



NATURAL RESOURCES & ENVIRONMENT SECRETARIAT
Application Form for Environmental License for Projects under Category 2 and 3
SINEIA F-02

SINEIA FORM F-02: INFORMATION ABOUT THE PROJECT AND THE ENVIRONMENTAL SURROUNDINGS						
Application Submission Date: (filled by a SINEIA authority)						
Place of Presentation:						
I.- General Information of the Project, Work or Activity						
1	1.1 NAME OF THE PROJECT	TOURISM CORRIDOR PROJECT: TRANCHE LA BARCA - PROGRESO				
	1.2 ACTIVITY BASED ON THE CATEGORIZATION TABLE	CONSTRUCTION OF ROADS, HIGHWAYS, RAILWAYS				
	1.3 PROJECT AMOUNT (LEMPIRAS)	L. 1034,822,952.37 ((exchange rate on September 3, 2013 = 20.47) B/. 50,538,335.24				
2	2.1 EXACT LOCATION	The tranche to be evaluated initiates on the intersection of Road CA-5, with the town of La Barca, towards the Municipality of Santa Rita, it ends in the Bridge of Rio Pelo in the Municipality of El Progreso.				
	2.2 MUNICIPALITY	Santa Cruz de Yojoa, Santa Rita y El Progreso				
	2.3 DEPARTMENT	CORTÉS: Santa Cruz de Yojoa; YORO: Santa Rita y El Progreso				
	2.4 COORDINATES					
	UTM(NAD 27 CENTRAL)		WGS84 (DEGREES, MINUTES AND SECONDS)			
	X=	Y=	Latitude= 15° 6'27.24"	Longitude= 87° 55'49.74"	Beginning of La Barca town	
	X=	Y=	Latitude= 15° 23'29.11"	Longitude= 87° 48'23.33"	End of the tranche Rio Pelo El Progreso	
	2.5 PROJECT LOCATION IN RELATION TO LAND USE PLAN					
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	AGRICULTURAL	FORESTRY	OTHERS
						Road Use
INFORMATION ONLY FOR COMPANIES IN OPERATION						
3	3.1 TELEPHONE NUMBER	3.2 FAX NUMBER		3.3 EMAIL		
II.- OWNER'S GENERAL INFORMATION, LEGAL REPRESENTATIVE						

4	4.1 OWNER'S NAME, LEGAL REPRESENTATIVE OR CORPORATE NAME (INDIVIDUAL OR LEGAL ENTITY)			4.2 NATIONAL TAX REGISTRY NUMBER OR PASSPORT	
	TRANSPORTATION, CIVIL WORKS AND HOUSING SECRETARIAT (SOPTRAVI)				
	4.3 DOMICILE: AVENUE/STREET/NUMBER			Barrio La Bolsa front of Hospital y Clínicas San Jorge	
	4.4 MUNICIPALITY		Comayagüela M.D.C		
	4.5 DEPARTMENT		Francisco Morazán		
	4.6 Telephone numbers			4.9 EMAIL	
	FIXED	MOBILE	FAX		
2225- 1771			Ugasoptravi1@gmail.com uga@soptravi.gob.hn		
III.- LEGAL REPRESENTATIVE GENERAL INFORMATION					
5	5.1 NAME OF THE LEGAL REPRESENTATIVE		Attorney Carlos Arlinton Velásquez Jimenez		
	5.2 DOMICILE			5.3 Honduran Bar Association Number	
	Residencial Plaza, A Block, House Number N°8			10744	
	5.4 TELEPHONE NUMBERS			5.5 EMAIL	
	FIXED	MOBILE	FAX		
	2225- 5445	9934-4515		velasquesjimenez@yahoo.com	
IV.- CLASSIFICATION (ACCORDING TO THE CATEGORIZATION TABLE)					
6	6.1 SECTOR		6.2 SUB-SECTOR		6.3 CATEGORY
	Urban Development (Diverse Real Estate and Infrastructure)		Urban Development (Diverse Real Estate and Infrastructure)		Construction
	6.4 DIVISION		6.5 ACTIVITY NAME		6.6 DESCRIPTION
	Construction		Construction of roads, highways, railways		Road construction for mobilization of any kind of vehicle. Includes bridge construction and related Works.
	6.7 CIU CODE	6.8 NOTES:			
SC					
V. INFORMATION REGARDING THE ENVIRONMENTAL SERVICE PROVIDER					

	7.1 Name	7.2 Registration Number	7.3 Classification	7.4 Authorized until
7	Ingeniería y Ambiente de Sula	RE-0017-2003	Environmental Analysis and Control in General Matters	December 2014

VI.- TECHNICAL DESCRIPTION OF THE PROJECT

The Honduran State, through the National Commission For The Public-Private Partnerships (hereinafter called COALIANZA), and the Secretary of State in the Transportation, Civil Works and Housing Secretariat (SOPTRAVI) under the Law on Promotion of Public - Private Partnerships, established and awarded by International Competitive Tender, the Construction and Operation of the TOURISM CORRIDOR of Honduras. The successful bidder of this process is to the Atlantic Highway Consortium, SA de CV (Consortio Autopistas del Atlántico, S. A. de C.V.), comprising the GRODCO, S IN C.A. (Colombian companies), and PRODECON, SA de CV, (Honduran companies).

Project Components of the TOURISM CORRIDOR of Honduras

The Tourism Corridor of Honduras, includes the following components:

1. **The design and construction of the selective rehabilitation and maintenance undertakings of the highway's tranches connecting:** San Pedro Sula – El Progreso (17.50 km); La Barca – El Progreso (36.50 km); Camalote –Tela (62.66 km) and Tela – La Ceiba (97.00 km).
2. **The expansion to four lanes, two on each way of circulation of the tranches that connect:** La Barca – El Progreso de 36.50 km and Camalote – Tela 62.66 km
3. **The bypass of the city of El Progreso, this is a completely new construction:** The bypass of El Progreso 5.94 km
4. **The rehabilitation of La Democracia bridge and construction of a new bridge made up of four lanes on the municipality of Santa Rita, over Humuya River.**

Objectives of the Project - Tourism Corridor of Honduras

The objectives of the Concession of the Tourism Corridor Project of Honduras are:

1. To reduce travel times by providing a roadway surface in optimum condition and signposted, complying national and international standards.
2. To duplicate lanes and separate traffic directions between La Barca-El Progreso-Tela.
3. To introduce continuous routine maintenance on road.
4. To provide equipment and personnel for security and user assistance on the road.

5. The public-private partnership will introduce a positive flow of resources to the Honduran State, for the construction of infrastructure, job creation, without the high initial investment required for infrastructure. These investments, which are made possible by the private sector, will be amortized as the project generates benefits, concomitantly with the corresponding contributions to the tax authority.

Environmental Technical Document

The tranche object of this Environmental Assessment, includes the following components: Selective rehabilitation and maintenance undertakings and widening to four lanes of the tranche La Barca – El Progreso with 36.5 km and the rehabilitation of the Bridge of Santa Rita over the Humuya River, hereinafter La Barca – El Progreso Tranche.

The activities to be performed in the planning, construction, operation and restoration of the tranche El Progreso – Tela are described in detail below

VI.1 PLANNING PHASE

At this phase the following activities will be executed:

- Award of the corresponding territories on behalf of Government. At this phase the physical environment of the new road is determined (including easements) and technical records are prepared to start the indemnification process that the Transportation, Civil Works and Housing Secretariat (SOPTRAVI) will carry out, to acquire private lands that may be necessary to develop the work.
- Dissemination of the project through the Citizen Participation Plan. The awarded project is presented in the media and outreach meetings begin with all stakeholders, both representatives of civil society, institutions and the community in general.
- Preparation of technical environmental Documents and Application of the Environmental License. Parallel with this and the proposal in hand, the Technical Environmental Documents begins, as per the instrument indicated for each category, for later submission to SERNA (Natural Resources & Environment Secretariat (Hereinafter called SERNA) to obtain the corresponding environmental license. (Regulation of the National System of Environmental Impact Assessment SINEIA - Agreement No. 189-2009).
- Processing of the corresponding permits. The CONCESSIONAIRE must take the steps required by the UGA (Environmental Management Unit) of the Transportation, Civil Works and Housing Secretariat (SOPTRAVI) for all the activities to be performed, for example, tree pruning permit, use of water resources from the Natural Resources & Environment Secretariat (hereinafter called SERNA), use of authorized sites by the municipal authorities (UMA's) for the final disposal of solid waste and construction waste, among others.
- Relocation of Public Services utilities. The Concessionaire shall prepare the final design plans for the relocation of public utilities (electricity, water supply, sewage system, drainage and communications), obtain approval from all Concessionaires to make the necessary Works to prevent any cut or interruption of service during the construction phase.
- Preparation of work program. The Concessionaire shall prepare or update a detailed work program and present it to SOPTRAVI (Transportation & Civil Works Secretariat (SOPTRAVI) for its approval.
- Development of Traffic Detours Plan during the construction, including traffic studies and Works for the adequacy of minor roads, as required.

Location of construction materials supply sources. Similarly, the Concessionaire should find the best construction materials supply sources and provide in its work schedule a continued provision to decrease the quantities and storage areas. Regarding the asphalt plants in operation, the Concessionaire shall ask the proprietary for the respective Environmental Permit for this case.

At this phase, the Concessionaire Company should begin to train workers so that an appropriate training for health protection and the environment of persons is ensured and at the same time, the preparation of the terms of reference for the firms to be outsourced should initiate, in order to ensure compliance with environmental regulations in-force in that moment.

VI.1 CONSTRUCTION PHASE

8.1 Project Area (attach a copy of plans in double letter size)

The plans that include the Project Area are presented under the Additional Requirement presented under subsection H.

8.1.1 Total area of the project (Apt) in m²

The total project area is 1,465,000 m². Within this area we include 40 meters of the existing road easements, two areas for location of camps of 5,000 m² (0.5 ha) throughout the length of La Barca – El Progreso with 36.5 km.

8.1.2 Net area of the project (A_{pn}) in m²

The net area of the project (A_{pn}) is of 1,465,000 m². Within this area we include 40 meters of the existing road easements, two areas for location of camps of approximately 5,000 m² (0.5 ha each), throughout the length of La Barca – El Progreso with 36.5 km.

8.1.3 Total construction area in m²

The construction area will be of 839,500 m². This area is defined by reference to an average typical section of 23 meters by the length of the tranche with 36.5 km. The 23 meters of the typical section include, for each side, the following: bottom of the slope (2 m), shoulder (1.5 m), roadway (7.30 m) and dividing wall (0.70 m).

8.1.4 Geographic Location and Limits

8 The tranche La Barca – El Progreso, runs thru the central sector of the Sula valley. It starts on the intersection of the road CA-5 (that communicates the cities of Tegucigalpa and San Pedro Sula), by the La Barca town in the municipality of Santa Cruz de Yojoa, in the department of Cortés, then continues its alignment through the municipality of Santa Rita, ending at the Rio Pelo bridge, in the municipality of El Progreso, department of Yoro, becoming an alternate route to the city of San Pedro Sula and being a connector to the Atlantic zone of Honduras, in order to promote the development of tourism in the area, as well as intercommunicate large livestock and agricultural regions. See Figure 8.1:

8.1.1 Administrative Location

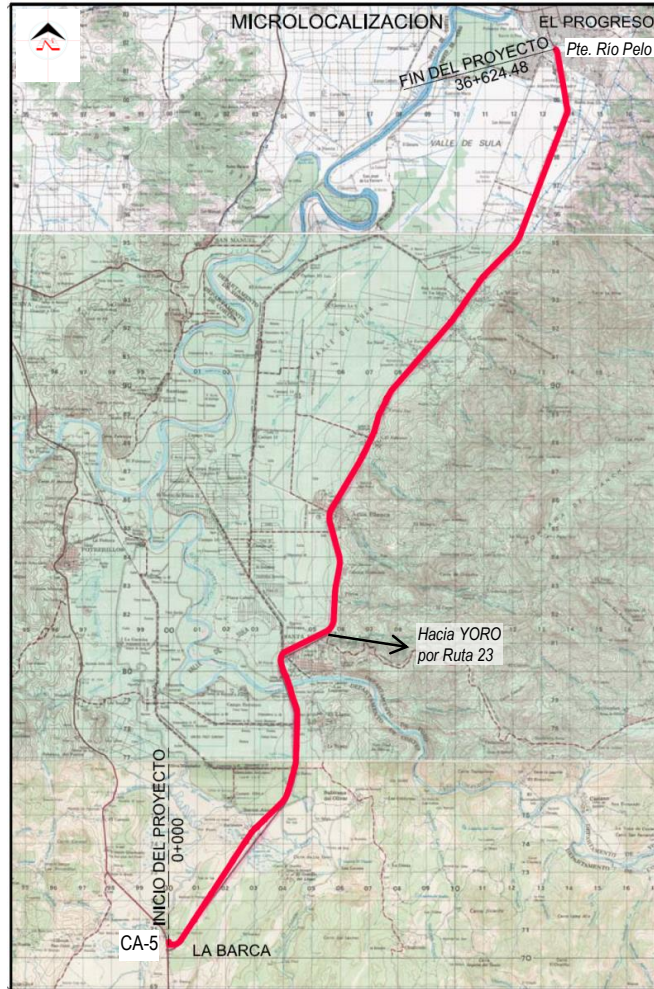
From its administrative viewpoint, the La Barca – El Progreso tranche is among the departments of Cortés and Yoro, running through the municipality of Santa Cruz de Yojoa in Cortés, and the municipalities of Santa Rita and El Progreso in Yoro. See Figure 8.1.

8.1.2 Technical Description of the La Barca – El Progreso Tranche

The tranche that is going to be made wider is characterized by having a carriageway of asphaltic concrete with two lanes, one in each direction of movement, with successive accesses and several urban areas of varying density, present along the way.

The expansion project includes the work needed to turn the tranche into a main highway with two carriageways, physically separated by a strict central strip, with four lanes, two in each direction. Treatment of the different areas along the way is included, with the primary objective of providing a safe route, both for traffic and for the inhabitants of the villages surrounding the project.

Figurea 9.1. Geographic location of the Projecto



8.1.2.1 Technical Description of La Barca – El Progreso Tranche

The presence of human settlements is evident along the alignment, some consolidated, others disperse along the side of the road, or scattered to some distance from its sides, with variable population density.

No transition areas exist on the road that may alert the drivers about their approach to the villages, and internally lack sidewalks and appropriate areas for intersections and pedestrians.

Sugarcane crops are present in the area of influence of the road, that is why the traffic of articulated and big size “sugar cane” trucks must be taken into consideration on the geometric design phase, and in the election of the measures aiming to improve the road safety of the project.

The presence of sugarcane crops by the Agua Blanca Sur community must be highlighted, with access through a road located on the margin on the left margin of the road, adjacent to the cemetery, approximately at 17km + 400.

In addition, the sugar mill Azucares del Norte S.A. (Azunososa) is located on the left side of the road, with access road to the south of Sarrosa, approximately at 23km + 340.

Moreover, one of the existing means of transportation in the area is the motorbike taxis, whose journey should be limited to the inside of the villages; however, their presence is visible in some sections of the road. Can see them driving on the shoulders and sometimes on the road.

The flat trend of the topography and the region’s climate, favor the use of bicycles as means of transportation, reason why it is also common to see people from the different villages, going intermediate distances from work to their jobs or study centers. Normally the shoulder of the road is used for these journeys.

Among the road users, the intercity passenger transportation in its various forms, school busses, light vehicles, trucks and trailers must be considered.

8.2 Describe the activities

8.2.1 Selective rehabilitation and maintenance phase

As pointed out in the Concession Agreement, the term selective rehabilitation and maintenance are the activities of selective rehabilitation with tendency to renew the initial condition of the road, so that they meet the service levels specified in the Concession Agreement.

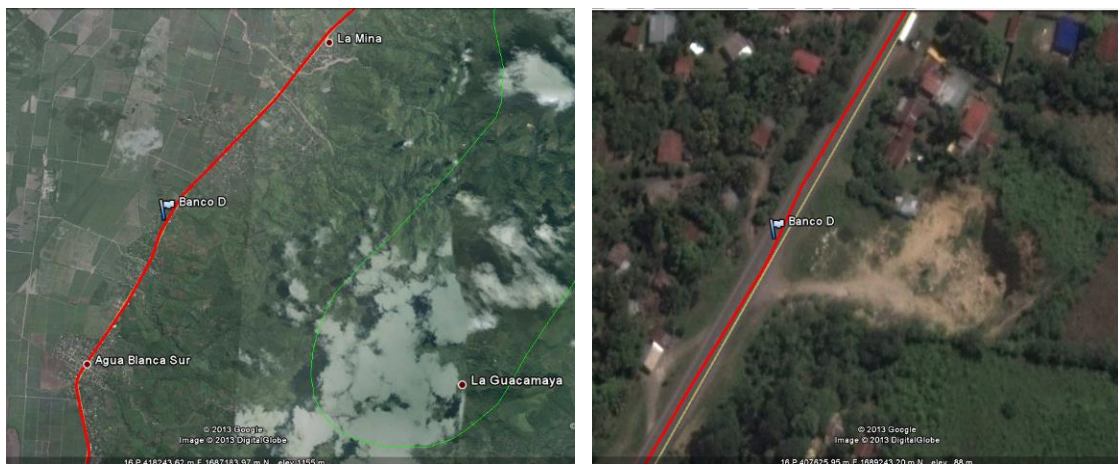
The first phase to be undertaken is the selective rehabilitation and maintenance of the tranche existing between La Barca – El Progreso, which will last 10 months. The activities included in this phase are described as follows:

- **Location and Operation of Temporary Facilities:** This activity includes site selection for the installation, construction and/or purchase or rental of temporary facilities next to the worksite and the operation of these during the time provided under the work plan (they can be temporary or semi-permanent, during the construction phase). These facilities will at least be the following:
 - Field Offices for engineers and for the administrative sector.
 - Provisional repair Shops.
 - Rest areas, food and sanitary services for workers.
 - Storage area for materials and equipment

According to the needs of the project, the use of these temporary facilities will be associated to its size and location, and can range from the establishment of offices, shops and storage, and provisional equipment parking . Similarly, the following aspects have been included in the plan: the change in land use, land leveling, removal of vegetation, construction of offices, sanitary infrastructure (water and sanitary drainage) including septic tanks to handle gray waters, enabling and implementing machinery parking sites in which storages of fuel, lubricants and other supplies will be included, petty (formwork and masons), mechanical repair shops, construction or rehabilitation of access roads, parking area adequacy and whatever is necessary for security (perimeter fencing) and comfort of workers.

In this case, it is proposed to use as location for the campground the provided area, very close to the existing road at station 27+000 about 3.7kms downstream of the crossing the Las Minas stream, which has an approximate area of 0.5 ha. See location on Figure 8.2.

Figure 9.2. Location of the area recommended to install temporary facilities



Source: Google Earth.

- **Preparation of the worksite:** Planned actions include: cleaning, cutting and removal of grasslands on both sides of the roadway and central strips along the alignment. Cutting of grass and shrubs will be performed on both sides of the road, up to a length of 1.0 meters from the outside of the gutter (concrete, stone or formed in the natural soil). Priority will be given to the curves, bridge access, intersections and areas of poor visibility. It also includes pruning of trees that are located in the central strip that have now reached high altitudes, thereby interfering with power lines and preventing visibility of users.
- **Paving of the roadway:** This activity involves the placement, distribution and compacting of the base (usually a crushed granular base), transport and placement of the pavement layer, of the material (asphalt) and thickness defined in the design, from the site of preparation (asphalt concrete plant) to the site of placement. For this case operating asphalt plants located in San Pedro Sula will be used, and the Concessionaire will have to request the owner thereof the corresponding environmental license issued by SERNA.
- **Maintenance of the drainage Works:** it consists of cleaning and removal of debris, dirt, residue, sand or any other material from the gutters, inlets and culverts, minor repairs to gutters, drains, sewers, discharge heads or any other work of drainage that may require it.
- **Bridge maintenance:** This activity is more specific and is based on the structural inspection that makes up bridges (e.g. brackets, stirrups, beams, etc.) as well as the cleaning and repair of joints, guardrails, drainage, pavement layer, etc. The purpose of this activity is to keep the bridge under good condition, repairing damaged secondary members, keeping the channel free of obstructions for the free flow of water and keeping clean the superior and inferior areas of the bridge.



- **Building:** The buildings that are covered by this activity include the toll booth and the administrative offices for staff and the National Police. This activity is subdivided into the foundation, construction of concrete structures and steel (considering: columns, structural walls, beams, etc.), masonry (those jobs that can be done with concrete blocks or terracota blocks, as shown in the plans), placement of doors, windows, stairs, installation of ceilings or roofs, finishes, furnishings (only considering the design, specification, quantity, size and location in the final plan), interior and exterior lighting, bathroom and kitchen.
- **Installation of road signals and illumination:** Consists on the repair or replacement of signage, both vertical and horizontal and light poles; and verification of the operation and programming of traffic lights and luminaries.

