System	-	-12.6

Code	Potential Impact	Affected element	Environmental Impact Rating (CAI)	
			Construction	Operation
	waste, increase in his generation.			
EI-2	Alteration of the traffic	Road network	-14.0	-20.0
EI-3	Deterioration of the road network	Road network	-16.0	-18.0
OT-1	Uses compatible with the territorial planning	Industrial development zones	-	-33.0

Source: Prepared by the consultant. January 2010.

With the objective of valuing and rank the environmental impacts identified, these are characterized considering quantitative parameters, set out in relative scales. These are combined in an index of Environmental Impact Rating (ISC), which allows for a comparative analysis of the potential alterations of the Project, assigning levels of importance to each of them.

The evaluation will consider the potential sources of impact (works and actions of the project), its location, the potentially affected elements of each environmental component and the environmental protection measures contained in the draft.

The rating is performed by environmental component, characterizing the impacts that could potentially affect each of the elements identified in the area of influence.

Ranking of Impacts

Positive impacts

The components that would be altered positively are socio-economic (population), economic activities (transport, commerce, industries, services, tourism, finance, banking), equipment and infrastructure (transport and telecommunications), property, land tenure and land value (land tenure and land value).

Listed below are the positive impacts:

Impacts of positive significance

Code	Potential Impact	Hierarchy	
SE-1	Generation of jobs	36.0	Positive significance
Is-4	Improving the quality of life of the population	36.0	Positive significance
AE-1	Development and intensification of economic activities	33.0	Positive significance
PT-2	Increase in the value of the land	33.0	Positive significance
PT-1	Changes in the division and possession of the property	30.0	Positive significance
OT-1	Uses compatible with the territorial planning	30.0	Positive significance
SE-1	Generation of jobs	27.0	Positive significance
Is-4	Improving the quality of life of the population	24.3	Positive significance

Source: Prepared by the consultant. January 2010
Note: Construction phase Operation Phase.

Negative Impacts

The negative impacts of the project, are hierarchical considering five categories of importance: very high, high, moderate, minor and not significant. With regard to the latter, no impacts with **non-significant negative importance rating**.

Of **importance** is defined very high negative impact, affecting the vegetation and flora. The first is caused by the incompatibility between the uses of the project and the regulated.

I mpactos Negative Effects of Very High Importance

Code	Potential Impact	Hierarchy	
FL-1	Risk of loss of biodiversity through the removal of vegetation and flora	-33.0	Very high negative importance

Source: Prepared by the consultant. 2010
Note: Construction phase Operation Phase.

With **high negative importance**, were qualified three impacts that occur on the population, air quality, noise levels, the stormwater drainage, hydrology, fauna and eco-systems. These are detailed in the following table:

Negative Impacts of High Importance

Code	Potential Impact	Hierarchy	
AI-2	Increased levels of emission of combustion gases	-27.0	High negative importance
RU-2	Risk of damage to the fauna, by the levels of noise generated	-27.0	High negative importance
FA-1	Risk of loss of habitat for wildlife	-30.0	High negative importance

Source: Prepared by the consultant. January 2010
Note: ▪ Construction phase ☐ Operation Phase.

With **moderate negative importance** are affected the road network, the system of collection and disposal of solid waste, the population, the system of collection and treatment of wastewater, noise levels, air quality, stormwater drainage system in the following table shows in detail these impacts.

Negative impacts of moderate importance

Code	Potential Impact	Hierarchy	
EI-1	Involvement of the system of collection and disposal of solid waste, increase in his generation	-16.0	Moderate negative significance
EI-3	Deterioration of the road network	-16.0	Moderate negative significance
EI-1	Involvement of the system of collection and disposal of solid waste, increase in his generation	-18.0	Moderate negative significance
EI-3	Deterioration of the road network	-18.0	Moderate negative significance
RU-2	Risk of damage to the fauna, by the levels of noise generated	-18.0	Moderate negative significance
ED-2	Soil loss	-18.0	Moderate negative significance

Code	Potential Impact	Hierarchy	
ED-3	Alteration of the physical properties of the soil	-18.0	Moderate negative significance
AI-1	Increased levels of emission of particulate material	-18.9	Moderate negative significance
EI-2	Alteration of the traffic	-20.0	Moderate negative significance
ED-4	Alteration of the quality of soils	-21.0	Moderate negative significance
AI-1	Increased levels of emission of particulate material	-21.0	Moderate negative significance

Source: Prepared by the consultant. January 2010
Note: ▓ Construction phase ☐ Operation Phase.

Finally, the **negative impacts of importance**, occur on soils, soil quality, population, geological formations, the quality of the air and the road network.

Negative impacts of Minor Importance

Code	Potential Impact	Hierarchy	
ED-4	Alteration of the quality of soils	-9.0	Negative minor importance
SE-2	Risk of accidents	-10.5	Negative minor importance
SE-2	Risk of accidents	-12.0	Negative minor importance
ED-1	Soil Erosion	-12.0	Negative minor importance
AI-2	Increased levels of emission of combustion gases	-12.6	Negative minor importance
EI-2	Alteration of the traffic	-14.0	Negative minor importance

Source: Prepared by the consultant. January 2010.
Note: ▓ Construction phase ☐ Operation Phase.

9.3. Methodologies used in function of: (a) the nature of the action undertaken, (b) the environmental variables affected; and (c) the environmental characteristics of the area of influence involved.

The methodology consists of a set of procedures that will be used to identify and assess the potential environmental impacts generated by the project, so that it is possible to design measures to reduce negative impacts and enhance positive impacts.

This set of procedures follows a sequence of methodological steps which includes the identification of all the impacts that could be generated on the environmental elements in the areas of influence of the project.

The identification and assessment of impacts is developed through the comparative analysis of the current status of the elements of the components of the environment that have been described, characterized and analyzed with the potential alterations that will be presented on the attributes of those elements during the execution of the project, which is listed in the description of the project.

The range of the prediction and assessment of impacts is referred to the construction and operation phases of the project. The exclusion of the stages of data collection and abandonment is based on the following considerations:

- The stage of acquisition of information for the different components of the project, includes activities that correspond mainly to curriculum design, without involving actions on the environment.
- The project does not provide a closure or abandonment of their operations.

The methodological steps followed for the identification, prediction, analysis, assessment and organization of impacts are the following:

- Identification of potential sources of impact
- Identification and description of potential impacts and affected components, and
- Rating and Ranking of impacts.

Methodological Steps

Identification of potential sources of Impact

From the description of the project and the analysis, we identify, for each of the components of the project, the works and actions that can potentially generate some degree of environmental alteration. These actions, which constitute potential sources of impact, are common to several of the project works.

The above defines an interaction between works and actions, what is presented in a matrix that combines both activities, which is attached to this document.

In this matrix may indicate for each component and/or environmental element, the actions and deeds that affect it.

The definition of the works and their actions is presented in section C Description of Project.

Identification and description of the type of Potential Impacts

On the basis of the analysis of the works and actions of the project, its area of occurrence and the general characteristics, identifies the potential environmental impacts that may result from the construction and operation of the project.

The potential impacts are presented in a table that includes the environmental component affected, a code identifier, the name of the impact and its description.

Qualification Process Impacts

The process of qualifying impacts is developed from the analysis of the following aspects:

- The characteristics and activities of the project,
- The elements identified in the area of influence of each environmental component,

- The potential sources of impact (actions associated with project activities) in each sector identified,
- Environmental protection measures referred to by the project itself.

The environmental rating of impacts (ISC) is a tool that facilitates the ranking of impacts, in order to prioritize and plan the implementation of mitigation measures, compensation or restoration. The CAI is organized by environmental component, evaluating the impacts that could potentially affect each of the elements identified in the area of influence.

The CAI of an impact is determined on the basis of the allocation of quantitative parameters, set out in relative scales, to each of the environmental impacts.