- brush from the surroundings is cleaned.
 - The installation of horizontal road signals or painting the dashed centerline on the pavement and the continuous line that runs along the edges with white paint. The edges of the islands in the central part of the road should be painted with a yellow line. The purpose of this activity is to define the traffic lanes for drivers to stay within them and have a guide or reference.
 - The vertical signals that are deteriorated will be restored and replaced.
- **Exploitation and transportation of materials from borrow pits:** This activity involves cutting (exploitation) and transport of stone material to be used for the construction of fillings or embankments from its borrow source (pit, dry or alluvial) to the Worksite. This activity requires greater mobilization of trucks, equipment and construction machinery, and will initiate securing the area with protective barriers that will limit traffic through the internal roads of the Worksite. This action will ensure the safety of pedestrians and workers.

The Concessionaire has identified ten (7) potential borrow pits for obtaining supplies for the selective rehabilitation and maintenance undertakings and construction. If the borrow pits do not have identified a current Concession, then the Concessionaire will process the appropriate permissions before the HONDURAN GEOLOGY AND MINES INSTITUTE (HEREINAFTER CALLED INHGEOMIN) through the UGA (Environmental Management Unit) of the TRANSPORTATION, CIVIL WORKS AND HOUSING SECRETARIAT (SOPTRAVI). The description and details of these borrow sites are presented in Table 8.3

No.	Banco	Uso	Ubicación	Volumen (m ³)	Coordenada N	Coord
1	Las Benjaminas	Banco para sub-rasante	En el municipio de Santa Rita, departamento de Yoro, a una distancia de 2.00 km del desvío que conduce a Yoro.	200,000	15°12' 06.2"	87° 5
2	Sabanetas	Banco para sub-rasante	En el municipio de Santa Rita, departamento de Yoro, a una distancia de 2.60 km tomando el desvío de terracería hacia el este del puente Bailey.	100,000	15°11' 24.62"	87° 5
3	El Bálsamo	Banco para sub-rasante	En la comunidad de El Bálsamo, en el km 20 sobre la carretera pavimentada que conduce de Santa Rita hacia El Progreso.	100,000	15°15' 38.45"	87° 52
4	Urraco Sur	Banco para sub-rasante	En la comunidad de Urraco Sur, en el km 22 sobre la carretera pavimentada que conduce de Santa Rita hacia El Progreso.	20,000	15°16' 41.6"	87° 5
5	Caracol	Banco para sub-rasante	En la comunidad de Caracol, ubicada sobre la carretera CA-5, a 1.5 km del desvío al oeste del puente Caracol.	500,000	15° 08' 56.75"	87° 57
6	Rio Humuya	Banco para sùbase, base granular densa, concreto hidráulico, y concreto asfáltico.	500 metros aguas arriba del puente sobre el río Humuya, Santa Rita departamento de Yoro.	500,000	15° 11' 39.16"	87° 52
7	La Barca	Banco para carpeta asfáltica, concreto hidráulico, base granular	Estación 2+000, lado izquierdo de la carretera La Barca – Santa Rita.	550,000	15° 07' 9.53"	87° 52

Figure 9.3. Location of borrow pits



BANCO DE MATERIAL PARA SUB RASANTE "LAS BENJAMINAS"
KM 2.0 CARRETERA A YORO



BANCO DE MATERIAL PARA SUB RASANTE "SABANETAS"
A 2.6 KM AGUAS ARRIBA DE PUENTE BAILEY



BANCO DE MATERIAL PARA SUB RASANTE "EL BALSAMO"
KM 20.0 CARRETERA LA BARCA-EL PROGRESO



BANCO DE MATERIAL PARA SUB RASANTE "URRACO SUR"
KM 22.0 CARRETERA LA BARCA-EL PROGRESO



BANCO DE MATERIAL PARA SUB RASANTE "CARACOL"
KM 198 CARRETERA CA-5



BANCO DE MATERIAL PARA SUB BASE, BASEGRANULAR DENSA, AGREGADOS PARA CONCRETO HIDRAULICO Y AGREGADOS PARA MEZCLA ASFALTICA "RIO HUMUYA"
500 METROS AGUAS ARRIBA DE PUENTE BAILEY



BANCO DE MATERIAL PARA SUB BASE, BASE GRANULAR DENSA, AGREGADOS PARA CONCRETO HIDRAULICO Y AGREGADOS PARA MEZCLA ASFALTICA "LA BARCA"
500 METROS AGUAS ARRIBA DE PUENTE BAILEY

Use of water sources: This activity consists on obtaining and transporting water resources from surface water bodies within the area of influence of the project to where it is required for those Works that require it, compaction, concrete casts, irrigation , etc.). This resource is usually obtained by pumping from the providing body (river with permanent or semi-permanent flow) to a temporary storage tank from where it will be transported to the worksite.

Table 9-1. List superficial bodies of water

Name	Location
Rio Zacatales	5+400
Río Humuya	10+900
Rio Guacamaya	26+060
Rio Camalote	34+660

Source: The Concessionaire

- Management of construction waste and solid waste:** This activity involves the collection, separation, transportation, and disposal of surplus materials or construction waste generated during the construction of the work in any of the activities mentioned above (including the restoration or removal of temporary facilities), as well as solid and domestic waste and the activities of the construction generated by the operation of the temporary facilities.

Under Table 8.3 we present the description of the current conditions of the sites chosen as dumps for this work; in order to use these places, approval from municipal authorities is required (UMAS)

Table 9.3. Description of the Dump Sites

LA BARCA - EL PROGRESO Solid Residue



Description

Coordinates: Zone 16 East: 407637 North: 1679947

Location: 2km, road to Morazán

Departament: Yoro

Municipality: Santa Rita

LA BARCA - EL PROGRESO Solid Residue



Description

Coordinates: Zone 16 East: 412670 North: 1694523

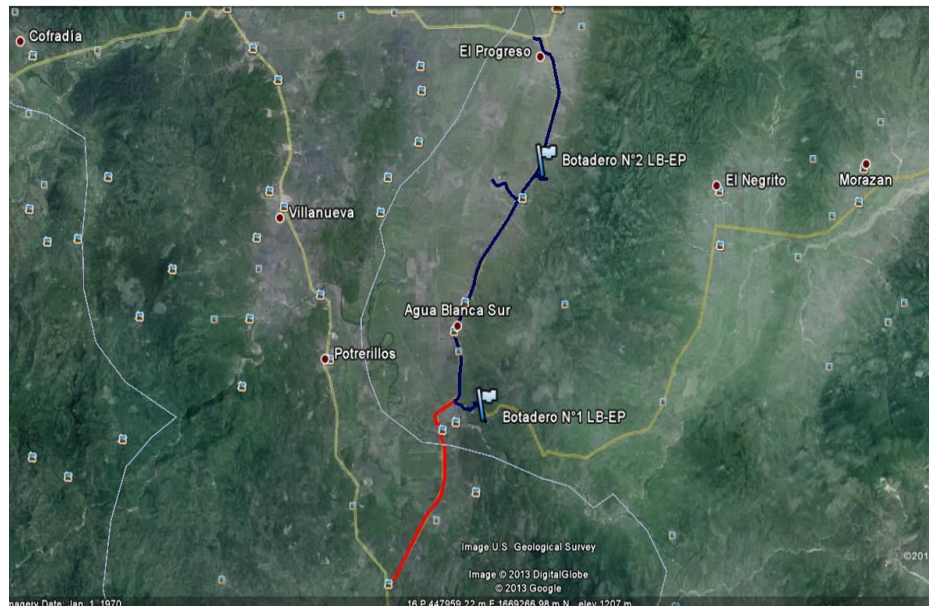
Location: Guacamaya, Progreso

Departament: Yoro

Municipality: El Progreso

Source: Field visits, between February and April 2013

Figure 9.4. Location of the places for dumps



Source: Google Earth. Field trips, april 2013

8.2.2 Construction (extension) Phase

After the selective rehabilitation and maintenance undertakings are completed, the extension work will begin in the Construction Phase, which will last 12 months and includes some of the activities described in the previous phases:

- **Location and operation of provisional installations:** This activity was described in the selective rehabilitation and maintenance undertakings.
- **Preparation of the Worksite:** Removal of topsoil and trees, demolition of existing buildings or infrastructure, construction of temporary traffic detours (mainly at intersections with other roads) and utilities relocation within the road layout is required.

The material from this operation shall be removed with front loaders and dump trucks, and under no circumstances will it be burnt. All wood from this activity may be used by the Concessionaire for the activities of the Works and land (organic layer) from the clearing will be used in the areas where grass or other vegetation needs to be planted.

According to the General Regulations of the Forest Act. Protected Areas and Wildlife - Agreement No. 378-2009, the felled trees will be sold by the owner of the land to be affected as long as he proves its dominance. In the case of national public areas, their use is for social projects at the request of the neighboring communities or community organizations that are under the Social Forestry System and by the municipalities for development of Works. For this a Reforestation Plan will be developed and implemented during the construction phase..

- **Excavation, cutting and conformation of fillings:** the actions include the excavation or slope cuts in the hillsides with heavy machinery and earthmoving. However, the formation of fillings or embankments, is the placement, distribution and compacting of the filling material, either from quarry or from the cuts, according to the required

specifications in the design.

- **Management and use and transportation of material from borrow pits:** This activity was described in the selective rehabilitation and maintenance undertakings, and includes possible places to be used for obtaining the Work's material.
- **Placement of the pavement layer:** This activity was described in the selective rehabilitation and maintenance undertakings.
- **Construction of drainage Works:** It consists on understanding the necessary tasks for placement of sewers, sub-drains, ditches, and other Works that facilitate drainage of rainwater, longitudinally and transversely.
- **Bridge construction:** For bridge construction, independently of the length, height or design, the activities consist of the adequacy of river flow and construction of the temporary detour (if feasible and required), the actual construction of the bridge, by digging for the foundation of the supports and portions (substructure), the cast or placement of pillars according to the height and separation of design, placement of concrete beams and the adequacy of the superstructure and finally the return of the river flow to its original condition.

Currently, seven (7) structures for vehicle crossing of wide natural water sources, can be identified, their location and geometric characteristics are shown in Table 8.4:

Adding to the list an eighth bridge in Santa Rita, Yoro, which collapsed on June 28, 2009, one month after an earthquake caused it serious breakdown, and is now replaced by a parallel interim crossing.

Table 9.42. List of bridges to build

ESTACION INICIAL APROXIMADA	NOMBRE	LONGITUD TOTAL	Carriles	Ubicación lado del Puente nuevo
5+400	Río Zacatales	60.00	4 carriles	derecha
10+900	Puente sobre Río Humuya	240.00	4 carriles	derecha
12+100	Puente Negro	30.10	2 carriles	Centro (*)
17+800	Quebrada Agua Blanca	24.90	2 carriles	Centro (*)
20+400	Río Bálsamo o Piedras de Aflar	14.75	4 carriles	Derecha
26+000	Quebrada Guacamaya	24.60	2 carriles	Derecha
26+600	Quebrada Las Minas	74.60	2 carriles	Derecha
34+650	Río Camalote	50.05	2 carriles	Izquierda

Note (*): They will be broadened over the existing shaft.

Additionally, 5 concrete cases, and structures for minor drainage like concrete tubes for water disposal and pipelines of different diameters can be located.

Such structures become a must in the geometric layout, and are subject to expansion and/or replication to meet the objectives of the road project.

- **Use of water sources:** This activity was described in the selective rehabilitation and maintenance undertakings.
- **Installation of road signals, lighting and architectural finishes:** It involves the supply, installation and placement of light poles with luminaires containment barriers (New Jersey type) and signs of both vertical and horizontal traffic signaling, including accessories such as poles, frames and boards, which are regulatory,

preventive, informative and permanent, along all roads in accordance with the technical specifications of the Ministry of Public Works, Transportation and Housing (SOPTRAVI).

- **Removal of temporary facilities and equipment:** This activity refers to the removal or restoration or decommissioning of temporary facilities. The key actions include the cleaning and restoration of the area (within restoration we can include soil scarification, removal of any structure that is to be discarded, placing topsoil, replanting and reforestation, if applicable).
- **Management of construction waste and solid waste:** This activity was described in the previous phase.

8.3 Describe the machinery to be used in the selective rehabilitation and maintenance undertakings and in the construction phase

With regards to equipment to be used during the construction phase, the following are listed (see Table 9.3):

Table 9.3. Equipment list – Construction Phase

Phase	Activity	Machinery and Equipment
Rehabilitation, Refinement and Construction	Stripping	Moto grader, dump truck, flatbed, others (saws), retro shovel
	Preparation of the Worksite	Bulldozer, front loader, dump truck, platform truck, other (chainsaw).
	Hauling and placement of stone material	Moto bulldozer, compacting roller, front loader, dump trucks, backhoe, flatbed, tanker
	Construction of drainage Works and bridges	Excavator, backhoe, dump trucks, flatbed
	Placement of the pavement layer	Moto bulldozer, double drum roller, pneumatic compactor, asphalt setter, dump trucks, flatbed
	Management of Construction and Solid Waste	Backhoe, dump trucks
	Installation of road signals. Illumination and architectural finishes	Crane Truck
	Withdrawal of Provisional Facilities and Equipment	Front loaders, dump trucks, flatbed

Source: The Concessionaire

8.3.1 Vehicular Equipment

The traffic flow, product of the activities of the project will consist mainly on moving raw materials from Works and waste disposal, truck fuel dispenser or asphalt distributors. It also includes inspections, operation personnel and field supervisor transportation.

Because we will be working simultaneously in the construction of various infrastructure Works and the various tranches, the peak period for traffic flow will depend on the timetable execution of the work. Additionally, some routes have been planned for the management of equipment, materials and wastes, which will be transported by the Concessionaire and its subcontractors to and from the different work areas.

8.4 List the materials to use in each construction phase (detail the origin of aggregates, masonry wood, foundry,

water, etc..)

The development of the various Works comprising this project will require supply of construction materials in a timely and efficient manner. In this sense, a Supply Plan will be developed to guarantee in advance the materials required for each phase of the work, so that it can meet a timetable for execution and with the required quality by the specifications.

A storage policy, aimed at the management and control of materials according to their displacement, replacement time and the importance of its application in the execution of the work and in that sense supply contracts, consignment and auto parts will be signed. Orderly transport of materials is contemplated, with no major impacts on the transit of the storage site or supply, until the areas of the Works.

Some of the main materials specified in Table 9.4:

Table 9.4. <i>List of Basic Raw materials (Construction Phase) materials</i>
asphalt
Sand
Crushed stone
Steel (shaft)
Wood
Cement Block
Pipes of different diameters and materials (Concrete and PVC)
Filling material (Coarse)
Paint
Concrete
Zinc
Cyclone wire
Wire Mesh

Source: Concessionaire

The materials required for the sub-base and base shall be obtained from the sources described above in the section covering borrow sites. In the case of asphalt, it will be purchased from existing asphalt plants operating in the area, located in the city of San Pedro Sula.

8.4.1 Fuel

Fuel will be supplied by trucks used for these services or asphalt distributors, who will transport it from the fuel storage site in temporary facilities and will supply the machinery daily in each work front. These trucks shall have all the signaling and emergency implements such as fire extinguishers, triangles or cones, first aid kits and spill absorbent material. Consumption is expected to be approximately over 50.000 liters per month.

8.4.2 Energy

For field offices and camps: these must be connected to the system of the National Electrical Energy Company (ENEE), in case of an emergency, an own fuel-based generator would be used. Also for road works, portable fuel operated generators will be used.

8.5 Describe the origin of water to be consumed / amounts to use

During the selective rehabilitation and maintenance undertakings, small amounts of water are required to perform the cleanup of the roadway or ditches, etc., in addition to dust control. Along the alignment surface water bodies exist, and the necessary permits can be obtained from the Water Resources Authority of SERNA for its use, in addition to the permission or payment to the relevant municipality.

In Table 8.7, the surface water running through the alignment, where permits for water use could be obtained are mentioned.

Table 9.5 List of surface water bodies passing through the alignment

Name	Location
Rio Zacatales	5+400
Río Humuya	10+900
Rio Guacamaya	26+060
Rio Camalote	34+660

Source: The Concessionaire

In the Construction Phase, the water will be used for the required compacting activities for the placement of the pavement layer. An estimated 7 million gallons of water are consumed in this phase, which are likewise derived from the bodies of water that cross the alignment noted above.

To meet the needs of cleaning, sanitation, etc., water tanks with a capacity of 55 gallons could be installed in the camps, which would be supplied daily (depending on need), by tank trucks with water from any of the water bodies mentioned above.

With regards to the consumption of drinking water by workers, 5 gallon bottles or more should be used. Private companies could provide this service.

8.6 Number of employees at this phase (work area)

8.6.1 Selective rehabilitation and maintenance undertakings

Jobs that are expected to be needed during the phase of selective rehabilitation and maintenance undertakings are shown in Table 8.8. The list refers to 49 jobs. The administrative staff is not listed below.

Table 9.6. Jobs during refinement and rehabilitation

AMOUNT	DESCRIPTION
1	Master of Paving Work
1	Master of Mechanical Works
1	Work Master of the Crushing Plant
1	Topographer
2	Prism holder
1	Assistant of the topographer
1	Tractor operator
1	Front loader operator

8	Dump truck operator
1	Finisher Operator
1	Sweeper - Blow Operator
1	Asphalt tank driver

AMOUNT	DESCRIPTION
1	Asphalt tank driver
1	Crushing Plant Operator
1	Horizontal Signal Equipment Operator
8	Construction Assistants
2	Mechanic
1	Electrician
1	Welder
2	Greasers
1	Lube truck driver
3	Light Vehicle Drivers
1	Environmental Specialist
1	Environmental Specialist Assistant
1	Manager of workplace safety
1	Assistant Clerk of workplace safety
4	Flaggers
49	Total

Source: Own compilation

8.6.2 Construction Phase

Jobs that are expected to be required during the construction phase are shown in Table 8.9. The listing refers to 132 jobs. The administrative staff is not listed below.

Table 9.7. Jobs during Construction

AMOUNT	DESCRIPTION
1	Master of Paving Work
1	Earth movement work master
1	Bridge work master
1	Master of Sewer Work and Boxes
1	Master of Mechanical Works
1	Work Master of Crushing Plant
1	Topographer
2	Prism holder
1	Assistant of the Topographer
8	Tractor operator
4	Motor grader operator
3	Vibrocompactors Operator
3	Front Loader Operator

20	Dump Truck Operator
3	Water Tank Operator
1	Road Recovery Operator
3	Excavators
1	Finisher Operator
1	Sweeper - Blower Operator

AMOUNT	DESCRIPTION
1	ASPHALT TANK Driver
1	ASPHALT TANK Driver
1	Crane Operator
1	Crushing Plant Operator
1	Horizontal Signal Equipment Operator
3	Carpenters
10	Masons
25	Construction Assistants
4	Mechanic
1	Electrician
1	Welder
4	Greasers
1	Lube truck driver
5	Light Vehicle Drivers
12	Flaggers
1	Environmental Specialist
1	Environmental Specialist
1	Manager of workplace safety
1	Assistant Clerk of workplace safety
132	Total

Source: Own compilation

VI.2 Operation Phase

9.1 Describe the course of business or activity when in operation

The operational phase begins with the complete delivery of road work and when open to the general public, both road users and those living adjacent to the road. The operation will be continuous and permanent, with a long 30 year term.

For the road to be kept in operational safe conditions within the design horizon, maintenance activities must be performed.

9.2 Describe the services or products to be borrowed or produced

During the operation phase, the following activities will be executed:

- **Maintenance of the roadway.**
- **Maintenance of the drainage Works**
- **Maintenance of bridges:**
- **Maintenance of road signals and lighting**
- **Patching and covering of potholes**

During this phase the Concessionaire will implement for free the following services, which will be beneficial to road users:

- **Central Emergency Services which will work twenty-four (24) hours a day.**

The Concessionaire shall respond to emergency requests and/or accidents which have occurred in the tranche, through the Emergency Center, communicating them or referring requests to the National Police, a hospital, doctor, clinic or similar, or an insurance company, as applicable.

- **Real Time Emergency Communication System.**

The terminals shall be located at a distance of twenty-five (25) miles between each other. This system should at least allow the execution of free calls exclusively to the Emergency Central.

Ambulance service

For the attention of the injures and transfer to another hospital center, medical center, polyclinic, as applicable



- **Vehicle transfer service**

Transfer of vehicles that have been damaged on the road to the nearest service station, distance must not exceed seventy (70) miles.



- **An office for use by the National Police of Honduras**

This office should be adjacent to areas of location of each toll unit , with its basic equipment and electricity, to support surveillance and control.

9.3 Describe the machinery to be used

The machinery to be used in the operation phase, is presented under Table 9.1:

Table 9.1. Equipment List - Operation and Maintenance Phase

Phase	Activity	Machinery and Equipment
Operation and Maintenance	All maintenance activities	Tractor, grader, vibro compactor, front loader, dump trucks, water tank, finisher, sweeper - blower, tank asphalt, sealers (patching), grease truck, truck crane Backhoe
	Road signal and illumination maintenance Crane truck	

Source: Concessionaire

The traffic flow during the operation phase will consist mainly of moving raw material for Works and disposal of waste, fuel dispenser car or asphalt distributors. It also includes inspections, operation personnel and field supervisors transport.

9.4 List the raw materials to be used

During the operation phase, the raw material will consist mainly of the inputs required for the maintenance of the project facilities. Some of the main materials are described in Table 9.2:

Table 9.2. <i>List of Basic raw materials (Operations Phase)</i>	
materials	
Asphalt	
Barrows	

Signals
Security elements, cones
Shovels
Paints
Wood
Biodegradable detergent for cleaning of the road signals
Gasoline, kerosene or diesel to clean road signs
Coarse or gravel (if required for patching)
Gravel or sand (if needed for patching)

Source: Concessionaire

9.4.1 Fuel

Fuel will be supplied by trucks used for these services or asphalt distributors, who will supply the machinery daily in each work front. These trucks will have to have all the signaling and emergency implements such as fire extinguishers, triangles or cones, first aid kits and spill absorbent material. Consumption is expected to be approximately over 5.000 liters per month and less than 50,000 liters a month.

9.4.2 Energy

For field offices and camps: these must be connected to the system of the National Electrical Energy Company (ENEE), in case of an emergency, an own fuel-based generator would be used. Also for road works, portable fuel operated generators will be used. This phase is expected to see a consumption of less than 360 liters per year and in any case a lower energy consumption of less than 240 MWh / year.

9.5 Describe the origin of water and the amounts to be used.

Water consumption in the operation phase will be to clean the roadway (if necessary) and for dust control when required.

Water from surface water bodies where the alignment crosses will be used, they are the same that were mentioned in the construction phase, for which a permit or Concession issued by the Water Resources Authority of SERNA and the corresponding municipality will be required,.

It is estimated that a total of 200,000 gallons of water per year will be used in the operation phase. The water consumption should not exceed 25% of the remaining flow.

With regards to the consumption of drinking water for workers, use 5 gallons bottles or more, the supply could be done with private firms providing this product.

9.6 Hazardous substances to be used

Some of the hazardous substances to be used are: asphalt, paints, oils for machinery, solvents or degreasers, hydrocarbons, diluents, additives for concrete.

Hazardous substances to be used, must have their safety sheet (MSDS) and the staff that handles them must have the

required training and protective equipment required for handling them for safety purposes.

In the case of hazardous waste, such as packaging of these materials, oily rags, paint residues among others, management will be conducted according to the Waste Management Plan indicated by the EMP.

9.7 List the number of employees by department (detail gender)

Jobs that are expected to be required during the construction phase are shown in Table 9.3. The list refers to 41 jobs. Administrative staff is not listed below.

Table 9.3. Jobs during Operation

Amount	DESCRIPTION
1	Master of Paving Work
1	Master of Mechanical Works
1	Work Master of Crushing Plant
1	Topographer
2	Prism holder
1	Assistant of the Topographer
1	Tractor operator
1	Motor grader operator

AMOUNT	DESCRIPTION
1	Vibrocompactors Operator
1	Front Loader Operator
5	Dump Truck Operator
1	Water Tank Operator
1	Finisher Operator
1	Sweeper – Blower Operator
1	Asphalt Tanker Operator
1	Asphalt Tanker Operator
1	Water Tank Operator
1	Horizontal Sign Operator
3	Sealants Patch Work
1	Mason
5	Construction Assistants
1	Mechanics
1	Electrician
1	Welder
1	Greasers
1	Lube Truck Diver
2	Light Vehicle Driver
1	Environmental Specialist

1	Responsible for workplace safety
41	Total

Source: Own compilation

VII Description of the Environmental Surroundings of the Project

VII.1 Physical Environment

All aspects of the physical environment baseline in the project area are presented in this section. The information presented in this section was obtained from both the review of existing information like surveys and direct on-site measurements.

10.1 Bodies of water

Along the alignment of El Progreso - Tela, several permanent and intermittent water bodies are present, like rivers and main streams, which are presented in Table 10.1:

10.1.1 Rivers, lakes, lagoons, wetlands, seas

Table 10.1. Bodies of water flowing through the alignment

Source: The Concessionaire, based on field work.

Nombre	Ubicación
Rio Zacatales	5+300
Rio Humuya	10+900
Qda. del Cacao	13+620
Qda. Pileta	15+180
Qda. Agua Blanca	17+780
Qda. Piedra de Afilas	20+380
Qda. La Ruidosa	24+600
Qda. La Zacarosa	24+740
Rio Guacamaya	26+060
Qda. Las Minas	26+620
Rio Camalote	34+660

10.1.2 Basin

On the La Barca – El Progreso tranche, the following watershed are found: Zacatales, Humuya, Camalote stream, La Mina stream, Guacamaya stream, Piedras de Afilas and Agua Blanca streams. See figure 10.1:

Zacatales river: With an area of 19,634 hectares, the length of the main course is 43,929 meters. This basin has a time of concentration (Kirpich) of 367 minutes and a delay time (lag time) of 220.2 minutes. The highest percentage of land use within the basin is occupied by traditional agriculture – scrub.

Agua Blanca Sur River: It has an area of 2,047.75 hectares, the length of the main course is 11,753 meters. This basin has a time of concentration (Kirpich) of 59.7 minutes and a delay time (lag time) of 35.8 minutes. The highest percentage of land use within the basin is occupied by traditional agriculture - scrub.

Piedras de Afilas River: It has an area of 1,560 hectares, and the length of the main course is 9,352 meters. This basin has a time of concentration (Kirpich) of 46.6 minutes and a delay time (lag time) of 27.9 minutes.

The highest percentage of land use within this basin is occupied by broadleaf forests and traditional agriculture - scrub.

Guacamaya River: It has an area of 1,375 hectares, and the length of the main course is 9,006 meters. This basin has a time of concentration (Kirpich) 44 minutes delay time (lag time) of 26.4 minutes. The highest percentage of land use within the basin is occupied by broadleaf forests and traditional agriculture - scrub.

La Mina Stream: It has an area of 2,134 hectares, and the length of the main course is 9,642 meters. This basin has a time of concentration (Kirpich) of 47.9 minutes and a delay time (lag time) of 28.7 minutes. The highest percentage of land use within the basin is occupied by broadleaf forests and traditional agriculture - scrub.

Camalote River: It has an area of 1,982 hectares, and the length of the main course is 10,417 meters. This basin has a time of concentration (Kirpich) of 56.9 minutes and a delay time (lag time) of 34.1 minutes. The highest percentage of land use within the basin is occupied by traditional agriculture - scrub.

Humuya River: It has an area of 1,410.49 acres, and the length of the main course is 46,048 meters. This basin has a time of concentration (Kirpich), estimated in different segments according slope changes, of 640.5 minutes and a delay time (lag time) of 384.3 minutes. The highest percentage of land use within the basin is occupied by traditional agriculture - scrub.

Figure 10.1. Water Basins

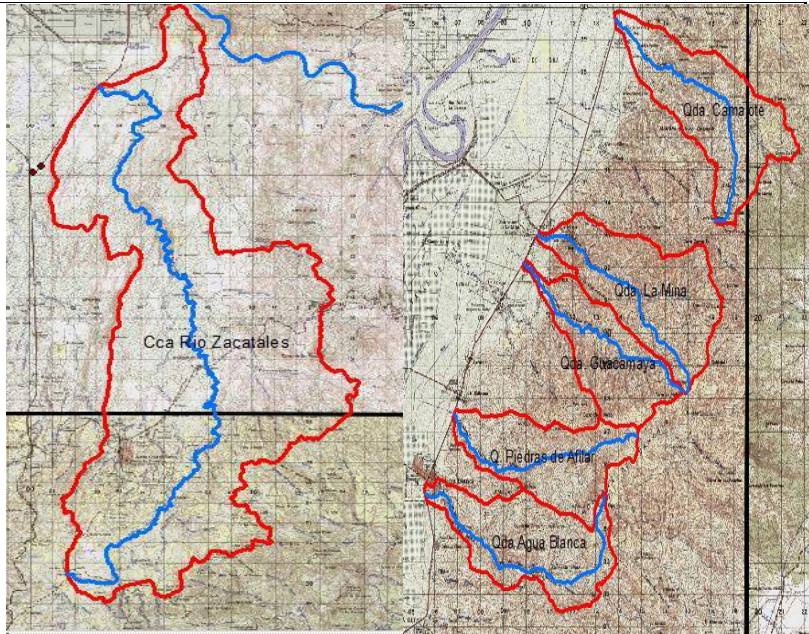


Table 10.2. Water Producing Micro-basins in El Progreso

101.1.3 Water producing zones (and for recharging)

With regards to water producing microbasins, 7 have been identified, supplying some communities in the municipality. Find below the micro-basins for El Progreso and the communities bien supplied by each one.

The only microbasing declared as a water producing zone is the Pelo River basin in Mico Quemaod. The total area is 3,570 ha and it supplies water to the capital of the municipality, providing for 70% of the consumption. This microbasin counts with a management plan for its protection.

Except for Rio Pelo microbasin, no other microbasin in El Progreso has been declared as a water producing body, hence, no management plan has been prepared, which is a disadvantage for the people of this municipality, since there is nothing to guarantee the quantity and quality of the production of water coming from this microbasin.

Micro-basin	Community It supplies
Pelo River	El Progreso Col. Rodas Alvarado
La Sarrosa Stream	Col Las Palmas Buenos Aire Sur
La Danta Stream	Agua Blanca Norte

Guacamaya Stream	Guacamaya
Camalote Stream	Col. 7 de Abril El Porvenir Norte Col. San José Castaños Carlos R. Reina San Jorge Col. Primavera
Corocol Stream	Col. Corocol
El Milagro Stream	Agua Blanca Sur

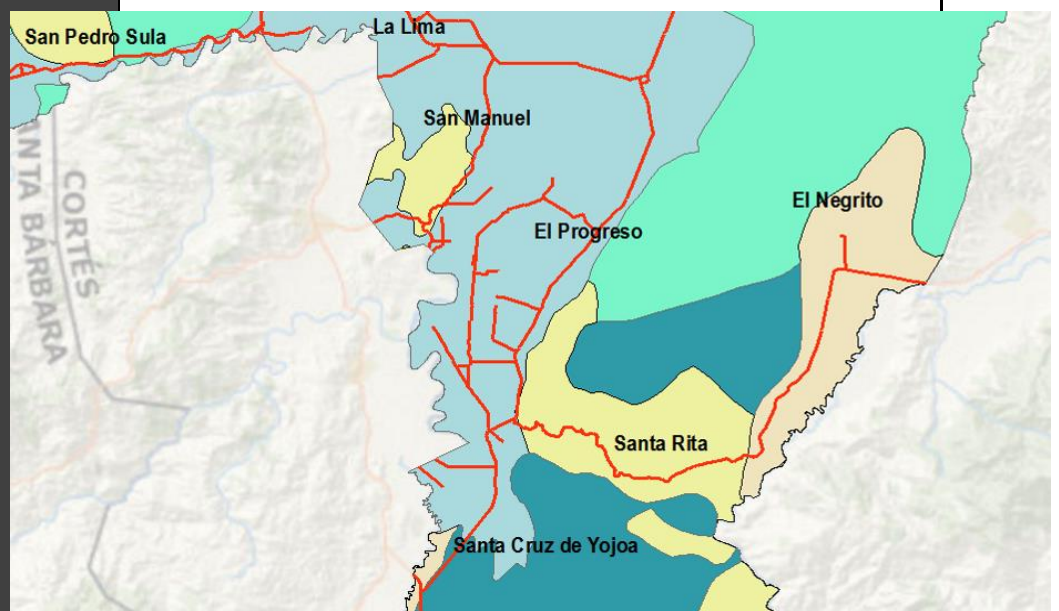
Source: water boards Shop, Municipality of El Progreso.

10.1.3 Possible location of underground water







In general, all the Sula Valley presents highly productive aquifers, especially the municipality of El Progreso. It has the following characteristics: rocks with local limited underwater resources, highly productive extensive aquifers, moderately productive and extensive local aquifers.

Most of the municipality 69% is located in extensive and highly productive aquifers, and as seen in the hydrogeological map (See Figure 10.1), the whole project is within highly productive aquifers and where almost 90% the bypass is located in marsh conditions with saturated soils. It is important to note that part of the contribution of soil saturation is due to wastewater discharges to the aquifer from non-punctual sources, like floods by the Ulua River.

Figure 10.2. Hydrogeology in the Project Area



Map Key

-  Acuíferos extensivos y altamente productivos
-  Acuíferos locales y extensivos, moderadamente productivos
-  Acuíferos locales y extensivos, pobre a moderadamente productivos
-  Acuíferos locales, moderada a altamente productivos
-  Lago de yojoa
-  Rocas con recursos de agua subterránea locales y limitados

Source: Hydrogeology. Technical Secretariat of Planning and External Cooperation (SEPLAN). National Land Information System.

10.2 Land (according to the classification by category)

10.2.1 Type

It is possible to locate in the area of the project, four kinds of soil according to Simmons classification: Alluvial soils, Sulaco soils, Urupas soils and Soils of the valleys. The description of each type is presented above:

- **Alluvial Soils:** These soils are sand and gravel, with a thickness greater than 90 meters, which generally constitute auriferous material. This type of soil is the most representative in the municipality of El Progreso.
- **Soils of the Valleys:** Are moderately deep soils, fine or very fine textured, moderately well drained, slightly eroded, slopes less than 15%, flat to moderately undulating topography, include alluvial plains and rounded hills a little rocky.

They are covered mainly by natural and improved pasture, scrub and cultivation of basic grains. Have been formed from alluvial sediments from basic volcanic rocks, mainly basalt and slag.

A representative profile of these soils has a surface soil with a deep of 12 cm, is dark reddish brown, clay loam texture, sub angular blocky structure, very firm, sticky and plastic consistency; subsoil up to 56 cm shows colors between red and dark red, clayey textures, massive structures, very firm, very sticky and very plastic consistency, with coarse angular gravel fragments mainly of basaltic rock in more than 30%.

The partially weathered basalt rock occurs at 56 cm. Due to its conditions of moderate depth, slope, and very fine texture, and the presence of gravel in the listing, these soils present ability or vocation, corresponding to class VI, reason why its recommended use is pasture establishment.

- **Urupas Soils:** These are moderately deep fine textured soils with gravels within the profile, moderately well-drained, slopes between 0 and 30%, flat to undulating topography, rounded hills, moderately eroded, very rocky surface.

They are covered with dense pine forests, scrub and improved and natural pasture. Geologically they have been formed from basic volcanic rocks consisting mainly of basalts, andesites, slag and other resilient flooring materials. A representative profile of these soils have a surface soil of 35 cm deep, dark brown, clay loam texture, granular structure, friable consistency, very sticky to very plastic, stones and gravels basalts by 10%; subsoil to 60 inches, is brown, clayey, angular blocky structure, firm consistency, very sticky and very plastic, with basalt gravel 30%, very consistent and continuous basalt rock occurs at 60 cm .

Due to its characteristics of depth, very fine textures and slopes, these soils have kind of capacity between IV and VI, that is, agricultural vocation according to the slope (less than 15%) requires measures for soil conservation, and slope greater than 15% livestock vocation.

- **Sulaco Soils:** They are shallow, moderately, fine textured, slopes greater than 30%, moderately eroded, steep topography, with abundant stone on the surface and many rocky limestone outcrops.

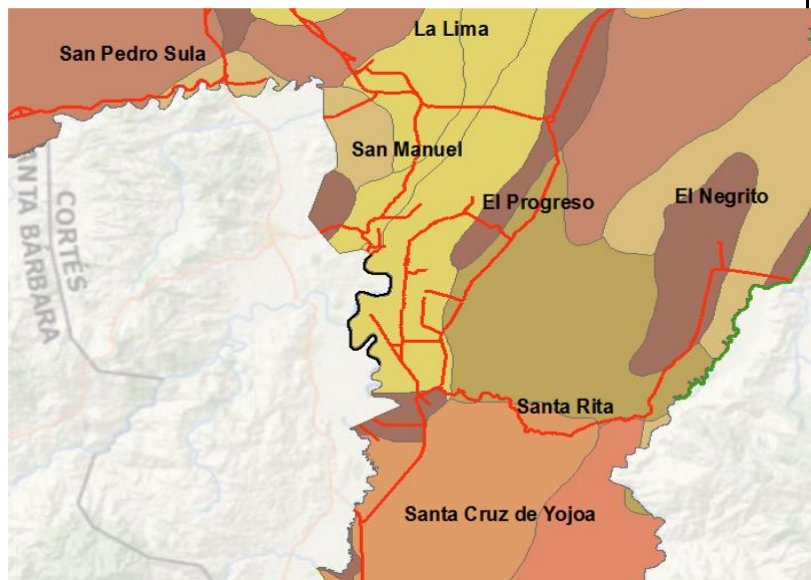
They have developed from sedimentary rocks of marine origin, constituted mainly by stratified limestone bluish gray colored, well established in robes of different thicknesses.

A profile of this soil has a surface horizon of 23 cm deep, black color, clayey texture, granular structure, friable consistency, sticky, plastic and without gravel; subsoil, up to 47 cm deep, it is deep brown, clayey texture, angular blocky structure, firm consistency, sticky and plastic, 40% limestone gravel; limestone occurs at 47 cm.

From the point of view of usability, these soils can be considered forest land (Class VII), mainly due to its shallow depth and its slope, as well as the amount of stone on the surface and rocky outcrops.

The type of soils, according to Simmons classifications found in the area of the project, are shown in Figure 10.3:

Figure 10.3. Types of soils according to Simmons (in the area of the Project)



Leyenda

- ALLUVIALS
- JACALEAPA
- SUELOS DE LOS VALLES
- SULACO
- TOMALA
- TOYOS

Source: Types of soils according to Simmons. SEPLAN. National Territory Information System.

10.2.2 SLOPE

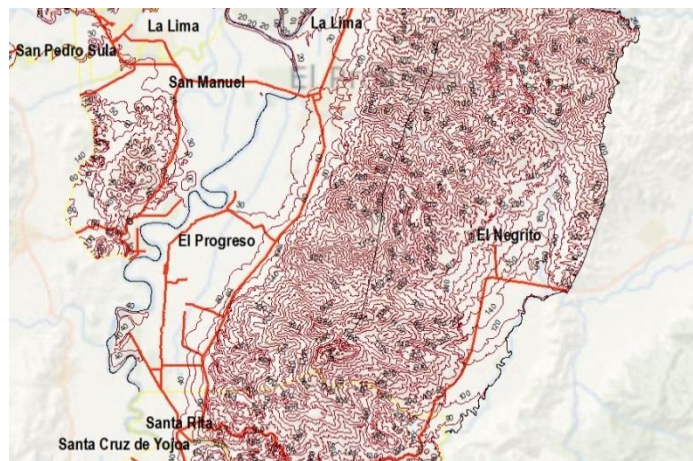
In the section La Barca – Santa Rita, elevations range from 40 to 60 meters above sea level, resulting in plain slopes, likewise, in the Santa Rita – El Progreso section, it is possible to find elevations ranging from 30 to 80 meters above sea level. In areas close to the tranche La Barca – El Progreso, mountain formation can be found such as: Mico Quemado hill, Guanchías mountains, La Mina hill, Los Leones hill, Los Toros hill. These elevations are presented in figures 10.4 and 10.5:

Figure 10.4. Current elevations in La Barca – Santa Rita



Source: Level curves: SEPLAN. National Territory Information System.

Figure 10.5. Current elevations in Santa Rita – El Progreso



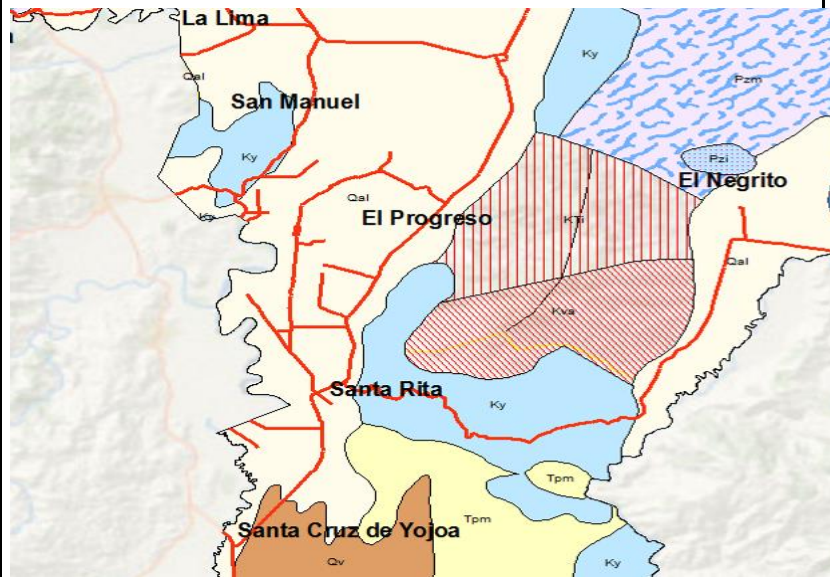
Source: Level curves: SEPLAN. National Territory Information System.