The final assessment is obtained from an index that reflects multiple quantitative and qualitative characteristics of the impact.

The parameters that are defined are those identified by the environmental regulations in force, the weighted average for the CAI in the following way:

CAI = Ca x RO x (GP + E + Du + Re) x IA

Where:

Ca	Character
RO	Risk of Occurrence
GP	Degree of Disturbance
E	Extension
Du	Duration
Re	Reversibility
IA	Environmental Importance

The Environmental Impact Rating (ISC) is the numeric expression for each environmental impact, resulting from the interaction or combined action of factors that define the probability of occurrence of the impact, the extent to which could manifest

itself (degree of disturbance, extension, duration and ability to be reversed) and the environmental value or importance of the element that is altered or impacted.

The importance of the Environmental Impact Rating is classified according to a scale of conceptual hierarchy, which is presented below:

Ranking of Impacts

Range of CAI		**Hierarchy**	
0	+36	Positive significance	The effects of the impact positively on the environmental elements of intervention by the Project
0	-5.3	A non-significant importance	The occurrence of adverse effects on the environmental elements is likely to affect a resource of low environmental importance, in an average length or local, in a period of short duration. The effects are generally reversible and of low intensity.
-5.4	-14.3	Minor	The occurrence of negative or positive effects on the environmental elements is likely or certain, affect a resource of low environmental importance, in an average length or local. The effects are generally reversible and average duration and low intensity.
-14.4	7.217	Moderate importance	The occurrence of negative or positive effects on the environmental elements is certain, affect a resource of medium to high environmental importance, in an average length or local. The effects are generally reversible, duration, and intensity.
-21.7	25.417	High Importance	The occurrence of negative or positive effects on the environmental elements is certain, affect a resource of medium to high environmental importance, in a wide range. The effects are generally reversible, permanent and important intensity duration.
-30.7	-36.0	Very high importance	The occurrence of negative or positive effects on the environmental elements is certain, affect a resource of high to very high environmental importance, in a wide range. The effects are generally irreversible, permanent duration and intensity.

9.4. Analysis of the social and economic impacts to the community produced by the project

Most of the positive impacts of the project, product of the economic and social impact, practically all capitalize with the operation of the project, which is transformed into a generator and inducer of jobs, activities and business. Similarly, construction activities also act as generators of employment, which in turn contributes to the improvement of the quality of life.

For the operation of the project, the qualification of the positive impacts varies between 30.0 and 36.0, while the negative impacts vary with grades of -33.0 to -12.0.

On the negative, of greater weight affect the territorial occupation or neighborhood of the project uses standardized incompatible with his aeronautical transport activity and industrial-commercial (-33.0). Next in importance the population migration, which can bring consequences such as: maintenance of high rates of unemployment in the district.

Positive impacts

The components that would be altered positively are socio-economic (population), economic activities (transport, commerce, industries, services, tourism, finance, banking), equipment and infrastructure (transport and telecommunications), property, land tenure and land value (land tenure and land value).

10. Environmental Management Plan (EMP)

The present Environmental Management Plan (EMP) has been prepared taking as a reference the information obtained in the work of the technical team, the identification and assessment of environmental impacts and the measures suggested by the team for the environmental impacts identified, which allows you to run the PMA on the same criteria.

10.1. Description of mitigation measures specific to each environmental impact.

The mitigation measures during the construction phase can be found in the table below:

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
Air	AI-1	Increased levels of ambient air pollution from mobile sources ()	Require contractors machinery in good mechanical condition. Check that the machines are in good state of maintenance during the work to be done in the project.	Not required	S/E
	AI-2	Dust generation and emissions (Increase of the immission levels of combustion gases)	The equipment and machines will receive regular maintenance and will remain in good working order to avoid and prevent excessive emissions and noise.		
			Silencers or other noise control mechanisms will be used and maintained in good condition.		
			The trucks traveling on public roads will be equipped with a canvas cover to prevent dust and the fall of materials during transport.	Not required	
			These trucks must be in perfect operating condition to ensure public and occupational health and safety during operations.		3 ,000.00
			With regard to the emissions into the atmosphere of the different machinery to be used, must be permanent maintenance (fortnightly) in order to avoid pollution.		3 ,000.00

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
Geology	GL-1	Alteration of the geological material Formations (Gatun and Aguadulce)	Maintenance will be given during the work to be done in the project.		3,500.00
Geomorphology	GM-1	Modification of the topography or shape of the highlight current	The works will be planned in such a way as to minimize the areas to intervene.		S/E
Soil Science	ED-1	Soil Erosion	Sediment barriers or other appropriate measure will be installed after the initial intervention and will be maintained. Temporary barriers will be installed sediment in appropriate places to prevent the deposition of sediment The sediment accumulated must be removed periodically and shall be inspected to ensure that the bottom edge of the follow buried. The temporary sediment barriers should be removed by the construction contractor unless they are useful for the control of sediments in the long term.		15,000.00
	ED-2	Soil loss	The soil loss for uses compatible with the territorial planning of the area.	Not required	
	ED-3	Alteration of the physical properties of the soil	The measures for stabilization against erosion, including revegetation, will begin as soon as practicable in areas where activities have been completed.		

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
	ED-4	Alteration of the quality of soils	To avoid contamination of the soil with the equipment used shall maintain an appropriate level of maintenance of the equipment. Will spill clean-up equipment accessible to the areas of operations.		
Water Resources	RH-1	Alteration of the quality of water in the sea	This construction will be planned in such a way as to minimize the areas to intervene, and in this way prevent further effects.		S/E
Noise	RU-1	Risk of damage to the people, by the increase of the levels of noise	All equipment must comply with the established noise limits for residential areas Noise monitoring will be carried out with the aim of determining remedies and enforcement of environmental standards. In the case of detected levels of noise outside permissible limits, corrective measures will be necessary, such as vehicle maintenance, noise mitigation barriers, etc.		2,500.00
	RU-2	Risk of damage to the fauna, by the levels of noise generated	There will be barriers of noise		2,600.00
Vegetation and Flora	FL-1	Risk of loss of biodiversity through the removal of vegetation and flora	Be planted ornamental species such as teak, oak and flamboyant in areas that would be authorized.	Not required	2,600.00
Fauna	FA-1	Risk of loss of habitat for wildlife	The species will move to areas with vegetation	Not required	2,600.00

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
Ecosystems	EC-1	Production of organic and inorganic solid waste	The solid waste shall be stored in suitable containers to then be transferred to the places where they will be processed	Not required	500.00
Socio-economic	SE-1	Generation of jobs	Positive		S/E
	SE-2	Risk of accidents	Within the labor contracts will be established safety standards established by law.	Not required	S/E
	SE-3	Improving the quality of life of the population	Positive		S/E
Economic Activities	AE-1	Development and intensification of economic activities	Positive		S/E
Property, Land Tenure and Land Value	PT-1	Changes in the division and possession of the property	Positive		S/E
	PT-2	Increase in the value of the land	Positive		S/E
Basic equipment and infrastructure	EI-1	Involvement of the system of collection and disposal of solid waste, increase in his generation	The system of collection and disposal of solid waste will be permanently during the construction phase.		S/E
	EI-2	Alteration of the traffic	Arrangements will be made with the transit authority (ATTT) to achieve the order from vehicular traffic in the project during the construction phase.		S/E
	EI-3	Deterioration of the road network	Will remain the clear path of construction material and debris.		3 ,000.00
Territorial	OT-1	Uses compatible with the territorial planning	Positive	Not required	

S/E: without setting the amounts, which will depend on the agreements with contractors as solidarity responsibility of both parties.