10.2.3 Geology

According to the geological map of Honduras: along the alignment of La Barca – El Progreso, there are two geological formations (see figure 10.6), which are described below:

The geological formation Qal – quaternary alluvium Cenozoic period, for recent continental and marine sediment, including foothill deposits and gravel terraces, flood plains and river bed deposits.

Qv formation – volcanic cones of the quaternary with andesites and pyroclastic debris.



Qal
Ki

Recent continental and marine sediments, including deposits of foothills and gravel terraces, floodplains and river bed deposits.

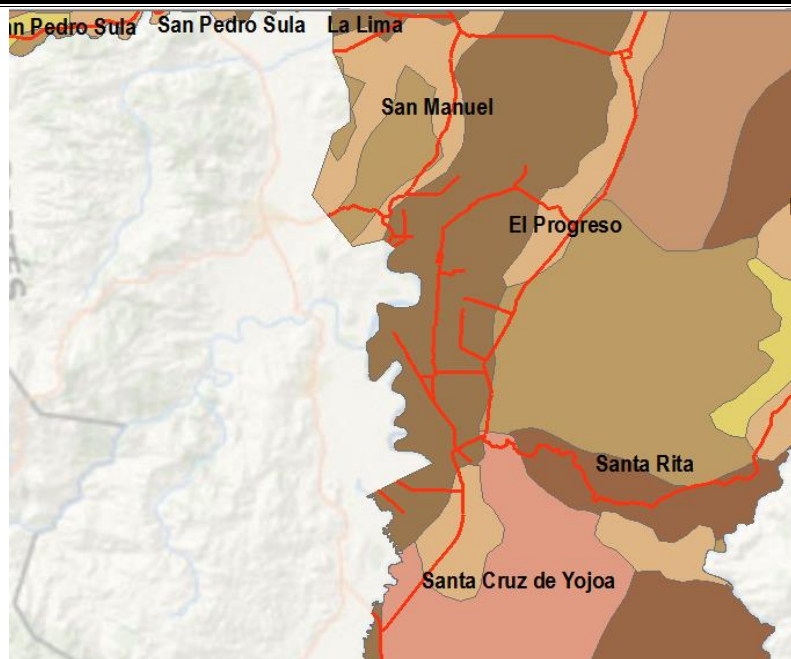
Intrusive rocks: granites, granodiorites, diorites and tonalite of variable ages

Source: National Geologic Map. Technical Secretariat of Planning and External Cooperation (SEPLAN). National Land Information System.

10.2.4 Capacity of land use

Capacity of land use

Close to the area of La Barca on the Santa Cruz de Yojoa municipality, the land's use capacity is VI.3 agroforestry and crop rotation. Following the road to Santa Rita, evidence can be seen, that the capacity of use of the land is of intensive crop rotation, and getting close to El Progreso, the crop rotation and protector forest (broadleaf) with selective felling areas are evident. See Figure 10.7:

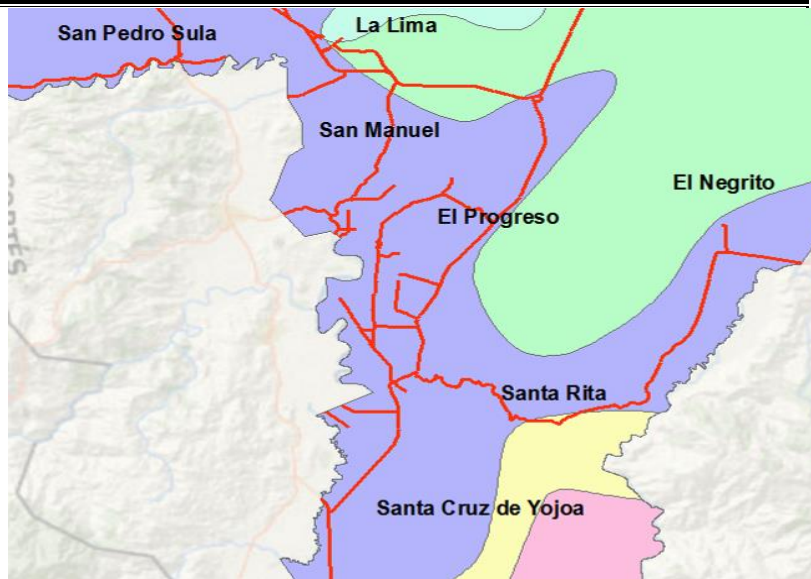


- I.II Cultivos Intensivos
- II Cultivo intensivo y extensivo
- III.I Cultivos en Rotacion
- IV.2 Vegetacion permanente, cultivo ocasional
- IV.3 Vegetacion permanente
- M Regeneracion de biomasa
- Reservorios de Agua
- V.I Cultivo Intensivo, drenaje
- VI.3 Agroforesteria
- VI.1 Vegetacion Permanente(pasto, cafe, frutales)
- VII Exclusion y tala selectiva
- VII.3 Bosque Protector(pino)
- VII.6 Bosque Protector y tala selectiva(latif)
- VII.1 Bosque Productor (pino)
- VIII.2 Pantano o cienaga

10.3 Climate

According to the Zuñiga's climate classification, the area of the project is very rainy with a rainy winter (Tela). See 8:

Figure 10.6. Climate classification of Honduras



- Muy lluvioso con Invierno lluvioso
- Muy lluvioso de barlovento
- Muy lluvioso tropical
- Variante lluvioso de altura
- Variante muy lluvioso de Barlovento (Semiestacional)
- lluvioso de altura
- muy lluvioso con distribución regular de lluvias
- variante muy lluvioso tropical

10.3.1 Pluviometry (annual average precipitation, wettest months, etc.).

According to the data provided by the meteorological service of Honduras, information that can help as reference for this tranche of the project is available only for the municipalities of Yoro and San Pedro Sula.

The following information was obtained from the La Mesa climatological station in San Pedro Sula: the annual precipitation is estimated in 1731.6mm. As well

This zone is known as the Interior North Zone of the country and is characterized by having two seasons; one dry from January to April, being the months of March and April the driest with an average precipitation of 25mm. The rainy season starts in June and end between November and December, with annual precipitations of 1,700mm. As an average, with 150 days a year with rain, September presents the highest average with 176mm. The relative humidity of the air (year average) is 75%.

According to data obtained from the climatological station "La Mesa", the absolute minimum annual average temperature is 22°C, and the absolute maximum is 43.3°C. For Yoro, the absolute minimum annual average temperature is 6°C, and the absolute maximum is 39.6°C.

San Pedro Sula presents winds with an average speed of 5 knots and a 360° direction, for Yoro the average speed is of 3 knots and a 90° direction.

10.4 Risks of flooding (according to official maps or documented experiences)

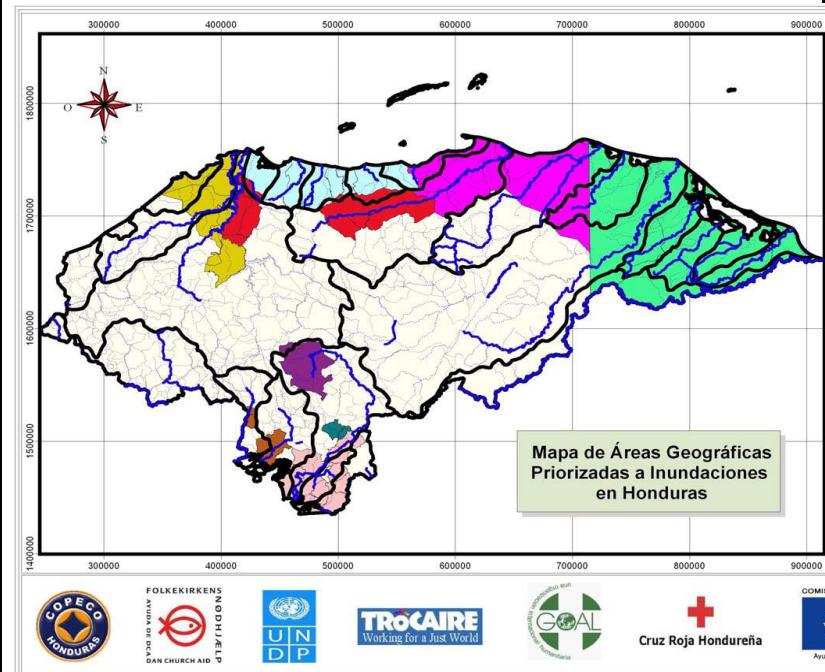
The areas most affected by the floods have been the floodplains by major rivers (Ulúa Chamelecón Patuca, Choluteca, Sico and Paulaya and other) the areas adjacent to major rivers and the nearby communities of all basins and short sub-basins, where the times of concentration of flood water are very low.

The increase in human settlements in high risk areas, the improper use and soil deterioration from deforestation and poor basin management, have become a key factor to build greater flood vulnerability concept. Deforestation contributes well to river and streams siltation and in a warm microclimate. Floods despite low levels of annual rainfall, are very common and devastating. (Country Document, DIPECHO., 2007).

10.4.1 Geographic Prioritization to flooding threats

According to the country document, DIPECHO, the flood worktable identified as priority areas for this threat five regions, they are displayed on the map of geographic priority areas to flooding, which is presented as follows in the listing: Ulúa and Chamelecón and Mezapa-Lisis Macrobasin, Aguan River, Iriona and Gracias a Dios Basin, and Choluteca River Macrobasin.

Figure 10.7. Geographic map to flooding areas prioritized in Honduras



Source: Country Document, DIPECHO. 2007

The population exposed by the flooding threat in the prioritizing executed in the

national Shop comprises a total of 3,742,237 inhabitants (data projected to 2007) of 9 departments and 55 municipalities. See Table 10.5

Table 10.3. Priority basins

Priority basin	Exposed Population
Aguan river basin	300,812
Mezapa – Lisis Basin	403,719
Iriona and Gracias a Dios Basin	110,767
Choloteca River Basin	1,445,703
Ulúa – Chamelecón Macrobasin	1,481,236
TOTAL	3,742,237

Source: Country Document, DIPECHO. 2007

The population exposed within the Ulua Macrobasin, in the department of Yoro, are presented below:

Table 10.4. Exposed population in the Ulua Macrobasin

Macrocuenca Ulúa - Chamelecón		
Departamento	Municipio	Población Expuesta 2007
Cortes	Choloma	237,132
	Omoa	30,148
	Puerto Cortes	111,372
	SPS	515,458
	San Manuel	45,649
	Villanueva	120,651
	La Lima	62,595
	Pimienta	20,821
	Potreros	22,194
	Santa Cruz de Yojoa	61,461
	San Francisco de Yojoa	13,968
Yoro	El Progreso	186,971
	Santa Rita	17,165
	El Negrito	35,651
Total		1,481,236
TOTAL		3,742,237

Source: Country Document, DIPECHO. 2007

The variables and indicators considered for prioritization of the areas are:

- 1 Threat frequency
- 2 High population density
- 3 Areas of high productivity
- 4 Poverty levels
- 5 Coordination and response capability mechanisms
- 6 Poor interinstitutional presence
- 7 Isolation of zones

* It is considered that the variables of institutional presence and isolation are heavier for the area of Gracias a Dios and Iriona.

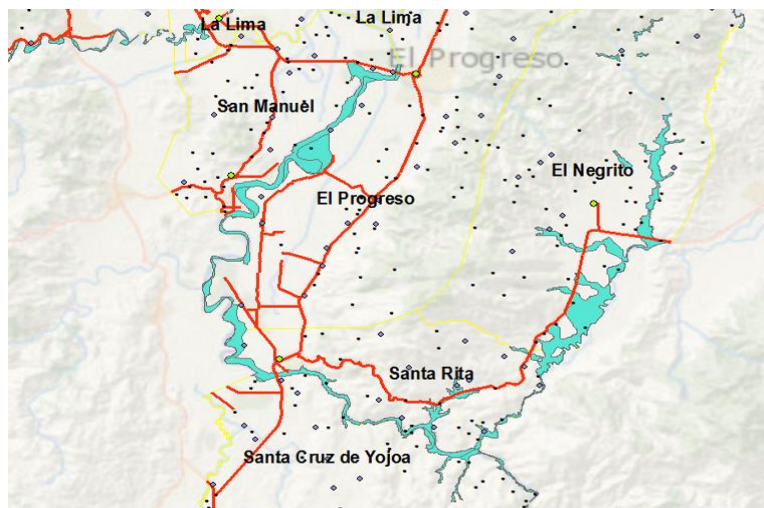
Specifically, in the area of the project, it can be noted that the most flood-prone areas would be ones close to the Humuya River in the municipality of Santa Rita. See Figure 10.10.

In this municipality, zones threatened by flooding have an area of 12,792.56 hectares (Lower Threat), 4332.40 ha (Medium Threat) and 8574.68 ha (High Threat) causing damage to homes, bridges, roads, potable water and energy electrical network, PMDN, (2003).

According to the municipal emergency plan (2010), The municipality of El Progreso has been severely affected by periodic flooding, given its location downstream of the Ulua and Pelo Rivers, that because of the large amounts of water they bring during rainy season or during an extreme event, they easily overflow their pits and affect the population, their goods and crops.

Among the factors that make these areas more vulnerable to suffer the ravages of floods we have: deforestation in the upper watershed and not considering preventive and mitigation measures to be taken by local authorities which should be aiming at territorial ordinance, because currently many human settlements are found around the edges of containment walls developed to mitigate the flood problem. The bodies of water that represent a risk of flooding are; Ulua and Pelo rivers; The Los Castaños, Arena Blanca, La Mina, La Guacamaya, Corocol, Pajuiles, Chindonga and La Ruidosa Creeks .

Figure 10.8. Flood prone areas threatened by the area project



Source: Flood threats. SEPLAN. National Land Information System.

 Flood threats

Landslide Risks (in a radius of at least one kilometer)

Slide is considered as the sliding movement of a mass of soil downslope under the effect of gravity, when the shear stress exceeds the strength of the material.

Slides have been more reported as more severe in the occidental part of the country, mainly associated with the seismic string due to the Motagua fault and others that cross the Honduran territory. (*Documento de País*, DIPECHO, 2007)

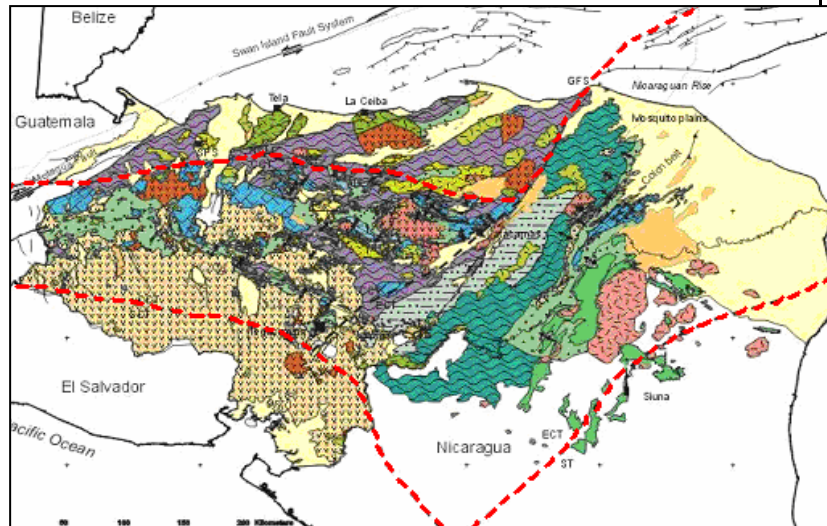
The area of the project has low risk to landslide threats. However it is possible to find high risk areas on the communities near the mountains in the municipality of El Progreso.

10.5 Risk of earthquakes or tremors (verifiable information)

The Honduran territory is geologically bounded by two tectonic plates, the plate of cocos and North America. The first one shows a subduction over the second, resulting in constant release of energy of varying intensity.

Data from all the epicenters shown in the map have been using a model of intensity and frequency reflected on a map, which reflects the threat of seismic hazard in Central America, projecting the Bay Islands fault and on the same trajectory the Motagua fault. Inside the country a series of faults are reflected (see Figure 10.11), which have molded the national topography, including the Patuca fault and others crossing west toward the center of the country.

Figure 10.9. Faults in the Honduran Territory



Source: Country Document, DIPECHO. 2007

The base map associated with earthquakes was generated taking into account the contributions of the Program for Disasters of the United Nations, whose vector database identifies the frequency of earthquakes in the Central American territory and the measured intensity in the Richter scale. The population exposed to the

threat of earthquakes in prioritization executed at the national Shop included a total of 899.438 inhabitants (projected to 2007) of 49 municipalities.

The geographical prioritization of earthquake threats resulted in the following vulnerable areas:

1. Department of Yoro (municipalities of Yoro, Yorito), Department of Francisco Morazán (Marale).
2. Ocotepeque (Ocotepeque, Mercedes, Santa Fe, Concepción, Dolores Merendón, San Jorge, San Fernando), Lempira (Cololaca, Guarita, San Juan Guarita, Valladolid, La Virtud, Mapulaca, Virginia, Piraera), Copán (Florida, El Paraiso, Copán Ruinas) e Intibucá (San Antonio, Sta Lucia, Magdalena, Colomoncagua) and La Paz (Santa Elena La Paz, Yarula, Marcala, Cabañas, Santa Ana, Opatoro, Mercedes de Oriente, San Antonio del Norte).
3. Valle (San Lorenzo, Nacaome, Amapala, Guascorán, Caridad, Aramecina and Alianza) and Choluteca (El Triunfo, Concepción de Maria, Namasigue, Choluteca and Marcovia).
4. Cortés (Omoa and Puerto Cortés).
5. Guanaja.

From the above it is concluded that in prioritizing areas vulnerable to earthquakes, the municipalities of the area of influence of the Project are not mentioned as risk areas.

VII. 2 Biological Environment

This chapter covers the information necessary to know the current status of the biological environment in the area of influence of the project. This information will be used in the identification and recovery of the potential impacts that the Works could generate and if applicable, to give special attention to the corresponding Management Plan.

The baseline developed for this study included the compilation of secondary data of the area, which responds to research by different authors and rapid biological inventory, which does not represent the total number of species present in the area. It was a diagnosis that allowed to have an overview of the area's resources.

The species of flora and fauna that are traditionally found in high traffic roads, are usually closely related with ornamental sowing patterns and often do not respond to the original vegetation, it is only in some points where roads pass through water bodies where sometimes remnants of flora and fauna can be observed similar to those on the regions not being intervened.

Introduction

Honduras has a large plant biodiversity which until 2000 had reported a total of 7,524 plant species, which are deposited in different herbaries of the country, this number is the product of many years of research throughout Honduras and in recent years has been increased by the report of new plant species on the country.

According to Matamoros (2009) in his list of freshwater species of Honduras, he mentions that there are 172 species inhabiting the continental and insular waters of Honduras, with 8 primary type species, 47 secondary species and 111 peripheral.

In Honduras 03 orders, 33 genera and approximately 119 species of amphibians, being anurans the largest group with 86 species (Marineros and Aguilar 2000) have been registered, according to research by McCranie Wilson, Cruz, Espinal, Köler, Porras and Williams, in the last 11 years 38 endemic species have been reported.

With respect to reptiles, in Honduras, 214 species of reptiles belonging to 04 orders and 103 genera have been recorded. The most numerous group consists of 114 species of snakes, followed by saurians with 83 species, 15 species of turtles and 02 species of crocodiles.

From the vertebrates group, mammals are probably of greater importance in terms of protein intake as part of the diet of the average Honduran living in rural areas, this situation makes mammals located between the most threatened species by habitat destruction and hunting.

To obtain information on the field data of species of flora and fauna of the tranche La Barca - El Progreso, 13 points were selected and located in a stratified manner, taking into account the vegetation cover and the presence of bodies of water. At these points the geographic coordinates were recorded and confirmed they were part of the spaces that would influence where the plans to expand the road tranches.

In this tranche (La Barca - El Progreso), the inventory was performed on both sides of the existing road, always taking into consideration only the species that would be affected, and respecting the same condition for rivers. In the case of the tranche of the bypass of El Progreso, being an entirely new area, all species of flora and fauna present in the area were identified. The plant species that were not identified in the field work for lack of flower or fruit or for presenting similar characteristics to other species were collected for identification in the herbarium or by other specialists.

The main characteristic features of the biological medium in the Project Area are described as follows.

11.1 Protected areas (declared or define their declaration status)

The most outstanding protected area in the municipality of El Progreso is the Mico Quemado National Park (listing SINAPH) located in the east sector of the urban zone of El Progreso. It was created by Decree # 144-94 of Sovereign National Congress of the Republic of Honduras as an ecological reserve with an area of 28,500 hectares. This area was created considering that the hydrographic network of the watershed of Mico Quemado and Las Guanchías Mountains was has been, up to this date by far the larger and more reliable source of water that the municipality of El Progreso and the urban zone of Santa Rita has, and over 140 surrounding communities which makes its conservation essential to avoid supply problems. See Figure 11.1.