The OPERATION STAGE OF THE MITIGATION MEASURES

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
Air	AI-1	Increased levels of susceptibility (pollution from mobile sources)	Check that the machines are in good state of maintenance during the work.	Not required	S/E
	AI-2	Dust generation and emissions (Increase of the immission levels of combustion gases)	The equipment and machines will receive regular maintenance and will remain in good working order to avoid and prevent excessive emissions and noise.		
			Silencers or other noise control mechanisms will be used and maintained in good condition.		
Geomorphology	GM-1	Modification of the topography or shape of the highlight current	The works will be planned in such a way as to minimize the areas to intervene.		S/E
Soil Science	ED-1	Alteration of the physical properties of the soil	To undertake the work will be planned in such a way as to minimize the areas to Intervene		15,000.00
	ED-2	Alteration of the quality of soils	To undertake the work will be planned in such a way as to minimize the areas to Intervene		15,000.00
Water Resources	RH-1	Alteration of the quality of water in the sea	This construction will be planned in such a way as to minimize the areas to intervene, and in this way prevent further effects.		S/E

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
Noise	RU-1	Risk of damage to the people, by the increase of the levels of noise	Noise monitoring will be carried out with the aim of determining remedies and enforcement of environmental standards. In the case of detected levels of noise outside permissible limits, corrective measures will be necessary, such as barriers for noise mitigation.		2,500.00
	RU-2	Risk of damage to the fauna, by the levels of noise generated	There will be barriers of noise		2,600.00
Fauna	FA-1	Workforce	There is a total ban on hunting and work in general of any action that May affect wildlife or their habitats. Train operators, drivers And contractors on the fragility of a desert ecosystem and the importance of Perform the operations taking into account the environmental policy of smcv	Not required	2,600.00
Ecosystems	EC-1	Change in the morphology	The works will be planned in such a way as to minimize the areas to intervene. In general mitigation measures provided for components Environmental (topography, soils, and vegetation) have implications in the visual quality The Environment	Not required	500.00
Socio-economic	SE-1	Generation of jobs	Positive		S/E
	SE-2	Risk of accidents	Within the labor contracts will be established safety standards established by law.	Not required	S/E
Economic Activities	AE-1	Development and intensification	Positive		S/E

Environmental component	Code	Potential Impact	Measures of Mitigation	Measures of compensation	Cost of the measure (B/)
		of economic activities			
Property, Land Tenure and Land Value	PT-1	Changes in the division and possession of the property	Positive		S/E
	PT-2	Increase in the value of the land	Positive		S/E
Basic equipment and infrastructure	EI-1	Involvement of the system of collection and disposal of solid waste, increase in his generation	The system of collection and disposal of solid waste will be permanently during the construction phase.		S/E
Territorial	OT-1	Uses compatible with the territorial planning	Positive	Not required	

S/E: without setting the amounts, which will depend on the agreements with contractors as soldaria responsibility of both parties.

The construction of the project, includes the set of investments and activities that the Company undertakes to perform under the technical parameters, economic and environmental objectives laid down in the law, so that they could start the operation of the project.

The objectives to be achieved with the preparation of the PMA are:

- Check early and in a timely manner, the implications that construction activities, may have on the biophysical and socio-economic and cultural aspects of the site involved.
- Identify and establish the different components of the PMA to be included in the project.

Presents the following scope of work:

- Adapt to the technical specifications for the preparation of the specific Environmental Management Plan for the Project.
- This PMA is aimed at providing practical mechanisms for the prevention, mitigation, control and rehabilitation of the potential impacts to the environment

and the inhabitants settled in the direct area of influence of the project. Has been structured with a proactive approach, which means that it can be evaluated, feedback and restructured according to the needs that arise.

- An important aspect that has been considered in the formulation of PMA, is one that has to do with the environmental laws and regulations and international environmental practices for similar projects.
- The Management Plan includes 8 programs, which will cover all activities that may cause some impact within the Area. It also includes a Monitoring Plan, to monitor compliance and the correct application of the measures proposed in the Management Plan during the construction and operation of the project.

Listed below are the programs that make up the PMA:

- **Prevention and Mitigation of Environmental Effects**, on the basis of the criterion that it is always better to prevent and minimize the occurrence of environmental and social impacts, which mitigate them or correct them, have worked a group of practical guidelines. Therefore: To prevent a balboa, mitigate 10 balboas and correct 100 balboas. As it is obvious that the idea is really prevent.
- **Waste Management**, aimed at establishing criteria for identifying, categorizing, recycle, reuse, control and dispose the degradable and non-degradable wastes, hazardous and non-hazardous industrial and domestic waste generated during construction activities, in accordance with the regulations and environmental standards.
- **Contingencies**, intended to provide a quick and effective response to the possible presence of emergent events.
- **Occupational Health and Safety**, to determine the minimum quality standards required, which must be observed in the aspects related to: personal protective equipment; reports of accidents and injuries; transport of personnel, equipment and materials; emergency equipment and hygiene and first aid.
- **Environmental training**, through the identification of the minimum content required for employees to carry out specific construction tasks in a way that is compatible with the environment.

- **Community Relations** , whose basic components have been structured according to the following criteria:
    - To minimize the undesirable effects on the community.
    - In order, if possible, the participation of unskilled labor in the project,
    - Mitigate the social conflicts and resulting from the implementation of the project.
- **Environmental Rehabilitation**, which involves the recovery of the vegetation of the impacted areas.
- **Monitoring** , focused on obtaining analytical information for:
    - Check the implementation of the mitigation measures and the characteristics and efficiency of the same,
    - Track linked to the restoration of the areas audited and/or affected.

10.2. Responsible for the implementation of the measures.

The entity responsible for the implementation of the measures will be the promoter and the contractor because in the employment contract with the promoter of the project, include clauses related to such compliance.

10.3 Monitoring

During construction activities must be carried out a series of environmental monitoring, with the objective to ensure that operations do not affect, in a meaningful way, to the environment, namely:

Monitoring of the management of solid waste

This control will be made through the implementation of a system of daily reports on the production and disposal of solid waste, generated by human activities. It is recommended that the general supervisor of the work perform a random review two times per week to determine the effectiveness of the provision in situ, harvest, transport and final disposal in the site.

To verify the classification and the proper handling and disposal of wastes will be carried out comparisons with the classification of the reports for the monitoring and verification of the implementation of the monitoring plan should take into account:

Type of solid waste generated

Provision which was given to the waste

All records must be dated and responsible.

Monitoring of noise

The noise is understood as an inarticulate sound, confusing and unwanted damages the ear and its intensity.

The unit of measure in which it is reported the noise is the decibel (dB), a unit that expresses the pressure variation which produces a body to vibrate. The noise is emitted by lathes, drills, jackhammers, pumps, generators, compressors, etc.

During the operation of the equipment, it is suggested to make at least a noise measurement in the areas of construction, to determine the securities issued, compare them with values already determined in the same computer by its manufacturer, and detect any abnormalities to suggest corrective action.

You need to use a decibel meter to measure noise levels at each point (platform) to be monitored.

Environmental audits

In accordance with the applicable environmental regulations will be the tool to evaluate the implementation and effectiveness of the Environmental Management Plan, check the conformity with the applicable environmental regulations, and propose relevant recommendations, during the phases of construction, operation, maintenance.

The institutions involved in the audit are: National Environmental Authority (ANAM), Ministry of Health (MINSA), Ministry of Housing (MIVI), Administrative Unit of goods reversed the Ministry of Economy and Finance, Municipal Authorities, among others.

For the purposes of what is mentioned in the previous paragraph, the promoters of the project must designate a person, which will be responsible for carrying out the coordination with the above-mentioned institutions and environmental follow-up to the different actions during each of the stages of the project (in the first instance is delegated the responsibility to the project promoter). The designated as responsible for the monitoring, must assume the following activities:

- Ensure compliance with the appropriate environmental measures at the start of each stage.
- To comply, the schedule of monitoring to follow in order to comply with the rules and mitigation measures.
- Adequate monitoring of progress in each of the stages, ensuring compliance with the environmental measures for monitoring and mitigation.
- Reporting of monitoring activities and progress of the project's environmental regulatory institutions when requested, which must assess these reports.
- Coordinate the inspection visits and periodic evaluation of the progress of the work to verify whether it complies with the environmental requirements raised in this environmental study (PMA).
- In the event of problems inherent in environmental monitoring, you must inform your top to apply corrective measures immediately and prepare a detailed report of the case.
- Must be field forms (checklists) for environmental monitoring of the different stages of the work.
- Check that the corrective measures are met in accordance with the environmental requirements of the project and avoid the potential environmental problems that may arise.

Environmental monitoring program.

Plans and Programs	Construction phase	Responsible	Control	Annual cost B/
Evaluation of the impacts generated: Soil quality. Air Quality Noise Generation	Monthly	Company	ANAM	**30,000.00**
Implementation of Mitigation Measures Efficiency of the mitigation measures implemented, Corrective measures not provided for.	Fortnightly	Company	ANAM	**45,000.00**
Environmental Management Plan Verification of compliance through a checklist.	Monthly	Company	ANAM	**20,000.00**
Contingency Plan Report of emergencies and The corrective measures applied	Semi-annual	Company	ANAM	**45,000.00**
Environmental Education Plan Reports of results,	At the beginning of the project	Company	Company ANAM	**20,000.00**

Monitoring Plan. First Year

Type of Monitoring	Action	Implementation Schedule	Legal Criteria	Responsible	Annual Cost B/
Preventive measures of occupational safety and health	Review of compliance practices, preventive measures and hygiene in the workplace	Semi-annual	COPANIT DGNTI 44-2000, 45-2000	Company	**120,000.00**
Documentation	Create a file of all the monitored data	Semi-annual	Business	Company	**15,000.00**

Note: The implementation of mitigation measures, follow-up and monitoring, are set for the first year for the economic aspect, not like this, during the stages and phases of the project, during their implementation.

Control Mechanisms

The Environmental Monitoring Plan, will continue to follow-up mechanisms and monitoring that are detailed below.

For the project proposed by the Promoter, the mechanism of control of Follow-up and Monitoring Plan, it shall be the responsibility of the sectoral authorities, in the exercise of their legal powers, participate in the Environmental Impact Assessment Process, monitor the ongoing compliance with the rules and conditions on the basis of which was approved the study submitted to the Company.

The sectoral authorities and public services, for the activity to develop are the following: National Environmental Authority (ANAM) - Regional Administration of Colon, Ministry of Health (MINSA), Ministry of Labor, Ministry of Housing, and Administrative Unit of goods reversed the Ministry of Economy and Finance, in the municipality of Colón, among others.

10.4 Implementation Schedule

According to what is established in the lease and investment, the implementation of the project will be carried out according to the schedule attached.

PHASES	DURATION	DESCRIPTION	AMOUNT (B/.)
PHASE 1	3 years after the date of the order to proceed	Reception, storage and regasification of Liquefied Natural Gas	300,000,000.00
PHASE 2	2 years counted from the expiration of the Phase 1	Vehicular Natural Gas Infrastructure	45,000,000.00
		Distribution Infrastructure for Domestic Use	115,000,000.00
		Pipeline System	160,000,000.00
		Thermal	130,000,000.00
		TOTAL	**750,000,000.00**

For the implementation of the different activities, was developed based on the following schedule of implementation.

Implementation Schedule

	Tasks	Duration Days	Home	End
1	**Government permits and authorizations**	90	01/10/2009	31/12/2009
2	**Financing**			
	2.1- Negotiation Conditions	120	01/01/2010	30/04/2010
	2.2- Signing Contracts	60	01/05/2010	30/06/2010
3	**Engineering**			
	3.1- Spring and Port Works	90	01/07/2010	30/09/2010
	3.2- Thermal	180	01/07/2010	31/12/2010
	3.3- Storage Tank	180	01/07/2010	31/12/2010
	3.4- regasification plant	150	01/08/2010	31/12/2010
	3.5- pipeline and complementary works	120	01/09/2010	31/12/2010
4	**Supplies**			
	4.1- Spring and Port Works	150	01/01/2011	31/05/2011
	4.2- Thermal	540	01/01/2011	30/06/2012
	4.3- Storage Tanks	360	01/01/2011	31/12/2011
	4.4- regasification plant	240	01/01/2011	31/08/2011
	4.5- pipeline and complementary works	180	01/07/2011	31/12/2011
5	**Construction and Mounts**			
	5.1- Spring and Port Works	270	01/06/2011	31/03/2012
	5.2- Thermal	450	01/10/2011	31/12/2012
	5.3- Storage Tanks	540	01/07/2011	31/12/2012
	5.4- regasification plant	540	01/07/2011	31/12/2012
	5.5- pipeline and complementary works	450	01/10/2011	31/12/2012

Note: Information from the promoter. 2010

10.5 Citizen Participation Plan

As stipulated in the Executive Decree N° 123, it is recommended to involve the community in regard to the Environmental Impact Studies, participation through interviews and/or surveys, where the population close to the area to express their opinion

in relation to the project, its positive or negative impacts that it can generate the environment and the extent of nuisance to the community.

Within the first phase of the citizen participation plan, was carried out the collection of information in the communities near the project.

We proceeded to:

1. Visit the project area
2. Tour of the community
3. Application of a structured survey
4. Data collection and analysis of information.

Table 10.5-1: Citizen Participation Plan

Actors	Resources	Actions	Responsible
Phase 1 - Community	Economic and social situation General opinion on the project	Tour of the community (social and economic) Implementation of surveys (public consultation)	Developer / Consultant
Phase 2 - Promoter	Material on the Project	Disseminate information about the project to the community and to the authorities of the area, through meetings and delivery of information material on the project. Notices in the newspaper.	Developer / Consultant
Phase 3 - Community Promoter Authorities	All Social Actors	Take into account to the community for the work to be performed. Promote activities that are directed	Promoter/ community/ Authorities

Actors	Resources	Actions	Responsible
		toward the care and preservation of the natural resources of the area.	

10.6 Risk Prevention Plan

For the implementation of this chapter is part of the criterion that is always preferable to avoid and minimize the occurrence of environmental and socio-economic impacts, rather than mitigate them or correct them, however, as the implementation of the project involves the generation of impacts, present a series of preventive and mitigating measures.

Preventive measures are those that are to be incorporated into the project design and/or to be applied prior to the implementation of activities whose impacts are intended to prevent or minimize.

Objectives

• Establish actions to minimize impacts on the environment.

• Propose measures that can prevent and mitigate the impacts.

Activities

General measures of prevention and mitigation

- The maximum amplitude of the permanent right-of-way shall not exceed established constructive specifications, for which red tape to demarcate the boundary of the same.

- When you need to run jobs in the vicinity to public facilities that could suffer damage as a result of its operations, it should begin such work to make the necessary arrangements to adequately protect such facilities (e.g. roads and public and private).

- After finishing the construction, all construction debris will be removed from the domain, and that path will be worked to restore it according to what is established in the program of rehabilitation of affected areas.

- Where vegetation and/or top layer of the soil and stored during construction, will be distributed on the right of way, during the reforming and restoration tasks.

- The staff involved in the activities of construction shall be in accordance with the Training Plan of this document, the appropriate instruction on the basic aspects of industrial safety and environmental management such as waste management, appropriate location of the organic layer of the soil, industrial safety and community relations.

- All the work teams that are working on the line must have a first aid kit (coordinated by a nurse trained in each group), and equipment for control of small liqueurs if necessary.

- The area of collection of materials will be delimited with red tape as a security measure.

- The transportation of equipment shall be carried out using the existing access (via the port), considering not cause inconvenience to the inhabitants of the sides of the roads and the possible deterioration of some of them.