This area is created considering that the hydrographic network of the Western Slope of Mico Quemado Mountains and Las Guanchias has been the highest and most trustworthy source of water for El Progreso and the urban area of Santa Rica and 140 adjacent communities, hence its preservation is essential.

Figure 11.1. Mico Quemado National Park



Source: Technical Secretariat of Planning and External Cooperation - SEPLAN. National Land Information System.

This protected area is located approximately 2.30 kilometers away from where the alignment of the Tourism Corridor: La Barca - El Progreso passes, which is outside of the area of influence.

11.2 Fauna (most common animals in the project environment)

To perform a representative inventory of the fauna in the tranche where the plans are to expand the road and the area of the new bypass, 13 points were strategically selected in coordination with site selection of the flora component. A search for present fauna was performed in the vegetation areas, roads and water

sources in an area of approximately 50 meters on both sides. Only in the case of birds, the sighted species were reported without taking transects as limits.

During the diagnosis made, the bird observations were made visually and auditorily. For identification a pair of prismatic binoculars 10 x 42 mm was used, two identification guides of birds on selected sites and the tranches of expansion of roads and where a habitat change is generated were covered (cutting of vegetation).



During each run we observed in detail the dirt roads, the vegetation between transects, the significant differences in plant composition and the streams found in the study area.



To make a representative sampling with the help of a herpetological hook and a metal rake, we thoroughly reviewed the micro habitat like rotting logs, rocks, liter areas, trying to cover all the different types of micro habitat that species of herpetofauna use as shelter.

In the case of the ichthyofauna in the streams of influence of the study area, interviews with community residents were performed treating the presence of species. In the rivers the same methodology was performed, but in this case fishermen were located to recognize the species in the area by their common name, besides observation tours were conducted, but no nets used for capture.

In the case of Masto Fauna, with the help of a sample booklet we interviewed people in the community about the sighting of this species on the road using the sample booklet, with the drawing of mammals, with the objective of having the interviewees refer the species they have been sighted on the road. See Figure

Figure 11.2. Booklet used for reference to the presence of mammals



Fish

During the tour, 06 families 07 genre and 09 species are present in water bodies that cross the alignment. It was noted that most of the water sources in the study area have not provided conditions for the establishment of commercial fish. These water sources generally present a non-continuous water surface and with a section cut no greater than 10 meters. The reported fish species by residents in the tranche La Barca – El Progreso, only on the rivers Zacatales, the following fish have been reported: Guapotes (*Parachromis manaquensi*), Sardines (*Astyanax faciolatus*), Cuyamen (*Joturus pichardi*), Dormilón (*Dormitator maculatus*) and Carp; on the Humuya river, the following fish: Cuyamen (*Joturus pichardi*), Robalo (*Centropomus*), Dormilón (*Dormitator maculatus*), Ronco (*Lutjanus sp.*), Tilapia (*Oerochromis sp.*).

Table 11.1. Species of fish found in the tranche La Barca – El Progreso

	Family	Scientific Name	Common Name	Status
1	Mugilidae	<i>Agonostomus monticola</i>	Tepemechín	Endémico
2	Mugilidae	<i>Joturus pichardi</i>	Cuyamel	Endémico

3	Characidae	<i>Astianax fasciatus</i>	Sardina plateada	Nativo
4	Eleotridae	<i>Dormitator maculatus</i>	Dormilón	Nativo
5	Poeciliidae	<i>Poecilia sp.1</i>	Bubucha	Nativo
6	Poeciliidae	<i>Poecilia sp.2</i>	Bubucha	Nativo
7	Centropomidae	<i>Centropomus sp.</i>	Robalo	Nativo
8	Ciclidae	<i>Oerochromis sp.</i>	Tilapia	Exótico
9	Ciclidae	<i>Paracromis managuensis</i>	Guapote	Nativo

Source: Diagnosis carried out in une of 2013.



Source: Diagnosis carried out in une of 2013.

Reptiles and Amphibians

During the tours in the tranches, we observed the presence of 03 families, 03 genera and 03 species of lizards, among which is the Iguana (*Ctenosaura similis*), the Charancaco (*Vaialiscus vitattus*) and Stripped Pichete (*Cnemidophorus sp.*). However for the type of ecosystem you can find flag pichetes *Norops sp.*, iguana and stripped Pichete *Sceloforus.sp* among others.

Figure 11.2.General view of some rivers and streams crossing the alignment



Río Zacatales



Río Piedras de Afilas



Río Humuya

Quebrada Las Minas

Source: Diagnosis carried out in June of 2013.

A small wetland was found, this allows the establishment of a wide variety of birds, including beautiful colored species. At the same time, amphibian egg masses were located, and there is no doubt that a significant variety can be found during the night.

Figure 11.3. Small wetland found in La Barca – El Progreso tranche



Fuente: Diagnóstico realizado en junio de 2013.

Birds

During the bird watching on this tranche, 18 families, 27 genera and 29 species were identified, all resident and none found in the special category. See Table 11.2:

Table 11.2. Bird species observed in La Barca – El Progreso Tranche

No	Orden	Familia	Nombre científico	Nombre común	Status
1	Anseriformes	Anatidae	<i>Dendrocygna autumnalis</i>	Piche	R
2	Suliformes	Phalacrocoracidae	<i>Phalacrocorax brasilianus</i>	Cormorán	R
3	Pelecaniformes	Ardeidae	<i>Ardea alba</i>	Garzón Blanco	R

4	Pelecaniformes	Ardeidae	<i>Bubulcus ibis</i>	Garcita bueyera	R
5	Accipitriformes	Cathartidae	<i>Coragyps atratus</i>	Zopilote	R
6	Accipitriformes	Cathartidae	<i>Cathartes aura</i>	Tincute	R
7	Gruiformes	Rallidae	<i>Porphyrio martinicus</i>	Polla morada	R
8	Charadriiformes	Jacanidae	<i>Jacana spinosa</i>	Gallito de agua	R
9	Columbiformes	Columbidae	<i>Zenaida asiatica</i>	Paloma ala Blanca	R
10	Columbiformes	Columbidae	<i>Columbina inca</i>	Turquita inca	R
11	Columbiformes	Columbidae	<i>Columbina talpacoti</i>	Turquita rojiza	R
12	Cuculiformes	Cuculidae	<i>Crotophaga sulcirostris</i>	Tijul	R
13	Coraciiformes	Alcedinidae	<i>Chloroceryle amazona</i>	Martin pescador	R
14	Coraciiformes	Alcedinidae	<i>Chloroceryle americana</i>	Martin pescador	R
15	Piciformes	Picidae	<i>Melanerpes aurifrons</i>	Carpintero	R
16	Passeriformes	Tyrannidae	<i>Pitangus sulphuratus</i>	Cristo fue	R
17	Passeriformes	Tyrannidae	<i>Myiozetetes similis</i>	Chilero social	R
18	Passeriformes	Tyrannidae	<i>Tyrannus melancholicus</i>	Tirano	R
19	Passeriformes	Hirundinidae	<i>Tachycineta albilinea</i>	Golondrina de manglar	R
20	Passeriformes	Hirundinidae	<i>Stelgidopteryx serripennis</i>	Golondrina gris	R
21	Passeriformes	Troglodytidae	<i>Troglodytes aedon</i>	Cucarachero casero	R
22	Passeriformes	Turdidae	<i>Turdus grayi</i>	Zorzal	R
23	Passeriformes	Thraupidae	<i>Thraupis episcopus</i>	Tanagra azuleja	R
24	Passeriformes	Emberizidae	<i>Sporophila torqueola</i>	Semillero de collar	R

N o	Orden	Familia	Nombre científico	Nombre común	Statu s
25	Passeriformes	Icteridae	<i>Dives dives</i>	Clarinero	R
26	Passeriformes	Icteridae	<i>Quiscalus mexicanus</i>	Zanate	R
27	Passeriformes	Icteridae	<i>Icterus pectoralis</i>	Chorcha	R
28	Passeriformes	Icteridae	<i>Agelaius phoeniceus</i>	Pájaro sargento	R
29	Passeriformes	Passeridae	<i>Passer domesticus</i>	Pinzón Casero	R

Source: Diagnostic conducted in June 2013.

Figure 11.4. Species of birds reported in the tranche



Zenaida asiatica (Paloma ala blanca)

Porphyrio martinicus (Polla morada)

Mammals

Interviews were made to the people in the communities to know about the observation of mammals species spotted in this tranche. The areas with greater vegetation cover were located within the community and with a mammals cards, the local residents indicated to have seen striped skunks (*conepatus mesoleucus*) and Guazalos, (*Didelphis marsupialis*).

11.3 Flora (trees and plants, etc.)

To perform the representative flora inventory, 13 points were evaluated in the tranche expansion.

At these points, a search for the present flora was made in an area of approximately 10 meters on each side of the existing road, mainly inventorying trees that will be cut as part of the widening of lanes.

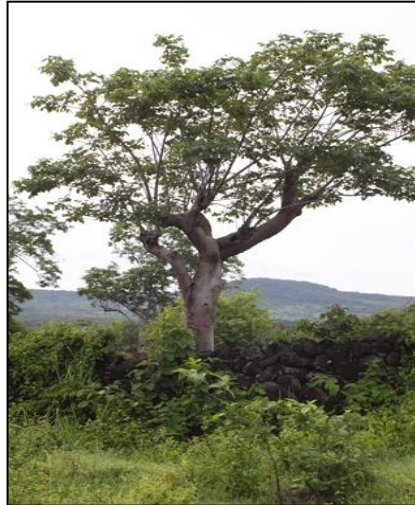
11.3.1 Diagnosis of flora in La Barca – El Progreso tranche

In the 13 points evaluated in the tranche, 39 species of trees are reported, distributed in 19 families and 36 genres, which are shown under table 11.3:

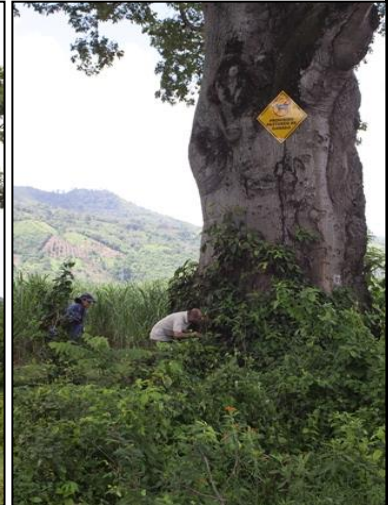
Table 11.3 .Flora species in the bypass area of El Progreso

No	Family	Species	Status	Common Name
1	Anacardiaceae	<i>Magifera indica</i> L.	Nativa	Mango
2	Anacardiaceae	<i>Spondias mombin</i> L.	Nativa	Jobo
3	Apocynaceae	<i>Plumeria alba</i> Aubl.	Nativa	Flor de mayo
4	Bignoniaceae	<i>Crescentia alata</i>	Nativa	
5	Bignoniaceae	<i>Spathodea campanulata</i>	Exótico	Miona
6	Bignoniaceae	<i>Tabebuia ochracea</i>	Nativa	
7	Bignoniaceae	<i>Tabebuia rosea</i> (Bertol.) A. DC.	Nativa	Macuelizo
8	Bombacaceae	<i>Ceiba pentandra</i> (L.) Gaertn.	Nativa	Ceiba
9	Boraginaceae	<i>Cordia dentata</i> Poir.	Nativa	Tigüilote
10	Boraginaceae	<i>Cordia dentata</i> Poir.	Nativa	Tigüilote
11	Burseraceae	<i>Bursera simaruba</i> (L.) Sarg.	Nativa	Indio desnudo
12	Caricaceae	<i>Papaya cauliflora</i> (Jacq.) Poir.	Nativa	Papaya
13	Combretaceae	<i>Terminalia catappa</i> L.	Nativa	Almendro
14	Euphorbiaceae	<i>Jatropha curcas</i> (Adans.) Griseb.	Nativa	Piñón
1	Leguminosae	<i>Acacia collinsii</i> (Lam.) de Wit	Nativa	Cachito
1	Leguminosae	<i>Acacia fistula</i> L.	Nativa	cañafistula
1	Leguminosae	<i>Albizia sp</i>	Nativa	
1	Leguminosae	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Nativa	Acacia roja
1	Leguminosae	<i>Cassia grandis</i> L. f.	Nativa	Carao
2	Leguminosae	<i>Delonix regia</i> (Bojer ex Hook.) Raf	Exótico	Morazán
2	Leguminosae	<i>Eritrina sp</i>	Nativa	Gualiqueme
2	Leguminosae	<i>Gliricidia sepium</i> Kunth ex Steud.	Nativa	Madriado
2	Leguminosae	<i>inga vera</i> Kunth	Nativa	Guama
2	Leguminosae	<i>Leucaena leucocephala</i> (Lam.) de	Nativa	Leucena
2	Leguminosae	<i>Lysiloma auritum</i> (Schltdl.) Benth.	Nativa	Quebracho
2	Leguminosae	<i>Mimosa peltata</i> Humb. & Bonpl. ex	Nativa	Carbón
2	Leguminosae	<i>Samanea saman</i> (Jacq.) Merr.	Nativa	Carreto
2	Leguminosae	<i>Senna reticulata</i> (Willd.) H.S. Irwin &	Nativa	
2	Moraceae	<i>Arthocarpus altilis</i> (Parkinson)	Nativa	Mazapán
3	Moraceae	<i>Cecropia peltata</i> L.	Nativa	Guarumo
3	Moraceae	<i>Ficus benjamina</i> L.	Exótico	Ficus
3	Myrtaceae	<i>Psidium guajava</i> L.	Nativa	Guayaba
3	Myrtaceae	<i>Zyzygium cumini</i> (L.) Skeel	Exótico	Uva
3	Palmae	<i>Cocos nucifera</i> L.	Nativa	Coco
3	Piperaceae	<i>Piper aduncum</i> L.	Nativa	Cordoncillo
3	Salicaceae	<i>Salix humboldtiana</i> Andersson	Nativa	Sauce
3	Simarubaceae	<i>Simarouba glauca</i> DC.	Nativa	Aceituno
3	Ulmaceae	<i>Guazuma ulmifolia</i> Lam	Nativa	Caulote
3	Verbenaceae	<i>Tectona grandis</i> L. F.	Exótico	Teca

Source: Diagnostic conducted in June 2013.



Bursera simaruba (L.) Sarg. **Indio desnudo**



Ceiba pentandra (L.) Gaertn. **Ceibo**



Senna reticulata (Willd.) H.S. Irwin & Barneby



Jatropha gossypifolia L.

Trees provide shelter, perch and feeding for the bird species. If there is thinning of trees in the construction phase in sections where the road were extended, the installation of temporary hangers of inexpensive material (bamboo) or made from the same trees that will be is recommended, because the reforestation process can be slow, once the new planted trees have an adequate growth, the hangers will be secondary.

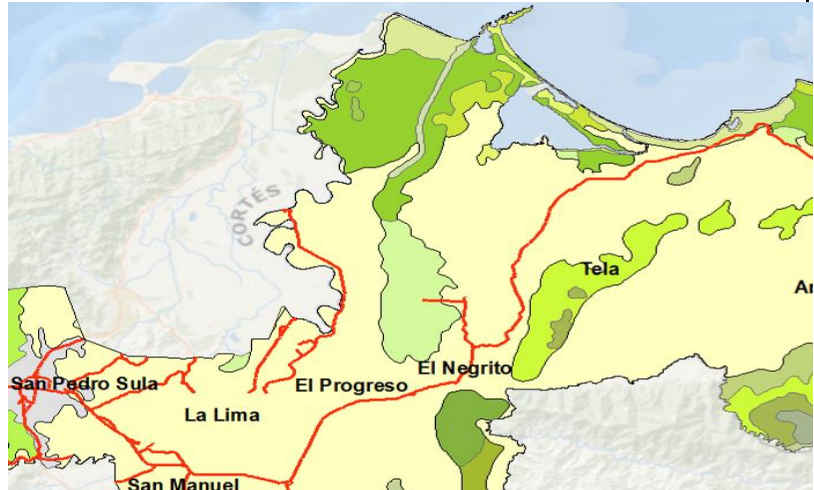
Taking into account that within plant species that are reported in the road tranches, commercial species are found, it is recommended that prior to the cut and before the construction, an estimate of the timber resource is made and the harvesting and reforestation plan is developed. Furthermore, it is important to request from ICF or the corresponding UMAs in the corresponding municipalities, permits and compensation measures for every tree being cut and the action for the use of such resources.

During cleaning activities, snakes or lizzards may be observed, it is advised to train people so that they avoid killing fauna.

11.4 Ecosystems

All alignment of the Tourism Corridor: La Barca – El Progreso, is located according to the ranks of classification of ecosystems, in the "system of agriculture" which includes human intervention ecosystems, agriculture, livestock, shrimp farms, salt extraction farms and others . See Figure 11.8.

Figure 11.8. Characteristics ecosystems of the project area



Map Key

- Bosque tropical semideciduo mixto, submontano
- Herbazal pantanoso con gramíneas, palmas y/o arbustos
- Sistema agropecuario
- Vegetación tropical costera en suelos muy recientes, moderadamente drenado
- Bosque tropical siempreverde latifoliado, submontano

Source: Vegetable Ecosystems Map of Honduras. Technical Secretariat of Planning and External Cooperation (SEPLAN). National Land Information System.

VII. 3 Social Environment

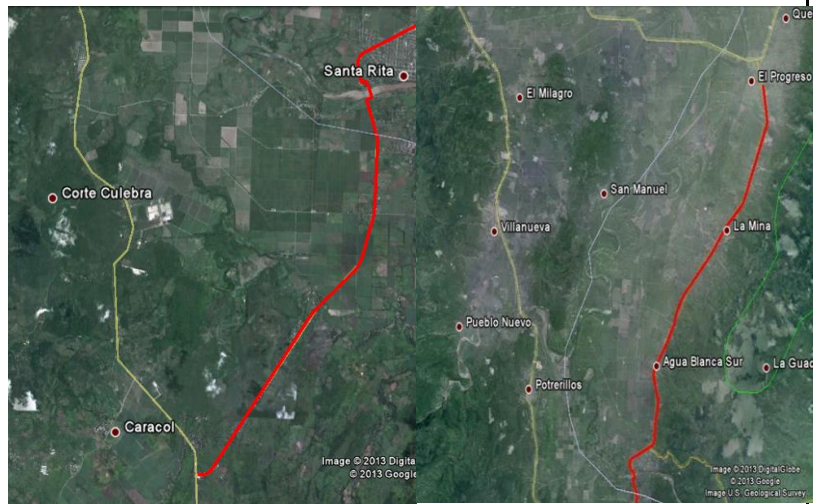
This section is the result of an analysis of information from the Population and households Census in addition to the review of related documents describing the area. It includes information on population characteristics, education, and other socio-demographic and economic indicators that provide relevant information about the quality of life of communities, equipment, services, infrastructure and economic activities, among others.

For this environmental assessment, the description of this section shall consist on the general aspects of the departments, municipalities, and in any possible cases, at the level of communities located along the alignment within the area of influence of the project.

12.1 Population where the project is located (attach location map and satellite image 1:50000)

The tranche La Barca – El Progreso, runs the central and central-west sector of the country. The tranche begins on the intersection of the road CA-5 that goes from the city of San Pedro Sula, with the village of La Barca in the municipality of Santa Cruz de Yojoa in the department of Cortés, then goes through the municipality of Santa Rita, ending at the Rio Pelo bridge, in the municipality of El Progreso, department of Yoro, becoming an alternate route to the city of San Pedro Sula and being a connector to the Atlantic zone of Honduras, in order to communicate large livestock and agricultural regions and promote tourism urban development.

Figure 12.1. Satellite image La Barca – El Progreso



Source: Google Earth.

12.1.1 General characteristics of the population of the area of influence

In this section we detail the characteristics at a level of knowledge, beliefs, education and behaviors of the population of the area of socioeconomic influence of the Project. Some of the general characteristics of the municipalities affected by the project are described as follows:

12.1.1.1 Demographics

The population estimate for 2010, conducted by the National Statistics Institute of Honduras, for municipalities of the socioeconomic influence area is presented in Table 12.1:

Table 12.1. Estimated population by municipalities, by rural and urban areas. 2010

Department/Municipality	Urban Population			Rural Population			TOTAL
	Men	Women	Total	Men	Women	Total	
Cortés	602,170	655,009	1,257,179	157,306	155,806	313,112	1,570,291
Santa Cruz de Yojoa	15,420	16,102	31,523	24,589	23,746	48,335	79,858
Yoro	141,171	152,487	293,658	131,475	126,967	258,442	552,100
El Progreso	84,916	92,535	177,451	13,406	13,572	26,978	204,429
Santa Rita	7,153	7,654	14,807	2,559	2,336	4,895	19,702

Source: National Statistics Institute of Honduras. Population projections by Departments and Municipalities. 2010.

With regards to urban and rural population in the area of socio-economic influence, it appears that in the municipality of Santa Cruz de Yojoa, 60.5% of the population is rural, and only 39.5% is urban. Progreso and Santa Rita, most of the population is urban, representing 87% and 75% accordingly, for the year 2010.