Specific measures of prevention and mitigation

Erosion Control

- Sediment barriers or other appropriate measure will be installed after the initial intervention and will be maintained.
- The sediment accumulated must be removed periodically and shall be inspected to ensure that the bottom edge of the follow buried.

- The temporary sediment barriers should be removed by the construction contractor unless they are useful for the control of sediments in the long term.
- The measures for stabilization against erosion, including revegetation, will begin as soon as practicable in areas where activities have been completed.
- To avoid contamination of the soil with the equipment used shall maintain an appropriate level of maintenance of the equipment.
- Will spill clean-up equipment accessible to the areas of operations.

Control of noise and atmospheric emissions

Noise Control

The project will be implemented in stages and levels of noise generated will vary depending on the activities to be carried out in each one. The phase that will generate greater amount of noise will be the movement of land due to the machinery used.

To such effects will be scheduled hours of work for the noise level does not impact to occupied dwellings in the surrounding land. To avoid the adverse effect that might have the increased traffic of trucks and the production of noise, you will work during the working hours and days only, between 6:30am until 4:30pm. In such a way as to avoid impacting the hours of greater peace of mind. The accessories provided by the manufacturer for the control of noise, shall be maintained in good conditions; in addition, the staff will have the necessary equipment to avoid health risks.

Atmospheric Emissions

During construction shall be temporary and shall be limited to the typical dust of construction projects and combustion emissions from mobile sources such as trucks, etc., dust emissions, product of the removal of the topsoil and earth movement, will be the main source of emission of air pollutants, in addition to the hauling of materials of the earth's crust and the vehicular movement.

By its level of emissions and the temporary nature of this type of project is not considered as a major source of hazardous contaminants, or an imminent threat to the quality of the air.

The operation stage of the project will consist mainly of the commercial use of the spaces for these purposes, in accordance with the schematic drawing suggested.

Measures to control pollution

The removal of the topsoil and the construction will produce sporadic emissions of fugitive dust, that will be controlled using the traditional mitigation methods and approved by the Environmental Quality Board. These are: irrigation water with tanker trucks, the early planting of vegetation, the speed control of heavy goods vehicles transiting through the grounds of the construction and the use of tarpaulins to cover the loading of trucks, thereby minimizing the generation of fugitive dust.

Waste Management

All solid waste from domestic or commercial sources shall be classified and arranged according to the established plan for Waste Management of this study.

The field supervisor will check daily at the end of the working day, that there are no waste within the construction area.

With regard to the emissions into the atmosphere of the different machinery to be used, must be permanent maintenance (fortnightly) in order to avoid pollution.

Waste Management Plan (PMD).

The current environmental regulations require the suitability of various alternatives for the management of waste, which alone or in combination will allow the temporary storage, minimization, treatment, reuse and/or recycling, or disposal in a landfill.

It is expected that the Waste Management Program (PMD) to comply properly with the following legal environmental requirements:

Objectives

The goals and objectives of the Waste Management Plan for this project include:

- Comply with applicable environmental laws and regulations.
- Eliminate, prevent or minimize the environmental impacts associated with the generation of waste.
- Reduce the costs associated with waste management and the protection of the environment, instructing and encouraging the employees and workers, to reduce the generation of waste and to manage them efficiently in accordance with the alternatives chosen;

Activities

To enable the obtaining of a PMD specific to environmental and operational conditions in which to implement the project, has been to establish a methodological framework that includes the following points:

- The list of wastes
- Waste Management.

List of waste

The proper identification of the wastes (debris, such as pieces of wood, stone, blocks, rods and others) is the most important activity in the day-to-day operations corresponding to the PMD project, in order to choose the most appropriate technical alternatives for treatment and final disposal.

With this purpose has been to get a list of solid and liquid wastes.

Waste Management

The following describes the basic measures that will be used for temporary storage and disposal of solid and liquid waste:

- A record shall be kept that includes quantities and management method used for all waste

- The waste containers will be coated or constructed of materials that are compatible with the stored waste.
- Roles of household and sanitary source will meet in closed plastic containers to avoid the presence of rodents, flies and other insects, for later disposal at the landfill site identified by the developer along with their contractors, notice or request for permission to the municipality of the province of Colon.
- The plastic containers will be stored in a basket and/or metal or plastic tank, for subsequent recycling; the same can be applied to the case of the remains of wood, before its reuse as stakes or final disposal for recycling in the first case and return to the soil as plant material in the second.
- No hydrocarbon liquid or solid waste containing hydrocarbons, it will be drained or discharged to the environment.

Waste minimization

Refers to the methods and technologies aimed at reducing or minimizing the amount of waste at its source of origin and/or the risk posed to humans and the environment.

The adequacy of specific strategies related to certain changes in operations, non-polluting, the timely maintenance of machinery and equipment and the cost of the disposal of excess items, are key factors for the correct application of this alternative.

The reduction in sources of waste generated is one of the most widely accepted alternatives. The activities to be followed will be:

- Waste Land with hydrocarbons; cans; kitchen scraps and junk food, batteries, paper, hoses, oils, lubricants are among those whose generation can be reduced by implementing appropriate technical staff training and use for each case.
- With this background, and in order to implement the policy of waste minimization, you must do the training to staff in accordance with the Training Plan.

Recycling

- Packaging of metal, glass or plastic, should again be used to contain those fluids that initially they did.
- The scrap and other metal parts, hoses used could be transported and delivered to the recycling sites. The same can be done with glass and plastic containers that have contained toxic and flammable products.

10.7 Rescue Plan and relocation of Fauna and Flora

Given that the area of influence of the project, has been strongly affected by anthropic actions, in the past, the species of fauna are relatively few due to existing activities in the area of influence of the project, are mostly birds, animals and this component is not necessary to the rescue, as they move alone, unless an accident occurs with some of the machinery used in the project.

For these purposes, in this work, an animal rescue plan in line with the environment and a brief methodology to complement it and carry it out.

10.7.1 Main Objectives

- Rescue, recover and protect until its reintroduction in its habitat, specimens that are in the area of influence, found or registered by the activities developed by the project.
- Collaborate and coordinate to the extent possible, with the competent authorities, responsible for the protection of the flora and fauna, in activities relating to the rescue of the species, located in areas of influence of the project.
- Have a program for protection of wildlife, as a possibility for some species of the area (if found) seriously threatened during the development of the phases of the project.
- Raising public awareness on the protection of the fauna, taking advantage of the deployment of the environmental education program to develop with the workers of the company.

Keep a record of the animals rescued or saved, with their respective scientific names and taxonomic groups they represent (in order to avoid misunderstandings or confusion of species), and the activities carried out, coordinated with the staff of the ANAM.

Actions of the Plan of rescue and relocation of Animals

1. Develop a program of activities to be undertaken, aimed at achieving the objectives formulated.
1. Protect this type of wildlife habitat.
2. Train workers in the care around the protection of wildlife, basic aspects of their legislation and the policy of the company. This item will be considered in the Environmental Education Plan formulated.
3. Prohibit have pets and hunting of wildlife, during the development of all the phases of the project, using the instructions issued to the staff, and the placement of signs alluding to this restriction within the areas of the project.
4. Coordinate with the ANAM, the availability prior to the development of the project, a complex of wildlife rehabilitation rescued.
5. Coordinate with the ANAM prior to the development of the project, the relocation of wildlife species, in the event of redemption.
6. A record should be maintained of animals rescued and the same will be placed at the disposal of the ANAM.
7. Consider within the plans of abandonment and environmental recovery, once the operation: the activities to be carried out, there will be a revegetation program in the surrounding areas, where possible, to which these plant species, constitute sources of food, shelter or reproduction, in order to ensure the development and the mitigation of the fauna in the place.