The villages or towns that are located near La Barca – El Progreso are listed below in Table 12.2:

Aldeas
Municipio de Santa Cruz de Yojoa
• La Barca
• San Luis Zacatales
• El Batey
• Campo Llano
Municipio de Santa Rita
• Santa Rita
• Piletas
Municipio El Progreso
• Agua Blanca Sur
• El Bálsamo
• Urraco Sur
• La Sarrosa
• La Guacamaya
• La Mina

- La Pita
- Arenas Blancas
- Mico Quemado
- La Ocho o El Socorro

There are then a total of 303,989 inhabitants, as of the year 2010 within the social-economic area of influence.

Some pictures of these villages are shown under 12.2

Figure 12.2. Villages near the Alignment of the Project



San Luis Zacatales

El Batey



Campo Llano

Santa Rita

12.1.1.2 Housing

The total number of occupied private housing in the area of socioeconomic influence of the project, are listed below:

Table 12.2. Total occupied housing in the Municipalities

Municipality	Total private homes occupied
--------------	------------------------------

Santa Cruz de Yojoa	11,597
Santa Rita	3,343
El Progreso	29,485

Source: Honduras National Statistics Institute. Occupied private dwellings. 2001 census.

12.1.1.3 Education

The main indicators of education of the population in the area of socio-economic influence, are presented in Tables below:

Table 12.3. School attendance of the population in the area of socio-economic influence

Municipality	No School	No Shool	Total	Not Considered
Santa Cruz de Yojoa	16,337	35,830	52,167	9,294
Santa Rita	4,280	10,542	14,822	2,343
El Progreso	40,520	87,136	127,656	19,713

Source: Instituto Nacional Estadística de Honduras. School Attendance. Censo 2001.

Tabla 12.4. Sabe leer y escribir

Municipality	No School	No Shool	Total	Not Considered
Santa Cruz de Yojoa	39,089	13,078	52,167	9,294
Santa Rita	11,564	3,258	14,822	2,343
El Progreso	104,070	23,586	127,656	19,713

Source: Instituto Nacional Estadística de Honduras. School Attendance. Censo 2001.

Tabla 12.5. Último nivel o grado aprobado en la Enseñanza Formal

Senior year graduated	Santa Cruz de Yojoa	Santa Rita	El Progreso
None	10,631	2,809	20,513
Basi (Elementary – Secondary)	40,949	11,815	103,411
Superior (not-university)	239	80	684
University (major)	348	118	3,048
Total	52,167	14,822	127,656
Not considered	9,294	2,343	19,713

Source: Instituto Nacional Estadística de Honduras. Last year or level approved for formal

education system. Censo 2001.

Note: it's important to mention that these numbers represent a census of 2001.

Municipality of Santa Cruz de Yojoa

A percentage of the population of the municipality, which was not considered in the census for these educational variables 9,294 (17%). All analysis performed, concentrated in 83% of the population of the Municipality:

- As for school attendance we have 31% of the population of the municipality as complying school and the remainder 69%, does not assists, however 75% of the population studied are literate and only the remaining 25% is not.
- With respect to the last level or grade approved, we can see that approximately 20% of the population of the municipality has no approved grade, on the contrary 78% of the population has a basic education at a grade school and high school level and 1 % has a college degree.

Municipality of Santa Rita

A certain percentage of the population of the municipality was not considered in the census for these educational variables 2,343 (16%). All analysis performed concentrated on 84% of the population of the Municipality:

- As for school attendance we have that 29% of the population of the municipality is complying school and the remainder 71%, does not assists, however 78% of the studied population are literate and only the remaining 22% is not.
- With respects to the last level or grade approved, we can see that approximately 19% of the population of the municipality has no degree approved, on the contrary 80% of the population has a basic education at grade school and high school and 1% has a college degree.

Municipality of El Progreso

A percentage of the population of the municipality, which was not considered in the census for these educational variables 19,713 (15%). All analysis performed, concentrated in 85% of the population of the Municipality:

- As for school attendance we have 32% of the population of the municipality as complying school and the remainder 68%, does not assists, however 82% of the population studied are literate and only the remaining 18% is not.
- With respect to the last level or grade approved, we can see that approximately 16% of the population of the municipality has no approved grade, on the contrary 81% of the population has a basic education at a grade school and high school level and 2.4 % has a college degree.

Education Centers

The education centers closest to the tranche El Progreso - Tela are mentioned as follows:

Table 12.6. Education centers closes to the Project's alignment

Departmen t	Municipalit y	Town	Name of school center	Type	Enrollmen t
Cortés	Sta. Cruz de Yojoa	Campo Llano	CE - Lempira	Básic a	123
Cortés	Sta. Cruz de Yojoa	El Batey	CE– Instituto Oficial Cultura Maya	Media Adulto	507
Cortés	Sta. Cruz de Yojoa	Zacatales	CE – Guadalupe de Quezada	Básic a	178
Yoro	Santa Rita	Bo. Echeverry	CE - John F. Kennedy	Pre- Básic a	483
Yoro	Santa Rita	Bo. Subirana	CE – Manuel de Jesús Subirana	Básic a	203
Yoro	Santa Rita	Barrio Nueva Vida	CE – Gabino Vásquez Argueta	Media Adulto	748
Yoro	El Progreso	Barrio El Centro	CE – Manuel García	Pre- basica	70
Yoro	El Progreso	Agua Blanca Sur	CE – Instituto Roberto Micheletti Bain	Media adulto	898
Yoro	El Progreso	Cristo Rey	CE – Nazaria Ignacia March	Básic a	77
Yoro	El Progreso	Aldea El Bálsamo	CE - El Porvenir	Pre-- basica	423
Yoro	El Progreso	Urraco Sur	CE – Juan F. Lindo	Básic a	80
Yoro	El Progreso	Aldea La	CE – Luis	Básic	832

		Mina	Bogran	a	
Yoro	El Progreso	Col. Los Castaños	CE – Roberto Micheletti	Pre-básica	312

Source: System of Educational Statistics. Secretariat of Education of Honduras. Planning Unit and Assessment Management.

Figure 12.3. School Centers near the alignment



Instituto Oficial Cultura Maya

Instituto Roberto Micheletti Bain

In some cases, these Educational Centers or the access to them, could be affected or impacted by the execution of the project. In these cases, the necessary mitigation measures are contemplated in the EMP.

12.2 Economic activity of the population

12.2.1 Department of Cortés

The economy of the Department of Cortés is based mainly in the economy of San Pedro Sula and Puerto Cortés which are the two cities of higher importance of the department, because Puerto Cortés has the most important port in Centramerica, and San Pedro Sula is considered the “Industrial Capital” of Honduras, being this the city where most of the economy of the country takes place. There are also other cities like Choloma in which, during recent years, considerable industrial development has taken place especially for the textile industry and maquila. On the other hand, other activities like large-scale farming of crops such as banana, plantain, oil palm, sugar cane, cocoa, orange and pineapple and also the production of basic grains are performed. Livestock has also become a main activity focusing on poultry, sheep and cattle. (Pineda, 1997).

8.2.1.1 Macro-economical activities in the municipality of Santa Cruz de Yojoa

During recent years, large scale poultry and livestock farms have been developing in the municipality, additionally, subsistence crops, and livestock, smaller scale, can be found. There is also, the recent development of the tourism industry given the presence of the only lake natural lake in the country, increasing hotel and food

service infrastructure on the shore of Yojoa Lake. (por example – Taulabé – La Barca); and the presence of the Joya Grande Zoo.

Under table 12.8 we present the occupied and unoccupied population for 2001, in the Municipality of Santa Cruz de Yojoa.

Type of Main Occupation	Cases	%
Occupied	17,666	36
Unoccupied	439	1
Inactive	30,433	63
Total	48,538	100
NSA :	12,923	

Source: Instituto Nacional Estadística de Honduras. Tipo de ocupación principal. Censo 2001.

It's evident from the table above, that 36% of the population is occupied in any type of activity, while the other 63% are inactive.

8.1.3 Yoro Department

Yoro's economy is based on agriculture, livestock and industrial activities. Some of the crops produced are: cocoa, sugar cane, corn, beans, cattle and bananas.

8.1.3.1 Economical activities of the Municipality of Santa Rita

The population of the municipality of Santa Rita, is also engaged in agricultural and livestock activities, also, some informal shops or stalls can be seen in the right of way.

Table 12.9 presents the occupied an unoccupied population in the municipality of Santa Rita for the year 2001:

Table 12.9 Occupied and unoccupied population in the Municipality of Santa Rita, 2001

Type of primary occupation	Cases	%
Occupied	4,616	33
Unoccupied	127	1
Inactive	9,158	66
Total	13,901	100
NSA :	3,264	

According to the table above, it is evident that 33% of the population is occupied in some type of activity, while the other 66% are inactive.

8.1.3.2 Economic activities in the Municipality of El Progreso

The economy in the municipality of El Progreso is largely linked to agricultural activities, mainly oriented towards the production of palm oil and basic grains (corn and beans) as representative crops in all communities. There is also the Industrial Park Zip El Porvenir where they companies dedicated to maquila operate. Table

12.10 shows, the employed and unemployed population for 2001, in the municipality of El Progreso:

Table 12.7. Employed and unemployed population in the municipality of El Progreso

Type of main occupation	Cases	%
Employed	41,186	34.4
Unemployed	1,457	1.2
Inactive	76,958	64.3
Total	119,601	100
NSA:		
	27,768	

Source: National Statistics Institute of Honduras. Main occupation type . 2001 Census..

It is evident from the above Table that 34.4% of the population is engaged in some activity, while 64.3% is inactive.

12.3 Source of water supply for the population

In private houses, water supply sources come mainly in its greatest percentage (> 70%) from the public or private system. See Table 12.11

Table 12.8. Water supply in the houses of the Municipalities Santa Cruz de Yojoa, Santa Rita and El Progreso, 2001.

Procedencia del Agua	Santa Cruz de Yojoa		Santa Rita		El Progreso	
	Casos	%	Casos	%	Casos	%
De tubería del sistema público o privado	9,410	81	2,836	85	2,442	8
De pozo malacate	311	3	54	2	461	2
De pozo con bomba	357	3	85	3	1,758	6
De vertiente, río o arroyo	889	8	174	5	1,866	6
De lago o laguna	14	0	5	0	35	0
De vendedor o repartidor ambulante	21	0	8	0	52	0
Otro	595	5	181	5	884	3
Total	11,597	100	3,343		29,485	
NSA :	2,982		703		6,392	

Source: National Statistics Institute of Honduras. Water supply. 2001 Census.

Note: Data obtained with the last census in the year 2001.

12.4 Cultural heritage

The concept of cultural heritage refers to "the legacy of tangible and intangible assets that endorses a specific society over time and from which forges an identity as a people or nation; cultural heritage expresses a form of be, do, and dream, a vision of life, a meaning, a meaning of existence."

12.4.1 Archaeological ruins

As expressed by the representatives of the Honduran Institute of Anthropology and History (IAHA) in the municipality of La Lima, Cortés; near the projects' area, there are no archaeological remains or sites that are in danger of being damaged, the areas where it is planned for the expansion and maintenance of this present tranche. In additional requests to present, in Section L, the certificates issued by the IAHA are attached.

12.4.2 Communities or ethnic people or Afro-descendants

There are no ethnical or people of African descent communities near the area of influence of the project.

12.4.3 Cultural interest sites

In the municipality of Santa Cruz de Yojoa lays the museum and an eco-archeological park "Los Naranjos", it is located in the North West side of Yojoa Lake, it possesses archeological findings from the lake zone, botanical interpretation, it also has 6 kilometers of path over stone and stools and an archaeological site under restoration.

In the municipality of El Progreso, the library *Casa de la Cultura* can be found.

In the municipality of Santa Rita, la public library *Ramon Amaya Amador*, located in front of the central park.

12.5 Transportation

There are routes of urban and interurban transportation, intercity transportation with a good number of runs throughout the day. In addition there are transport routes at a regional level that connect El Progreso with the surrounding municipalities and major cities in the country. We find, the north-south axis (Choluteca, Tegucigalpa, San Pedro Sula), west-north (Santa Rosa, Santa Barbara, San Pedro) and the north coast (Tela, La Ceiba, Tocoa, Olanchito).

In some cases there are intercity transport lines exist that use the main road CA-5 and CA-13 as a pass way between the major cities between the north-central, north-western, north-north regions.

There is also a taxi service for the transportation among the internal streets of the villages.

Figure 12.4. Picture showing the means transportation used in the area of social and economic influence.

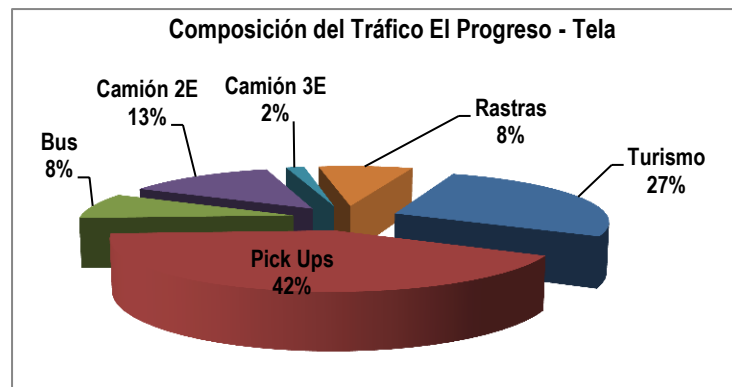


Source: LBG, Field visit, April 2013.

12.5.1 Traffic

The composition of the current traffic on the tranche: La Barca – El Progreso is as follows: 27% is composed of the light vehicles (tourism), 42% pickups, buses 7% buses, 11% 2E type trucks, 2% the 3E type, 11% Freight trucks . See Figure 12 1:

Graphic 12-1. Composition of traffic on the tranche El Progreso - Tela

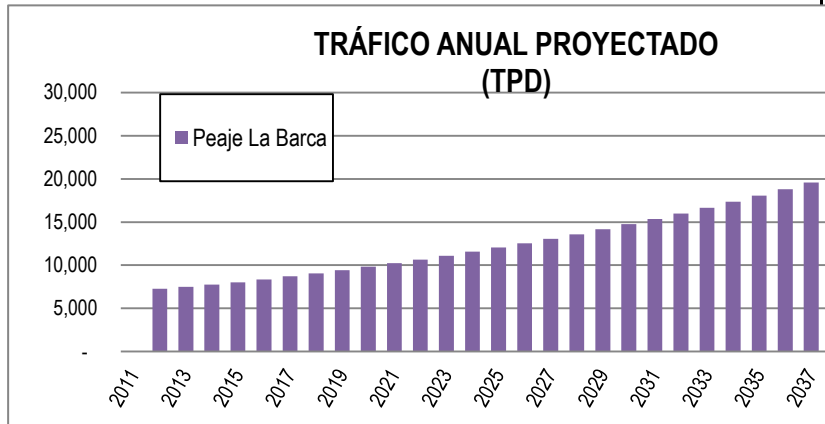


Source: Consultant, based on performed projections.

Yearly traffic (TPD) in the tranche La Barca – El Progreso is 7,507 vehicles. Completing the construction of the Tourism Corridor Project: Tranche La Barca – El Progreso, on 2016, we will have an annual traffic of about 8,361 vehicles.

After the construction, the annual increase in traffic will be between 3% and 4% remaining constant until 2045, according to the performed projections. See Figure 12 2:

Graphic 12-2. Annual traffic increase on the tranche El Progreso - Tela



Source: Consultant, based on performed projections

12.6 Solid wastes

In the case of the Municipality of El Progreso, the collection system is currently Granted under concession to MC (PROAMBIENTE), which efficiently meets their service, by monitoring satellite units and georeferencing systems.

Although there are authorized sites suitable for waste disposal at a municipal level, it is clear that most of the area's population of Socioeconomic Influence gets rid of solid waste by burning or burying them.

For the municipality of Tela, they lease two trucks for the collection of generated waste within the urban zone of the municipality.

12.6.1 Collection (containers, soil, etc.).

The mechanism of garbage disposal in the area of economic influence of the Project is presented in Table 12.12:

Table 12.10. Disposing of garbage in the area of socio-economic influence

Garbage Disposal	El Progreso		El Negrito		Tela	
	Cases	%	Cases	%	Cases	%
Throws it on the street, river, creek, lake or sea	581	5	110	3	1,003	3
Is picked up by the garbage truck	304	3	40	1	13,41	4
IS taken to the deposit or container	462	4	20	1	199	1
Is burned or buried	9,631	83	3,03	9	13,50	4

			5	1	5	6
Pays a particular person to dispose of it	243	2	102	3	1,161	4
Other	376	3	36	1	206	1
Total	11,59		3,34		29,48	
NSA:	7		3		5	

Source: National Statistics Institute of Honduras. Garbage disposal. 2001 Census.

As for the garbage disposal, we have that in the Municipality of Santa Cruz de Yojoa, at least 83% of the elimination of waste, is burned or buried and only 3% is by a garbage truck.

The trash collection system is nonexistent in the city of Santa Cruz de Yojoa, independent person collect and deposit the trash in the enabled dump, which is located at the north side of the neighborhood Las Glorias. The municipal authorities of Santa Cruz de Yojoa is in charge of collecting and evacuating twice a week the waste generated in the vicinity of Central Park and in the market. On the other areas, the proprietary is the one responsible of doing it.

In the municipality of Santa Rita, on 91% of the cases, the trash is burned or buried it, and only 1% is collected by the garbage truck. In the municipality of El Progreso, the situation is different,

12.6.2 Transportation (compactors, dump trucks, barrows, etc..)

It was evident the presence of Municipal collectors cars performing routes in the City of El Progreso to the final disposal site. See Figure 12.5:

Figure 12.5. Garbage truck in the Municipality of El Progreso



Source: LBG, Field work, April 2013.

12.6.3 Disposal (uncontrolled landfill, controlled landfill, sanitary filling)

Two sites for solid waste disposal have been identified, one located in the municipality of El Progreso and the other located in the Municipality of Santa Rita. Figure 12.4 presents the current conditions found in each of these sites.

Figure 12.6 Waste disposal sites in the area of socio-economic influence



Controlled dump in El Progreso

Dump in the Municipality of Tela

Soceur: LBG, Field work, April 2013.

12.7 Collection, treatment and disposal of wastewater

Table 12.13, shows issues regarding the provision of sanitary service in particular houses in the municipalities of AISE, for the year 2001:

Table 12.11. Municipal sanitary service in the area of influence

Sanitary Service	El Progreso		El Negrito		Tela	
	Cases	%	Cases	%	Cases	%
Toilet connected to the sewage system	586	5	139	4	13,291	4
Toilet connected to a septic tank	6,423	54	1,356	39	11,088	37
Toilet connected with river discharge, creek, lagoon, sea or lake.	73	1	5	0	462	2
Latrine or simple pit	2,893	24	1,539	44	3,279	11
None	1,919	16	468	13	1,942	6
Total	11,894	100	3,507	100	30,062	100

		0		0		0
NSA:	15		2		23	

Source: Honduras National Statistics Institute. Sanitary Service. 2001 Census.

It is evident in the municipality of Santa Cruz de Yojoa, the sewer system covers only a small area of the city, specifically the one north of the intersection formed by the village Las Flores with the Modesto Chacon y Ponciano Leiva avenue. South with the second street. East with the Ponciano Leiva Avenue and to the west with the Modesto Chacon Avenue. In the rest of the city, outside of the described area, septic tanks are used or the sewage is downloaded directly to the natural water runoffs.

Rainwater in the village is evacuated using the channels of the streams that cross the sector.

On the specific case of the municipality of Santa Rita, 44% of the households have a simple pit latrine, 39% a toilet connected to a septic tank, and 13% have no toilet. Only 4% of the household in the municipality have toilets connected to the sewer system.

The urban zone of El Progreso has a public sanitary sewage system, which is deteriorating and with an almost totally inefficient operation, the rest of the settlements in the municipality have toilets or latrines connected to septic tanks. This second system presents a serious problem of contamination of ground and surface and underground waters of the area, affecting the health of residents, specially children.

The public sanitary sewage sanitation system of El Progreso has treatment lagoons and is finally disposed of into the Ulua River.

The specific case of El Progreso has a system of wastewater treatment that covers the urban zone . It Consists of 4 oxidation and treatment lagoons with care staff, operation accessories and the presence of several of local fauna species. ¹

12.8 Health

The main health facilities in the Municipalities of socioeconomic influence area is presented as follows:

Municipality of Santa Cruz de Yojoa

The municipality of Santa Cruz de Yojoa is the base for the health regional area #6, which has a coverage of 6 municipalities, it has 7 service health delivery units, which are located in the following communities: Santa Cruz de Yojoa, Peña Blanca, Yojoa, El Llano, Las Flores, San Isidro and Los Caminos.

The municipality of Santa Cruz de Yojoa has 3 Health Centers with Doctor and

¹ Multidimensional Integral Diagnosis, Municipal Development Plan, with a focus on territorial ordinance plan, El Progreso, Yoro

Odontologist (CESAMO from the Spanish Centro de Salud con Médico y Odontólogo) and 4 Rural Health Centers (CESAR – from the Spanish Centro de Salud Rural – CESAR).