10.7.2 Methodology (phase of Operation)

The operation will be made prior to the start of the project, and shall be carried out in two phases: the first will be reviewing the trees of the area to look for nests of birds, and to

detect the semi-arboreal or arboreal mammals and reptiles that could be among their glasses or branches.

The second phase will consist in making transects, and searching in the understory, leaf litter, trunks and roots falls or rotten etc., as precise as possible, to detect amphibians and reptiles, taking great care, both for not doing damage to the future specimens, and for personal safety, and the poison produced by venomous snakes and insects, present in the study area, it is lethal and fast, therefore, an accident of bite with some of these animals, would create a situation embarrassing and complicated, therefore its handling, preparation and capture must be done in a very professional manner and care.

Be Placed Sherman traps and Tomahawk, for the capture of mammals, and they will as bait, peanut butter, canned sardines, bananas and other fruits.

The amphibians and reptiles, captured will be placed in transparent plastic bags soaked with rain water, to keep the space wet and species are kept fresh, and at the same time to reflect the sun's rays, to create an environment as similar as possible, of their natural environment.

Plastic bags will be placed in boxes of small and medium-sized enterprises, timber to keep fresh specimens, until its relocation in the future, in coordination with the competent authorities in environmental matters.

For mammals captured, will be placed in the traps of wires, some will be adjusted depending on the size of the animals, and other larger, obviously for larger animals, traps will be covered with plastic bags in cool places, so that animals are not will stress and will remain quiet, so as not to hit or hurt in the cages.

For the group of birds, it will not be necessary to the use of capture, as they move naturally,

However, during transport or transects, efforts will be made to observe any bird that could be injured or damaged, in order to provide assistance or care, then give it freely.

10.7.3 Funding and Justification

The implementation of the Plan of rescue and relocation of animals, which should be applied from the start of operations of the project, it will be the responsibility of the company's **LNG GROUP PANAMA, S.A.,** in coordination with the **ANAM** .

The promoter must provide the funds for the arrest and transfer of the species of fauna at the site designated by the ANAM. Each time an event occurs you should make the report to the respective environmental monitoring.

Table No. 1. Cost of the Rescue Plan of Wildlife

The cost of this Plan includes the aspects necessary for its implementation as follows:

Description	Cost (B/.)	Responsible
Talks about the wildlife (terrestrial and marine), identification, and management standards. 2 modules. Cost per module B/.500.00. (2 LECTURES)	**1,000.00**	The company's LNG GROUP PANAMA, S.A., through the hiring of an environmental professional ideal for training. Will the talk from the start of the work.
Site monitoring to detect wildlife species (terrestrial) and come to their rescue. Will be trained or train a person or worker if it is possible to perform this work. During the construction phase. 1 year.	**5,000.00**	The company's LNG GROUP PANAMA, S.A., to request that the ANAM or hired an environmental consultant to train the staff.

Table No. 2. Cost of the Rescue Plan of Wildlife

The cost of this Plan includes the aspects necessary for its implementation as follows:

Description	Cost (B/.)	Responsible
Communication and coordination with the National Environmental Authority for the management and conduct of the wildlife species (terrestrial) rescued in a protected	**1,000.00**	Company

area or secure site.		
Purchase of materials, supplies, and other technical equipment, such as cages, traps, networks, transportation, etc., for the rescue of the fauna.	**2,000.00**	Company
Total	**B/. 96,875.19**	

10.8 Environmental Education Plan

The Environmental Education Plan includes programs related to the components of the Environmental Management Plan. This plan is aimed at technicians and field personnel who will carry out the construction activities, action which will lead to the knowledge and compliance with company policies and operating procedures established.

Objectives

- Provide the knowledge and necessary training to staff in aspects related to the management of the safety procedures and the protection of the environment.
- Perform the strict monitoring of the training plan, to ensure that personnel are familiar and correctly applied environmental measures established within PMA.

The Plan is aimed at all personnel of the company and contractor working on the project. This plan will be directed in particular to the knowledge of the preventive and mitigating measures for the construction phase.

Activities

- The Industrial security personnel of the company, will be responsible for meeting the training needs of staff (and contractors) operating in the different sectors; that is to say, you should review the implementation of the Program of Training and should coordinate new dates for the implementation of talks.

- It will track the training received by staff this is carried out by means of a record that contains the information of the talks received. (Attendance Sheet).

- The assessment will be conducted weekly of the effectiveness of the training provided to staff by using the following criteria: analysis of non -conformities and quasi-accidents; Analysis of environmental incidents and personal accidents; and analysis of audits and inspections.

- Weekly presentations will be made to the contractor's representative to learn about the components of the Environmental Management Plan, the environmental and social impacts of the project together with mitigation and prevention measures.

- The general themes to be included during the implementation of the Training Plan will be the following:
    - Environmental and social impacts caused by the construction along with mitigation and prevention measures.
    - The Environmental Management Plan of the present study addressed to the staff of the company, Contractor Company. This program will be according to the functions that each employee plays within the project.
    - Procedures and drills for the Contingency Plan that will include: handling of equipment and material response.
    - Procedures and measures of occupational health and industrial safety (Plan of Industrial Safety and Occupational Health).
    - Procedures for the proper use and handling of personal protective equipment.
    - Procedures for the proper management of waste generated by the construction operations (Waste Management Plan).

10.9 Contingency Plan

The Contingency Plan for this EsIA, is an internal document that is used as a guide, for the implementation of the actions that require emergency cases as a product of the following:

- Accidental or unexpected risks

The Contingency Plan part of the development of various scenarios of incidents that might occur during the useful life of the facilities, plans to respond to these events, procedures for implementing these plans or guidelines for action, coordination, materials, equipment use, communication system, etc. is oriented to provide an immediate and effective response to any emergency situation that includes fuel spills or accidents, with the purpose of preventing impacts to human health, protect the community property in the area of influence and reduce the risks for the environment and the operation of the facilities.

Objective

- Provide the basic guidelines for rapid and effective response to any emergency situation that could be presented during the execution of the project.

Activities

The Contingency Plan is activated upon the occurrence of an incident or accident. The decrease in the risk of an incident, either in terms of the probability as its magnitude, is achieved by following the guidelines set out in the Waste Management and Occupational Health and Safety.

The Contingency Plan is designed to combat damage of different magnitude and will include the following groups and constituencies of support:

- Key Personnel: Personnel that by their specialty and training is prepared to counter the accident.
- Control group: Staff trained to respond to an emergency.
- Base of operations: Place where they go.
- Center of operation: Where are the instructions for the base of operations.
- Medical Assistance Center: adequate equipment and specialized personnel for Attend to the injured personnel.

Organization of the Contingency Plan

For the operation and running a structural box set, that will make maximum use of existing human resources, while maintaining the levels of authority and delegation, with the purpose of developing the Plan together.

Once the work is a listing that determines the specific roles, the media and calling plans, contacts with governmental and non-governmental organizations, hospitals, etc.

Procedure in the event of a contingency

The following specific action steps that should be followed in the event of a contingency. This procedure may be modified to incorporate additional information that is relevant.

- Set the location of the event, estimate the size and type of event.
- Carry out specific actions to control it.
- Notify the occurrence according to plan.
- Notify government authorities if necessary.
- Take corrective actions in the short and long term.
- Modify operations to prevent the recurrence potential of the incident.
- Documenting and investigating the incident in a form.

Contingency Procedure

Staff Training

All the staff that is part of the emergency response team or, should be adequately trained in the operation and maintenance of the equipment. Several sessions will be developed to inform, instruct and train staff on the content of the Contingency Plan and contingency response program to make sure that you have a full understanding of the specific actions of the same and of the way in which the contingency response team will be organized.

All the staff of construction of the project should be clear about the following criteria:

- **Prevention:** Protect the environment and to the staff, using the best prevention procedures that are technically and economically feasible.
- All operations shall be conducted in an orderly and careful manner to prevent any incident. All personnel will receive appropriate training as the Training Plan.
- **Detection:** the constant vigilance and adherence to prescribed procedures are essential not only to prevent incidents, but also to ensure that any effect to the system is detected immediately.
- **Initiation of response actions:** The person(s) to detect the incident shall give notice immediately to the responsible at the site, who, in turn ready to contingency response team.

INDUSTRIAL SAFETY AND OCCUPATIONAL HEALTH PROGRAM

The occupational safety and health is an issue of vital importance to the company, the same that must be shared by the different contractors and workers.

The activities of the project will take place observing and respecting the national and local regulations, as well as the policies and regulations that for the effect.

Objective

Set the main guidelines for industrial safety and occupational health.

Activities

Occupational Health

- The Company will ensure that all of their workers and contractors are medically trained, with good health and medical conditions that may involve liability for the company. In this respect, it must be carried out before the start of the activities, a general physical examination to their employees and contracted staff or outsourced.

The staff will participate in an introduction program (induction) courses on health and safety, coordinated by staff responsible for the company. In these courses will be

developed both issues of a general nature as particular, specifically related to the work to be performed. The topics will be the following:

- Risk Factors
- Safety equipment: objective and forms of use
- Personal hygiene in the facilities and access roads.
- Awareness about the environment and responsible behavior (treatment and disposal of waste, handling of fuels, etc.)
- First aid and familiarization with the procedures for the evacuation of the wounded
- Importance of the reporting and analysis of accidents and near-accidents (potential accidents)

The courses may be supported with audiovisual materials (videos, charts, handouts) and with discussions and demonstrations. The basic training will be supplemented with additional courses in response to the deficiencies identified and/or to the responsibilities assigned to different people.

Industrial Safety

Conscious of the fact that the adequate treatment of safety aspects, as well as those relating to health and the environment, supported by adequate training of staff worker, the company will require the organization of safety meetings at different levels and frequencies:

- Initial meetings, induction for new staff. These meetings will be held prior to the start of the daily jobs and they are intended to provide the basic knowledge needed to begin the activity.
- Daily safety meetings. In the facilities will be developed daily safety meetings. Its aim is to maintain a high level of awareness on aspects relating to security. These meetings will consist in a session of about 10 minutes before the start of the work of that day. A specific topic should be chosen and discussed.

Meetings of the affirmation of knowledge acquired or on specific topics, according to responsibilities. The purpose of these meetings is to maintain and improve the knowledge of the workers on issues of security, and include the participation in the testing of training, practices in Emergency/first aid and safety on vehicular transport.

In relation to the management of vehicles, should take into account the following aspects:

- Importance of the use of seat belt
- Daily checks of vehicles on the part of the drivers (including lists of control signed and filed by the chief mechanic).
- Speed limits
- Seating capacity
- It is the driver's responsibility for the safety of the passengers
- Defensive Driving Techniques

It will provide basic first aid training for the staff in such a way that the minor injuries can be treated in a timely manner, until they get adequate medical attention.

Contractors will be required to provide your staff with personal protective equipment such as:

- Pants for protection
- Helmets
- Face Shields
- Welding lenses with the appropriate lens
- Safety Boots
- Leather gloves
- Protectors
- Respirators
- Eye Protectors
- Other Protective Equipment, such as breathing, gloves, safety harnesses or belts, clothing for the rain, should be used when the danger to which the worker is exposed to demand its use.

- The contractors shall provide the equipment and tools in good working condition.
- Contractors will be required to periodically run formal inspections of industrial safety to all construction equipment and associated equipment.

Type of Clothing: work clothing should be appropriate for the same. You must use a shirt and pants or coveralls.

Electrical equipment - will be required of the procedure of card lock, and test when a computer with the capacity to generate energy is taken out of service for repairs.
The procedure to block, card Id and test must be capable of preventing unauthorized starting of the machine that is being maintained, shall be equipped with appropriate labels and tested to ensure that they do not represent any danger.

The subcontractors who are working around electrical equipment must take all the necessary precautions to ensure that the computer is disconnected while you are working on or near the equipment. The stairs are used around electrical equipment should be made of wood, so that they do not constitute a conductor of electricity.

Precautions must be taken to ensure that all equipment used is properly grounded and that any accidental contact with underground electric sources is prevented.

Accident reports
As for the environmental incidents, you must have a system to inform or report accidents.

The reports should not only document the situations of real accidents, but also situations of "near misses". The reports must be completed within a maximum of 24 hours of the incident and shall be completed within the following 8 days, with the research and recommendations or corrective actions.

Any dangerous incidents involving personnel, equipment or facilities will be reported immediately and independently of the existence or not of personal injury or damage to the equipment.

Monthly or when merit will be presented a summary report of the compliance of safety standards and statistics on accidents. This will include statistics on cases which required medical treatment, lost-time incidents, the accumulated hours men work without any lost time incident, first aid cases, fatalities, near-accidents, audits and safety meetings.

10.10. Environmental Recovery Plan and abandonment.

The activities of installation, the Company must implement the following measures of environmental recovery post-construction:

- Remove any scrap of the area
- Removal of all solid waste
- Restoration of any fuel spill on the floor

Revegetation

To achieve an adequate revegetation of the areas you will need to perform the transplant of herbs, and shrubs in the project sites dedicated for such purposes.

There is a plan of abandonment for this project, however, before the operation of the project will be all project areas clean and free of debris that have been produced by the activities of the project.

The expectation of economic life of the installations is approximately 30 years. But the experience with other terminals, thanks to the good practices of operation and maintenance and upgrade/update projects that incorporate cutting-edge technologies, has shown that these facilities tend to have a much longer life. In this way, the older facilities remain competitive with regard to the new, with regard to the economic and environmental performance. In the event that the installation is dismantled, this operation

will be treated as a separate "project", LNG group presented the terms of reference for the development of the plan of abandonment, and a plan for the restoration of the site.

10.11. Cost of Environmental Management.

In the box in the box #10.1-1 are estimated the costs of mitigation measures.

11. Economic Adjustment by social and environmental externalities and Cost-benefit Analysis End

11.1 Monetary valuation of the environmental impact

The Monetary valuation

The monetary valuation indicates the value in terms of money, of the physical and psychic obtained in the evaluation of environmental agents, for it is part of the evaluation. The objective of the monetary valuation methods is to estimate the variations of well-being, product of the changing patterns in the environment. The assessment is a supplement to the assessment of environmental policy, since it is necessary to quantify the physical units into monetary units, for the purpose of homogenization and allowed to express calculations in economic terms. The quantification methodology must follow certain guidelines framed by ethical and moral principles.

These methods are applicable both to the valuation of environmental goods, and agents as to the effects that give rise to certain external agents producing impacts on the environment, being the main effect of pollution.

There is a classification according to the procedure in the valuation, separating the two valuation methodologies: direct methods and indirect methods, which are detailed below.

Direct methods of monetary valuation

Direct methods are those that obtain the monetary value, of the provisions to pay for an environmental good or of the request for compensation that asks for a man compared to the condition of their environment, by an external agent. It does not make comparisons with the physical drives, takes place in real markets and also within hypothetical markets, through simulations and direct surveys on those affected.

Certain features on the environmental impact, such as for example, the location of the phenomenon, the time duration, the amount of affected, etc. impeding the use of the market as a source of information, it is necessary to ask those involved (through surveys and test) about the changes that they expect, or by the changes already produced (ex post), in regard to their well-being and quality of life.

Indirect methods of monetary valuation

Indirect methods employ a structure in which the relationship "dose effect", where it is determined physical values for pollution, and then proceed to make a monetary valuation. These methods allow you to estimate the value of the effects of the impacts on the health and comfort of the human being and the other living beings, as well as of the abiotic factors and the depreciation of the real material processed by the human being.