Municipality of Santa Rita

In the municipality of Santa Rita, only one CESAMO is located, five private clinics and 4 dental laboratories. The CESAMO assists a population of 17,645 inhabitants.

Municipality of El Progreso

In 2007 the municipality of El Progreso had 7 Health Centers with a Medical Dentist (CESAMO), two located in the municipal capital 1 in each of the following communities: Urraco Pueblo, Guaymitas, La Mina, Agua Blanca Sur and Quebrada de Yoro. The population served by 2007 and the staff providing assistance for each Center, is presented in Table 12.14:

Table 12.12. Health installations in the Municipality of El Progreso

Health Center	Attended population on 2007	Staff that provides assistance
CESAMO Carlos B. González Location: El Progreso	78,847	physician, nurse, assistant nurse, psychologist, microbiologist,
CESAMO y Clínica Materno Infantil Location: El Progreso, Col. Berlín	43,325	Physician, nurse, assistant of the nurse
CESAMO Location: Urraco Pueblo	18,529	2 auxiliary nurses, 1 general physician, 2 assistants in environmental health, one fund raiser
CESAMO Location: Guaymitas	11,106	2 auxiliary nurses, 1 social service Doctor, 1 ss dentist ., 1 Environmental health technical(tsa), 1 watchman, 1 cleaning woman
CESAMO Location: La Mina	14,807	2 auxiliary nurses, one Cuban doctor, 1 environmental health technical (EHT), 1 pharmacy clerk, 1 watchman
CESAMO Location: Agua Blanca Sur	12,958	2 auxiliary nurses, 1 general doctor, 1 environmental health assistant 1 environmental health technical,1 watchman, 1 cleaning lady, 1 pharmacy clerck, 1 lent municipal health unit

CESAR		
Location: Quebrada de Yoro	5,553	1 auxiliary nurse, one doctor in Cuban social service, 1 environmental health technical

Source: Municipal Development Plan focused on territorial ordinance plan, El Progreso, Yoro.

VIII.- Affidavit Of The Legal Representative

I **Carlos Arlinton Velásquez Jiménez** of **Honduran** Nationality , Of legal age, **married**, Identity number (passport, resident card) number **1803-1970-00322**, residing in: **Residencial Plaza, Bloque A, Casa #8**; under the condition of **Legal Representative** of The Civil Works & Transportation And Housing Secretariat (known as SOPTRAVI) project: **Tourism Corridor of Honduras**.

Located **between the Municipalities of Santa Cruz de Yojoa, Santa Rita and El Progreso**; I declare that the information here provided on this form is true. I therefore manifest that I am aware of the existence of the Code of Good Environmental Practices of Honduras and declare that I agree to comply in all that apply to this Project, Work or Activity.

13

Legal Representative Signature

IX.- Affidavit of the Lender of Environmental Services

I, **Carol Yisel Perdomo Cardona** , of legal age and of this domicile, **Civil Engineer** by profession and acting in my capacity as legal **representative of the consulting firm Ingeniería y Ambiente de Sula**, registered in the Natural Resources & Environment Secretariat (Known In Spanish as SERNA) **RE-0017-2003**, and hereby certify that all the information concerning the environmental status of the area where you plan to build the **Tourism Corridor Project Tranche La Barca – El Progreso** in the municipalities of **Santa Cruz de Yojoa, Santa Rica, and El Progreso** is true at the time of the inspections. In witness whereof I sign this in the city de _____ on _____ of the year ____

14

Lender of Environmental Services Signature

X.- Additional Requirements to Submit

15	A	Form F-02 Assessment of the Significance of the Environmental Impact (Digital Matrix and printed)	X
	B	Environmental Management Plan	X
	C	Document of company constitution, individual trader or legal person	X
	D	Title Deed or lease of the place where the project will be developed, duly stamped and registered	N/A
	E	Certificate issued by the Municipal Environmental Unit (MEU), which states the status of the project (if it has commenced operations and if it is located in an environmentally fragile area) (only for procedures in the Natural Resources & Environment Secretariat Known in Spanish as SERNA)	N/A
	F	Publication (in a newspaper of general circulation) of alert of entry before this Secretariat, five days prior to the presentation of this form and other requirements.	X
	G	Detail or breakdown of the amount of global investment activity, work or project.	X
	H	The basic design of the site corresponds with a general level of activity, work or project to be developed	X
	I	The copy of the map sheet in which is the AP located	X
	J	Certification issued by the consultant responsible for the geotechnical and civil engineering situation of the land where the project is located.	X
	K	Certification issued by a consultant responsible for the situation of geology, geomorphology, hydrogeology and natural terrain threats.	X
	L	Certification issued by the consultant responsible for the archaeological situation of the land where the project will be located.	X

Photocopies of any deed or other documents must be authenticated

XI.- For use by the Competent Authority

16.1 ENVIRONMENTAL RECEIVING AUTHORITY			16.2 DATE		Month	year
16.1.1 (Natural Resources & Environment Secretariat (hereinafter called SERNA))	16.1.2 Municipality		16.3 TIME		16.4 Reception Seal	
16.5 Name of the receiving official						
16.6 Charge						

16.7 FILE TRACKING						
Name	Charge	Action			Date	
		Report	Revision	Legal opinion	Start	End
XII.- Results of the Environmental Assessment Process						
17.1 Environmental feasibility	17.1.1 Accepted		17.1.2 Declined			
17.2 License authorizing official			17.3 Charge			
17.4 Signature of authorizing officer			17.5 Licence number			

**F-02 Form – Evaluation of the
Environmental Impact Significance
(Matrix)**

1. RESOURCE CONSUMPTION																	
A. CONSTRUCTION STAGE																	
Component/ Subcomponent	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	y	Regulatory framework (z)					X= y * z	Value per Component				
	(Value = 1)	(Value = 2)	(Value = 3)	(Value = 4)	(Value = 5)		a	b	c	d	e						
Recurrosos	1.1 Water	1.1.1 Source/ consumption	Body of water (surface or underground) within or outside the ADI not used as a source of drinking water	Body of water (surface or underground) which supplies the drinking water network outside ADI communities	Body of water (surface or underground) from which the community's drinking water network is supplied	Drinking water network outside the ADI project/ Well within the ADI project	Drinking water network within the ADI project	1		4					4.00	4.00	General Water Law
	1.2. Energy	1.2.1 Source / consumption		An own generator will be used, which will make noises, cause gases, and vibrations in the ADI, where there is NO population	An own generator will be used, which will make noises, cause gases, and vibrations in the ADI, where there is population	It will be necessary to disconnect the public network in order to make the project's own connections	The public network's consumption might generate supply problems to the community	3		4					12.00	12.00	The Electric Subsector Framework Law
B. OPERATION STAGE																	
Recurrosos	1.3 Water	1.3.1 Consumption in public supply network	Water consumption does not exceed 50 m ³ /month.		Water consumption between 50 and 200 m ³ /month.		Water consumption greater than 200 m ³ /month.								0.00	8.00	General Water Law
		1.3.2 Superficial body of water consumption		Water consumption does not exceed 25% of the remaining flow.	Water consumption is greater than 25% and less than 50% of the remaining flow	Water consumption is greater than 50% of the remaining flow.	Greater consumption than the remaining flow.	2		4					8.00		
		1.3.3 Consumption of underground source		Water consumption is no greater than 50 m ³ /day.	Water consumption between 50 y 200 m ³ /day.	Water consumption greater than 200 and less than 500 m ³ /day.	Water consumption greater than 500 m ³ /day.								0.00		
	1.4. Energy	1.4.1 Energy self-sufficiency through biofuels	Less than 360,000 liters are consumed	More than 360,000 liters and less than 750,000 liters of fuel per year are consumed	More than 750,000 liters and less than 1,800,000 liters of fuel per year are consumed	More than 1,800,000 liters and less than 3,600,000 liters of fuel per year are consumed	More than 3,600,000 liters of fuel per year are consumed								0.00	6.00	Regulations for the installation and operation of service stations, deposits of fuel for own consumption and alternative or substitute products. (Agreement No. 1011, The Gwawe.
		1.4.2 Energy self-sufficiency through fossil fuels	Less than 360,000 liters are consumed	More than 360,000 liters and less than 750,000 liters of fuel per year are consumed	More than 750,000 liters and less than 1,800,000 liters of fuel per year are consumed	More than 1,800,000 liters and less than 3,600,000 liters of fuel per year are consumed	More than 3,600,000 liters of fuel per year are consumed	1				2			2.00		
		1.4.3 External supply	Less than 240 MWh/year, or 360,000 liters of fuel per year, or 12 TJ/year will be consumed.		More than 240 and less than 1200 MWh/year, or more than 360,000 L and less than 1800,000 L of fuel per year, or more than 12 or less than 60 TJ/year will be consumed.		More than 1200 MWh/year, or 1,800,000 L of fuel per year, or 60 TJ/year will be consumed.		1		4						
A Consumptic												30.00					

2. IMPACT ON THE BIOLOGICAL ENVIRONMENT

A. CONSTRUCTION STAGE

Component/ Subcomponent	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	y	Regulatory framework (Z)					X= y * z	Value per Component		
	(Value = 1)	(Value = 2)	(Value = 3)	(Value = 4)	(Value =5)		a	b	c	d	e				
2.1 Fauna	2.1.1 Terrestrial fauna			There will be some type of impact (displacement, hunting, destruction of habitat)		There will be impact on endangered species, indicators, CITES, endemic or with small populations.	3			3			9.00	24.00	Environment General Law
	2.1.2 Aquatic fauna			There will be some types of impacts (displacement, hunting, destruction of habitat, etc.)		There is an impact on endangered species, indicators, CITES, endemic or with small populations.	5			3			15.00		Environment General Law
	2.1.3 Coral reefs					There will be limitations and conditions.							0.00		
	2.1.4 Introduction of non-native species of fauna					There will be introduction.							0.00		
2.2 Flora	2.2.1 Terrestrial flora			There will be some type of impact (logging, burning, extraction of timber, etc.)		There will be an impact on endangered species, indicators, CITES, endemic or with small populations.	3			3			9.00	18.00	Environment General Law
	2.2.2 Aquatic flora			There will be some impact (extraction, cutting, siltation, etc.)		There will be an impact on endangered species, indicators, CITES, endemic or with small populations.	3			3			9.00		Environment General Law
	2.2.3 Wetlands					There will be impact.							0.00		Environment General Law
	2.2.4 Introduction of non-native species of flora					There will be introduction.							0.00		
A. OPERATION STAGE															
2.3 Fauna	2.3.1 Terrestrial fauna			There will be some type of impact (displacement, hunting, destruction of habitat, etc.)		There will be an impact on endangered species, indicators, CITES, endemic or with small populations.	3			3			9.00	24.00	
	2.3.2 Aquatic fauna			There will be some type of impact (displacement, hunting, destruction of habitat, etc.)		There is an impact on endangered species, indicators, CITES, endemic or with small populations.	5			3			15.00		
	2.3.3 Coral reefs					There will be limitations							0.00		
	2.3.4 Introduction of non-native species					There will be introduction.							0.00		
2.4 Flora	2.4.1 Terrestrial flora			There will be some type of impact (logging, burning, extraction of timber, etc.)		There will be an impact on endangered species, indicators, CITES, endemic or with small populations.	3			3			9.00	9.00	Environment General Law
	2.4.2 Aquatic flora			There will be some impact (extraction, cutting, siltation, etc.)		There will be an impact on endangered species, indicators, CITES, endemic or with small populations.							0.00		
	2.4.3 Wetlands					There will be impact.							0.00		
	2.4.4 Introduction of non-native species					There will be introduction.							0.00		
											SEI Biological environment	75.00			

3. Physical Environment

A. Construction Stage

Component/ subcomponent	CASE 1 (Value = 1)	CASE 2 (Value = 2)	CASE 3 (Value = 3)	CASE 4 (Value = 4)	CASE 5 (Value = 5)	y	Regulatory Framework (z)					X = y * z	Valuation by component			
							a	b	c	d	e					
3.1. Atmosphere	3.1.1.1 Stationary sources (see regulations of emissions by stationary sources)	Controlled emissions but which may cause impacts		Partially controlled emissions		Uncontrolled emissions.	3				2		6.00	17.00	Regulations for the control of emissions generated by stationary sources.	
	3.1.1.2 Mobile sources (see regulations of vehicle emissions)	Mobile equipment, in fair condition, will be used				Mobile equipment, old and in poor condition, will be used.	1				2		2.00		Rules for the Regulation of emissions of polluting gases and smoke in motor vehicles.	
	3.1.1.3 Air pollution emissions (dust, smoke, and others not included in Regulations)	Controlled emissions but which may cause impact		Partially controlled emissions.		Uncontrolled emissions.	3				3		9.00		General Environment Law	
	3.1.1.4 Ionizing radiations.					There are emissions							0.00			
	3.1.2 Other emissions not included in Regulations (odors, gases, and others)	Air pollution is generated and it is controlled, but could generate damages		Air pollution is generated, but it is partially controlled.		Air pollution is generated, but it is uncontrolled.	3				3		9.00		9.00	
3.1.3.Noises and/or vibrations			There is generation of noise or vibration and it exceeds the limit of the applicable regulation and/or could be alleviated.		There is generation of noise or vibration and it exceeds the limit of the applicable regulation and/or could not be eased.	3					2		6.00	6.00	General regulations for prevention of accidents at work and occupational diseases	
3.2. Bodies of Water	3.2.1 Reduction in capacity of infiltration		From 1,500 to 7,500 m ² of waterproof area	More than 7,500 to 15,000 m ² of waterproof area	More than 15,000 to 30,000 m ² of waterproof area	More than 30,000 m ² of waterproof area.	5				3		15.00	24.00	General Environment Law	
	3.2.2 Place for excretal disposal		In portable septic pits	Septic pits will be built	Outdoors, inside the AP, or on the AID	In bodies of water	3					1	3.00		Technical standard of discharges of Wastewater into Receiving Bodies and Sewerage	
	3.2.2 Place of sewage disposal (remains of concrete, oils, fuels, paints, sealants and other liquid chemical substances)	They will be treated and deposited to guaranteed receivers.	They will be disposed in places properly controlled by the competent authority.	They will be taken to places, not controlled, but authorized by the municipality	Outdoors, inside the AP, or on the AID	In bodies of water	2				3		6.00		Health Code	
3.3 Soil	3.3.1.1 Specials	Disposed in cell of confinement in controlled landfills or use means of sterilisation or incineration authorized by the competent authority		Are disposed in landfills without cells specific for special waste	Final disposal treatment or no adequate provision	Final disposal in uncontrolled dump or unauthorized location	3				2		6.00	26.00	Regulations for the Integral Management of Solid Waste	
	3.3.1.2 Non specials.	Final disposal in a landfill or an authorized treatment method			Final disposal in controlled landfill	Final disposal in uncontrolled dump or unauthorized location	4				2		8.00		Regulations for the Integral Management of Solid Waste	
	3.3.1.3 Inert		It is finally disposed in a dump in the AP or to a non-commercial third party	It is finally disposed in a landfill with classification or a dump outside the AP.		It is disposed in places not approved by the competent authority	2				2		4.00		Regulations for the Integral Management of Solid Waste	
	3.3.1.4 Transportation of waste	Complies with existing regulations		It will use the municipal transport system and it does not comply with regulation	It will use its own transport system and does not comply with regulation	Subcontract a transportation service and it fails to comply with regulation	4					2			8.00	Regulations for the Integral Management of Solid Waste
	3.3.2 Use of Soil					Use will be modified	5				3		15.00		15.00	Municipalities Act / General Environment Law
3.3.3 Movement of soil.		Soil movements and filling without mobilization outside the project area, are expected.	Soil movements and filling without mobilization outside the project area, are expected.	Soil movements and carrying it outside the AP up to volumes of 1,000 m ³ are foreseen.	Soil movements and carrying it outside the AP up to volumes of 10,000 m ³ are foreseen	Soil movements and carrying it outside the AP up to volumes greater to 10,000 m ³ are foreseen	5				3		15.00	15.00	General Environment Law	
3.3.4 Sloping.	The net area has a slope of about 0-15%.	The net area has a slope of about 15-25%.	The net area has a slope of about 25-45%.	The net area has a slope of about 45% y 60%.	The net area has a slope greater to 60%.		1				3		3.00	3.00	General Environment Law	
3.3.5 Density of construction.		Coverage of construction is less than 25% of the Project's total area.	Construction coverage is greater than 25% but less than 50% of the Project's property total area.	Construction coverage is greater than 50% and less than 70% of the Project's property total area.	Construction coverage is greater than 70% of the Project's property total area.		5				3		15.00	15.00	Municipalities Act / General Environment Law	

B. OPERATION STAGE														
Component / subcomponent	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	y	Regulatory Framework (Z)					X= y * z	Valuation by component	
	(Valor = 1)	(Valor = 2)	(Valor = 3)	(Valor = 4)	(Valor = 5)		a	b	c	d	e			
3.4. Atmosphere	3.4.1.1 Stationary sources(see regulations of emissions by stationary sources)			Emissions will be generated								0.00	21.00	Rules for the Regulation of emissions of polluting gases and smoke in motor vehicles. General Environment Law
	3.4.1.2 Mobile sources (see regulations of vehicle emissions)			Mobile equipment, that it is not known if it will comply with emission standards, will be used.		3				2		6.00		
	3.4.1.3 Air pollution emissions (dust, smoke, and others not included in Regulations)					5			3			15.00		
	3.4.1.4 Ionizing radiations.											0.00		
3.4.2 Other emissions not included in Regulations (odors, gases, and others)	Air pollution will be generated and it is controlled, but could generate damages			Air pollution will be generated, but it is partially controlled.								0.00	0.00	
3.4.3.Noises and/or vibrations				There is generation of noise or vibrations and it exceeds the limit of the applicable regulation and/or could be alleviated.		3				2		6.00	6.00	General regulations for prevention of accidents at work and occupational diseases
3.5 Bodies of Water	3.5.1 Type and quantity of sewage			More than 3,785 m ³ and less than 3,785 m ³ per day or, industrial sewage, agro-industrial, agricultural and aquaculture		1					1	1.00	5.00	Technical standard of discharges of Wastewater into Receiving Bodies and Sewerage Technical standard of discharges of Wastewater into Receiving Bodies and Sewerage
	3.5.2 Place of sewage disposal	Control based on volume or source and composition is not required	Unload waste water to the sewer system, complying with the regulations.	Unload waste water to receiving body, complying with the regulations	Download wastewater to receiving body, without complying with the regulations	4					1	4.00		
3.6 Soil	3.6.1.1 Specials	Disposed in cell of confinement in controlled landfills or use means of sterilisation or incineration authorized by the competent authority		Are disposed in landfills without cells specific for special waste	Final disposal treatment or no adequate provision	Final disposal in uncontrolled dump or unauthorized location	3				2	6.00	26.00	Regulations for the Integral Management of Solid Waste Regulations for the Integral Management of Solid Waste Regulations for the Integral Management of Solid Waste
	3.6.1.2 Non specials.	Final disposal in a landfill or an authorized treatment method			Final disposal in controlled landfill	Final disposal in uncontrolled dump or unauthorized location	4				2	8.00		
	3.6.1.3 Inert		It is finally disposed in a dump in the ap or to a non-commercial third party	is finally disposed in a landfill with classification or a dump outside the AP.		It is disposed in places not approved by the competent authority	2				2	4.00		
	3.1.1.4 Transportation of waste	Complies with existing regulations		It will use the municipal transport system and it does not comply with regulation	It will use its own transport system and does not comply with regulation	Subcontract a transportation service and it fails to comply with regulation	4				2	8.00		
3.6.2 Use of soil					Its use will be modified							0.00	0.00	
3.6.3 Population density.	A density less than 50 occupants per hectare is expected			A density greater than 50 and less than 200 occupants per hectare are expected.								0.00	0.00	
											Physical Environme	188.00		