The main and most common indirect methods are explained below:

Method of prevention costs (avoided costs): This procedure is based on the assumption that the costs of prevention of environmental damage are borne by society as a whole, which provides an indicator of the value of the well-reviewed. The reliability of this method is affected because the costs of prevention of environmental damage depend on individual appraisals or social awareness of the society, negotiating capacity of budgetary issues, groups, etc.

Method on the basis of damage: it consists in the evaluation of the overall physical damages caused by a particular agent; the translation in monetary terms is carried out to assess the cost of losses in material resources (destruction of homes, destruction of facilities, furniture, and other material damage), using the market price. It also takes into account the costs produced by diseases (medicines, hospital treatment) and inability to work.

The present project's Environmental Impact Study indicates that the main impacts are related to the impairment of the quality of the air, and the affectation of soils. The economic value of the project's impact would be given by the costs incurred by the change in the quantity and quality of these resources on the welfare of the population would be given by its relationship with the production of private goods that have a market.

Therefore, to determine a monetary value of the impact it is necessary, first, to know how affects the change in the quality of these natural resources to the community and to the ecology. However, such environmental impacts are often difficult to quantify since they do not have an expression in the markets given their characteristics of public goods, are not normally associated with goods or services that have prices recognizable. Added to this, there is an additional problem: when the environmental impacts, if they could be effectively quantified, the allocation of monetary values is usually complex, unreliable, and sensitive to economic conditions.

Despite these difficulties, the concept of 'environment' has become a strategic sense given the tendency to achieve sustainable development, which considers the internalization of the 'externalities', that is to say, the recognition that natural resources have a monetary value that must be borne by those who use or degrade. Therefore, in the field of economy of projects, there is a concern to consider other costs and benefits other than the traditional ones, as there are increasing demands of regulation, and the population affected by an investment project is concerned at the potential welfare losses, private property, and loss in the quality of the environment.

As a way of internalizing environmental and social costs of the project, proposes to the company allocate financial resources (as part of their operating costs) for monitoring changes in the quality and quantity of air, and soil (See Plan of monitoring, control and surveillance) conservation and restoration in the project environment, pending the availability of information to estimate the economic value of the environmental impacts of a more precise way using some proven methodologies.

Value of the environmental impact on the welfare of the population

The environment and natural resources they share three characteristics: generate externalities, public goods and common pool resources. Because of this the market system does not provide any information with respect to the value of the same, which leads to be considered free, to their use and consumption have no cost and consequently to the occurrence of the exploitation.

Economically value the environment means having an indicator of its importance in the well-being of society, to compare it with other components of the same. In reality, what we value is the change in the welfare for society resulting from changes in the availability and quality of the environment or natural resources, using as an indicator the money, which helps to weigh one thing with another as a common denominator. This problem may arise through the maximization of the utility function of the consumer, as follows:

Max U(A) s. a. I - P*A

Where, U is the utility of the individual, I is your income. A and P are vectors of goods and prices respectively.

To resolve this problem allows us to obtain the normal demand curves of the consumer goods (including the environmental good) and consequently the consumer surplus that is a monetary expression of the change in the welfare of the individual resulting from a change in the availability or quality of an environmental good or service.

Value of the Environmental Impact on the Ecosystem

The value of the project's impact on the ecosystem is more difficult to determine. Many people believe that there is something that you can call the intrinsic value of the resources, environmental goods and services. These have a value "in itself", values that do not match the values for the human species, values that are not manifested only because individuals have preferences for them. The economy of the environment currently accepts that both possibilities exist, and that the recovery involves two issues: the value of the preferences of the public in favor or against the changes in the economic value environmental quality, and the value that exists inherently to the "interior" of the resources of the environment (value).

The answer is that both values are legitimate, and both are relevant to the decision-making process. The decisions on the sole basis of economic values, does not adequately reflect the process that occurs in the real world; nor is appropriate when it is obvious that the agents involved in the development have multiple objectives, and not just the economic.

Economic Analysis of the Environmental Impacts of the Project

At the time of analyzing situations involving environmental problems, it is of the utmost importance the "Theory of externalities". An externality is defined as any action performed by an individual (producer or consumer) that influence the well-being of another. For example, the emission of pollutants into the air by an industry can lead to respiratory diseases for the population. Another aspect of an externality or environmental impact is the idea that the environmental risk can be transferred through time and space through the election of the strategies of reduction of pollution.

The environmental impacts caused by the development of projects, usually, can be positive and negative. The magnitude of these impacts depends on its participation in the Net Present Value and the effect of this on the internal rate of return of the project. For that reason, the concern of governments and international agencies for the issue of

externalities, suggests the economic valuation of the environmental variable in the analysis of the environmental impact of the projects.

As we have already seen, the economic evaluation of environmental impacts generated by a project, it is not always easy to implement because of the complexity of the impacts generated or by the lack of information to assess such impacts, or by the same uncertainty about the true dimension of environmental changes caused by the project over time.

Once estimated the economic value of each environmental impact, the use of a conventional methodology as the Cost-Benefit Analysis, allows you to record and to estimate all the effects (including environmental costs in terms of costs and benefits) that can generate a particular project. This methodology allows to verify the degree of profitability of the project through the estimation of indicators such as net present value and internal rate of return. In this way, the project's financial analyst, you can evaluate the extent to which they can invest in protection of the environment without losing the return on investment.

11.2. Monetary valuation of the social externalities.

This point does not apply to the study of Environmental Impact Category II.

11.3. Calculations of the VAN.

This point does not apply to the study of Environmental Impact Category II.

12. Team of Professionals and Functions

12.1. Duly notarized signatures.

Below are the signatures of the participating professionals duly notarized:

12.2. Record number of consultant (is).

	Name of the Professional	No. of registration in ANAM	No. of cédula	Profession / Topics
1.	Dagmar M. Henriquez C.	IAR-068-2000	6-57-2592	Responsible for the EsIA Biologist Description of the project's area of influence. Identification of the environmental impacts PMA.
2.	Natalia I. de Mendieta	IAR-096-2000	E-8-69041	Consultant Partner Support Engineer Hidrotermica Executive Summary Project Description

13. Conclusions and Recommendations

Conclusions

- The proposed project will be developed, with a minimum of pollution, if you follow the recommended mitigation measures.

- The project has a great acceptance on the part of the community.

- The work to be done by the company LNG GROUP PANAMA may be performed without these affect the national archaeological heritage.

Recommendations

- It is mandatory compliance of proposed mitigation measures, as well as monitoring of the environmental variable. Once the EsIA is approved and issued the resolution on the part of the ANAM, the developer has the obligation to comply with the provisions of the same.

- It is the responsibility of the promoter of the project stay in coordination and communication with the ANAM and all institutions involved in the activity. Any change, event or situation is not expected to be present during the execution of the project, must be communicated immediately to the ANAM or to the institution competent in the subject.

- The project sponsor should be seen in the contract with the manufacturer(s) of the work all the responsibility that this has with respect to the implementation of the mitigation measures recommended in the study.

- A copy of the EsIA, once approved, must remain in the project area at the disposal of the contractor, who is responsible for complying with the commitments made in the environmental issue. Must be the base document of consultation before any action or situation that is present.

- It is important that the institutions involved with the monitoring of compliance with the recommended mitigation measures comply with their obligation and commitment.

- For all of the above raised and the content of the document submitted, we recommend the adoption of the EsIA, Category II submitted.

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15. Annexes

No. 1 General of the promoter of the project. Photocopy of the identity card / passport of the legal representative (notarized). Certificate of good standing and dignitary of the original company in the public registry. Writing of the Company.
No. 2 drawings of the land (polygonal) of the project and regional localization of the project. 4243 Topographic Sheet IV IGNTG - MOP. Scale 1:50,000
No. 3. Lease and Investment: Cabinet Resolution No. 2, of 19 January 2010.
No.4 surveys, the results in original