4. SOCIAL ENVIRONMENT

A. CONSTRUCTION STAGE

Component/subcomponent	CASE 1 (Value = 1)	CASE 2 (Value = 2)	CASE 3 (Value = 3)	CASE 4 (Value = 4)	CASE 5 (Value = 5)	y	Legal Framework (Z)					X=z * y	Valuation per component		
							a	b	c	d	e				
4.1 Housing	4.1.1 Impact on homes or other assets				Temporary	Permanent	5			3			15.00	30.00	Compulsory purchase Act, Decree 113
	4.1.2 Mobilization, relocation of people from the AP.					There is mobilization, relocation, relocation of people living in the PA or area influenced by the effect of the project.	5			3			15.00		Compulsory Purchase Act, Decree 113
4.2 Culture	4.2.1 Landscape.				Development of infrastructure in an urban area and causes an imbalance in the texture of the existing landscape.	Development of infrastructure in a rural or urban area and it affects the texture of the existing landscape.	5			3			15.00	15.00	General Environment Law
	4.2.2 Patrimony.				The project partially affects the existing scientific, architectural, anthropological or archaeological heritage.	The project entirely affects the existing scientific, architectural, anthropological or archaeological heritage.							0.00		Cultural Heritage Law
4.3 Vialidad	4.3.1 Vehicular, maritime, air traffic, etc.	Generates new traffic ratio greater to 10% and less than 25% of the current traffic.		Generates new traffic ratio increased to 25% and less than 50% percent of the current traffic.		Generates new traffic ratio increased to 50% of the current traffic.	1		4				4.00	4.00	Traffic Law
	4.3.2 Means of communication					The roads of the ADI are not designed to withstand the traffic equipment and machinery							0.00		
4.4 Basic Services	4.4.1 Water					The project will alter the quality of the ADI's water source							0.00	0.00	
	4.4.2 Solid wastes			Generating solid waste will bring on problems to the public recollection system.		The generation of solid waste will collapse the municipal disposal site.							0.00		
	4.4.3 Residual water					RW layout will be in soil or bodies of water used (or to be used) by the community.							0.00		
4.5 Population's Health	4.5.1 Generating diseases			The project could affect the health of the population in the area of influence of the project.		The project affects the health of the population in the area of influence of the project.	3				2		6.00	27.00	Health Code Regulations
	4.5.2 Vectores			The project could generate or increase the type and quantity of vectors in the project area.		The project generates or increases the type and quantity of vectors in the project area.	3				2		6.00		Health Code Regulations
	4.5.3 Quality of the environment					The project could alter the normal pace of life of the population	5			3			15.00		General Environment Law

B. ETAPA DE OPERACIÓN

Component/subcomponent	CASO 1 (Valor = 1)	CASO 2 (Valor = 2)	CASO 3 (Valor = 3)	CASO 4 (Valor = 4)	CASO 5 (Valor = 5)	y	Marco legal (Z)					X=z * y	Valoración por efecto		
							a	b	c	d	e				
4.6 Housing	4.6.1 Impact on homes or other assets				Activities could generate vibrations or other impacts that damage houses.								0.00	0.00	
4.7 Culture	4.7.1 Patrimony.			The project partially affects the existing scientific, architectural, anthropological or archaeological heritage.	The project entirely affects the existing scientific, architectural, anthropological or archaeological heritage.								0.00	0.00	
	4.7.2 Culture , traditions					New religions, new celebrations or customs different from those of the community will be introduced.							0.00	0.00	
4.8 Vialidad	4.8.1 Vehicular, maritime, air traffic, etc.	Generates new traffic ratio greater to 10% and less than 25% of the current traffic.		Generates new traffic ratio increased to 25% and less than 50% percent of the current traffic.		Generates new traffic ratio increased to 50% of the current traffic.	1			3			3.00	3.00	Traffic Law
	4.8.2 Means of communication					The roads of the ADI are not designed to withstand the traffic that will be generated by the project.							0.00	0.00	

4.9 Basic services	4.9.1 Drinking water				The community does not accept that the company uses its water source	The community does not accept that the company use its network/ there is no availability of water for the project.												0.00	10.00	Regulations for the Integral Management of Solid Waste
	4.9.2 Solid wastes				The RW collection system has no ability to provide total service to the project.	The lifespan of the landfill or the RW dump will decrease largely to accommodate the waste of the company.	5						2					10.00		
	4.9.3 Sewer system and/or treatment of RW				The sewer system has no capacity to accommodate the rw of the project.	The treatment system has no capacity to accommodate the rw of the project.												0.00		
4.10 Population's Health	4.10.1 Generating diseases				The project could affect the health of the population in the area of influence of the project.	The project affects the health of the population in the area of influence of the project.	3						2					6.00	27.00	Health Code Regulations
	4.10.2 Vectors				The project could generate or increase the type and quantity of vectors in the project area.	The project generates or increases the type and quantity of vectors in the project area.	3						2					6.00		
	4.10.3 Quality of the environment					Work will be done at night and there will be noise, vibrations, traffic vehicles, etc.		5					3					15.00		
4.11 Conflicts using Natural Resources and Raw	4.11.1 Soil					The soil will be used for growing products that do not improve food security.												0.00	0.00	
	4.11.2 Forest					The project will decrease the availability of forests for energy purposes in the community.												0.00		
	4.11.3 Production					Raw material (basic grains, water, etc.) will be used for purposes other than food.												0.00		
																SEI Social Environment	116.00			

5. RISKS																				
A. CONSTRUCTION STAGE																				
Component/subcomponent	CASE 1 (Value = 1)	CASE 2 (Value = 2)	CASE 3 (Value = 3)	CASE 4 (Value = 4)	CASE 5 (Value = 5)	y	Legal Framework (Z)					X= y * z	Valuation per effect							
							a	b	c	d	e									
5.1. Handling of substances	5.1.1 Handling of fossil fuels.		It consumes, handles or stores less than 5,000 litres a month.	It consumes, handles or stores more than 5,000 and less than 50,000 litres a month.	It consumes, handles or stores more than 50,000 and less than 500,000 litres a month.	It consumes, handles or stores more than 500,000 litres a month.	4						2					8.00	18.00	Regulations for the Installation and Operation of Service Stations, Deposits of Fuel for own Consumption and Alternative or Substitute Products.
	5.1.2 Handling of agrochemicals.					Agrochemicals (fertilizers, herbicides, pesticides, insecticides, etc.) are used, stored, transported, or consumed.												0.00		
	5.1.3 Handling of substances with hazardous characteristics (other than pesticides)					Yes there is consumption, handling, transport or storage of hazardous substances.	5							2				10.00		
	5.1.5 Handling of risky biological material					Yes there is consumption, handling, transport or storage of hazardous biological material														
5.2. Natural phenomena (location)	5.2.1 Floods					The project is located in a flood area.	5							3				15.00	45.00	Ley de SINAGER
	5.2.2 Landslides					The project is located in areas prone to landslides or subsidence.												0.00		
	5.2.3 Earthquakes					The project is located in areas identified as areas of tectonic activity.	5							3			15.00			
	5.2.4 Winds					The project is located in an area prone to hurricanes and the infrastructure is not resistant to that kind of phenomenon.	5							3			15.00			
5.3 Occupational health	5.3.1 Accidents at work				The area of the project presents risks for workers	The construction will include the development of hazardous activities.	5											10.00	10.00	General Regulations for Prevention of Accidents at Work and Occupational Diseases

B. OPERATION STAGE																	
Component/subcomponent	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	y	Legal Framework (z)					X= y * z	Valuation per effect				
	(Value = 1)	(Value = 2)	(Value = 3)	(Value =4)	(Value =5)		a	b	c	d	e						
5.4. Handling of substances	5.4.1 Handling of fossil fuels.		It consumes, handles or stores less than 5,000 litres a month.	It consumes, handles or stores more than 5,000 and less than 50,000 litres a month.	It consumes, handles or stores more than 50,000 and less than 500,000 litres a month.	It consumes, handles or stores more than 500,000 litres a month.	4					2		8.00	18.00	Regulations for the Installation and Operation of Service Stations, Deposits of Fuel for own Consumption and Alternative or Substitute Products	
	5.4.2 Handling of agrochemicals.					Agrochemicals (fertilizers, herbicides, pesticides, insecticides, etc.) are used, stored, transported, or consumed.								0.00			
	5.4.3 Handling of substances with hazardous characteristics including radioactive material (other than pesticides)						Yes there is consumption, handling, transport or storage of hazardous substances.	5					2				10.00
	5.4.4 Handling of risky biological material						Yes there is consumption, handling, transport or storage of hazardous biological material.										0.00
5.5 Occupational health	5.5.1 Accidents at work						The project includes dangerous operations	5					2		10.00	10.00	General Regulations for Prevention of Accidents at Work and Occupational Diseases
											SEI Risk	101.00					

6. SIGNIFICANCE OF ENVIRONMENTAL IMPACTS OF THE PROJECT, WORK OR ACTIVITY

The grade obtained (SEI preliminary value) in the attached form must be weighted with the following factors to obtain the final grade that will serve as a criterion for the classification according to the significance of the environmental impact (SEI) outlined in this document.			
1. SEI preliminary value, i.e. the sum of all the SEI values of each evaluated mean (Σ)			510
2. According to the regulations applicable to the operation of the activity, work or project (p)			
2.a With the commitment from the developer to adhere, voluntarily, to the standards or guidelines of a sector, subsector of best environmental practices, that might exist for the work or project. Said instrument will be of mandatory compliance for the proponent from the moment in which the corresponding authority of the SINEIA gives the environmental license.	0.9	2.c Without specific environmental legislation governing the activity work or project	2
2.b With specific environmental legislation governing the activity, work or project. Specify _____	1	2.d With specific environmental legislation that establishes the prohibition of the performance of the work or project	3
(p)		1	
3. Value of SEI adjusted by regulations (SEI_R) =			510
4. Classification of the area according to the location of the project area (β)			
4.1. Location authorized by the Plan of Land of Use, regulation or approved zoning plan or another environmental planning of land use	0.5	4.2 Location authorized by the Plan of Land of Use, regulation or approved zoning plan or another environmental planning of land use, not approved Localización autorizada por Plan de Uso del Suelo, reclamo o plan de zonificación u otra	1
4.3. Location in area without a plan for use of the land, regulation or zoning plan or another environmental planning of land use	1.5	4.4 Location in environmentally fragile area, except that referred to in the paragraph 4.1	2
(β)		1.5	
5. Final score of the SEI:			765
6. Classification on the basis of the final score and that establishes the procedure of the SINEIA, according to the decision path.			
Type	Grade	Final Category	Procedure
Moderate	Less or equal to 850	2	Guide for good environmental practices or in its defect the over view of the Environmental Management Plan
High	Greater than 850 and less or equal to 2,800.	3	Environmental Management Plan using an established structure in the terms of reference indicated by the SINEIA scheme of the Evaluating and Environmental Manual.
Very High	Greater than 2,800	4	Environmental Impact Study, according to the terms of reference indicated by the SINEIA

1 INTRODUCTION

This document presents the Environmental Management Plan (EMP) of the Tourism Corridor of Honduras Project: Tranche El Progreso - Tela, as established by Agreement No. 189-2009 of the Regulation of the National Environmental Evaluation System (SINEIA), which notes that the EMP will be an integral part of environmental assessment tools in order to organize the applicable environmental measures and commitments.

The EMP is a set of technical operations and proposed actions, which aim to ensure the operation of any human activity, within legal, technical and environmental standards, techniques to prevent, correct or mitigate negative environmental impacts or risks and to ensure continuous improvement and compatibility with the environment.

The EMP describes programs or mitigation measures that should be executed or completed by the developer to prevent and minimize environmental impacts during the planning and design, construction, and operation of the Tourism Corridor of Honduras: Tranche El Progreso - Tela. In the event that the developer proposes different measures to those described in the Plan, it is his responsibility to obtain approval from Natural Resources & Environment Secretariat (hereinafter called SERNA) and/or other state agencies whose competence requires it for the implementation of the new measures.

EMP Objectives:

1. Provide the Civil Works, Housing and Transportation Secretariat (SOPTRAVI) the developer a document attesting to all the measures identified by the consultant to prevent, minimize, mitigate and compensate for potential negative impacts from the Tourism Corridor Project: Tranche El Progreso - Tela and to enhance positive impacts;
2. Define the parameters and variables that will be used to assess environmental quality in the area of influence of the Project;
3. Establish mechanisms for relevant authorities to follow up the environmental variables of the Project and implement the necessary controls;
4. Designing mechanisms for preventing and responding to accidents and contingencies.
5. Ensure compliance with social and environmental goals of the project, including compliance with the Equator Principles and Performance Standards on Social and Environmental Sustainability of the International Finance Corporation (IFC).

The Project Tourism Corridor of Honduras: Tranche La Barca – El Progreso will be developed within the framework of social and environmental sustainability, also it will be guided by the Equator Principles and the Performance Standards on Social and Environmental Sustainability of The International Finance Corporation (IFC). Based on this principle, the Environmental Management Plan developed here includes the elements set for compliance with the Standards and Principles of Performances of Ecuador and must include the following elements:

- o Environmental and Social Assessment;
- o Management Program;
- o Organizational Capacity;
- o Training;
- o Community Involvement;
- o Supervision; and
- o Accountability Reports

The Financial Institutions signatory of the Equator Principles (EPFIs, for its acronym in English) financed projects only when they meet the following requirements²:

² Principles 7, 8 and 9 are not mentioned because they are agreements established between the financial institution and the borrower, they are beyond the scope of this EIA.

Review and Categorization. Based on Agreement N° 1714-2010, of the Secretariat of Natural Resources and Environment, to achieve full compliance with the given objectives and responsibilities we proceed to modernize and issue a new Table of Environmental Categorization in the Republic of Honduras. This categorization Table, has as main objective to identify activities Works or projects subject to the process of environmental impact assessment, as well as categorize or classify them according to their potential environmental impact. This project, due to its nature is defined as Category 3, which corresponds to those human activities classified from Moderate to High Potential environmental impact or environmental risk. This is consistent with the Performance Standards and Equator Principles, where this project, according to their potential impacts is defined in the "**Category B:** Projects with potential social impacts or minor environmental adverse generally limited to a specific site".

Social Environmental Assessment. This principle is met with the identification of environmental and social impacts and risks, including labor, health and safety, considered in this Environmental Impact Assessment, as required by Decree No. 104-93, General Law of the environment of the Republic of Honduras and its regulations set out in Agreement No. 109-93, in addition to the implementation and enforcement of existing regulations in Honduras on Safety, Health and Industrial Hygiene.

Applicable Social and Environmental Standards. As you can see in this EMP, this project will adopt the Performance Standards of the IFC and the sectoral guidelines WB/IFC as social and environmental standards and comply with the requirements of environmental regulations established by Decree No. 104-93 and its regulations Agreement No. 109-93.

The Action Plan and Management System. According to this requirement, this project includes the Environmental Management Plan (EMP), which is equivalent to the Action Plan and Social and Environmental System Management, establishing the Performance Standards and Equator Principles. This EMP includes specific plans including Hazardous materials Management Plan, through the Collection Programme, Separation and Disposal and Waste, Plan for Preparedness and Emergency Response, through the Contingency Plan and Plan for health and Safety through a Risk Prevention Plan.

Consultation and Disclosure. The Performances Standards and Equator Principles require the project to properly incorporate the concerns of the affected communities and/or involved through a process of consultation and outreach to ensure the free, anticipated and informed consultation and that it facilitates participation. Therefore, during the process of Elaboration of the assessment impact by the relevant instrument according to category, interviews were conducted to ascertain the opinion of the mayors and key stakeholders in each municipality of the area of socioeconomic influence of the Project. Moreover, as indicated by mandatory requirements for obtaining the environmental permit, a sign will be placed in the area where the project will be developed, where the name of the project, work or activity, location and address of the Proposer shall be indicated, where the public can get more information.

Complaint mechanism. This project, in the Citizen Participation Plan established a Complaints Mechanism as part of the management system to allow the reception and facilitate the resolution of concerns and complaints from affected individuals or groups, which will remain during the execution of the work. This mechanism consists on a Field Office established by the Concessionaire with a "single window" as well as receiving them in the offices of the Environmental Management Unit of SOPTRAVI.

Affected Communities. After defining the area of influence of the Project, it is confirmed that despite the existence of villages or communities along the alignment of the Tourism Corridor project Tranche, El Progreso - Tela, they will only be impacted in a negative way by the development of certain specific and temporary activities, such as increased traffic, dust generation and polluting gases product of machinery, among others, as the activities to be developed, will be conducted only in areas of existing easements.

2 GENERAL INFORMATION

2.1 3.1 Information on professional consultant or professional team that the EMP produced

This Environmental Management Plan has been prepared by the company The Louis Berger Group, Inc and the Honduran company Ingeniería y Ambiente de Sula S de R.L with Registration Number in the Natural Resources & Environment Secretariat (hereinafter called SERNA) RE-0017-2003, consists of the following providers of environmental services:

Table 2.1. List of Environmental Services Providers

Name	Registration No.	Company	Classification
Carol Perdomo	RI-007-2004	Ingeniería y Ambiente de Sula	General environmental specialists. General review
Ana Marcela García	RI-029-2003	Ingeniería y Ambiente de Sula	General environmental specialists. Developing MIIA, description of impacts
Judith Perla	RI-0032-2003	Ingeniería y Ambiente de Sula. Subcontratado	Biologist Environmental Specialist.
Contributors			
Saulo Romero		Ingeniería y Ambiente de Sula. Subcontratado	Biologist with emphasis in Zoology. Description of the biological environment and mitigation measures
Germán Sandoval		Ingeniería y Ambiente de Sula. Subcontratado	Biologist
Julio Aysa		The Louis Berger Group	Coordinate the Project. Environmental Specialist General review
Zuleika Ibañez		The Louis Berger Group	Environmental Specialist GIS support
Yiseth Martínez		The Louis Berger Group	Environmental Specialist Description of mitigation measures
Julio Vanegas		The Louis Berger Group	Road specialist
Horacio Ibarra		The Louis Berger Group	Geotechnical specialist

Source: Own Compilation

2.2 Identification of standards and legislation to be complied

This section mentions the environmental requirements and other legislation applicable to the Project under the Environmental Assessment.

During the different phases of project some activities that generate environmental impacts will be developed and it is important then to know the laws and regulations for each specific case.

2.2.1 Legislation

The legislation discussed below contemplates:

- Environment designed for the protection of natural resources and the environment,
- Any sector that has environmental relevance and
- Various topics, such as the regulations of the Territorial Ordinance Plan and health code.

2.2.1.1 Constitution of the Republic of Honduras

The Constitution of the Republic, Title III, Chapter VII of Health, that "the right to health protection is recognized. The duty of everyone to participate in the promotion and preservation of personal and community health. The State will preserve the environment to protect the health of the people"(Art. 145).

A very important aspect for this project, in terms of environmental protection regulation, it is exposed in Article 340 of the Constitution which states:

"It is declared of public utility and necessity, technical and rational exploitation of natural resources of the Nation. The State shall regulate its use, in accordance with the public interest and determine the conditions of Concession to individuals. The country's reforestation and conservation of forests are declared of national interest and collective interest. "

Article 354 states that "the tax or property may only be awarded or sold to individuals and in the form and manner prescribed by the laws. The state has the power to set or change the demarcation of areas of control and protection of natural resources in the country".

Finally on private property, the Constitution of the Republic of Honduras, Article 103 states, "The State recognizes, promotes and ensures the existence of private property in its broadest concept of social function and without other limitations than those for reasons of necessity or public interest established by law. ""The right of property shall not prejudice the eminent domain of the State" (Article 104).

Then "No one shall be deprived of his property, but because of necessity or public interest ranked by the law or decision based on law and without prior to fairly priced compensation". (Art 106)

2.2.1.2 Forced expropriation act

According to Decree 113, which refers to the Expropriation Act, the following is explained in Article 1,:

"The forcible expropriation for public utility and necessity, as authorized under Article 103 of the Political Constitution cannot be implemented with respect to real property, except in accordance with the requirements of this law. (Art. 1)

"They will be Works of public utility and necessity, those that are principally intended to provide the State, one or more departments, or one or more municipalities, any use or improvements in overall good yield, as the erection of new towns, squares or streets, the construction of communication roads, charity or instruction buildings, building forts, walls and other defenses, whether executed by the State, Departments or peoples, or by companies particular or private duly authorized."(Art. 2)

Therefore, the Constitution of Honduras and the Law of Expropriation provides expropriation as a way in which the State may satisfy some collective need, before which, the private interest must yield, but conditioned it, either by judgment or by decree, to fair compensation.

2.2.1.3 General Environment Law

On June 30, 1993 the General Environmental Law came into force, with principles and objectives that govern the environmental activity of all public and private bodies, having them cited in any administrative or judicial proceeding. Here are the most important items with the related activities that will be developed in this project:

Article 1: Thus the Environmental Law among its general principles defines that it is of common interest, the integral ordinance of the national territory considering the environmental aspects and economic, demographic and social factors.

Article 4: The public and private projects that affect the environment should be designed and implemented taking into account the interrelatedness of all natural resources and interdependence between man and his environment.

Article 5: The projects, industrial facilities or any other public or private sector, likely to pollute or degrade the environment, natural resources or the historical cultural heritage of the nation, will be preceded mandatorily by an Environmental Impact Assessment (EIA), which will allow preventing possible negative effects.

Article 6 -. The provisions of this Act and the special laws concerning the protection of human health and the protection, conservation, restoration and proper management of natural resources and the environment, will become mandatory in the evaluation of EIA , referred to in the preceding article.

Article 30: It is responsibility of the State and municipalities in their corresponding jurisdiction, the management, protection and conservation of watersheds and natural water reservoirs, including the preservation of natural elements involved in the hydrological process. Water users, regardless of the intended purpose, they are required to use it wisely, preventing its waste and ensuring wherever possible its reuse.

Article 31: Will be object of protection and special monitoring the water of the following categories:

- a) The water intended for human consumption or populations in general;
- ch) Those that are in protected areas, and;
- d) Any other source of general importance.

Article 32: It is forbidden to discharge in inland or marine waters over which the State exercises jurisdiction, all kinds of polluting wastes, whether solid, liquid or gaseous, may affect the health of humans or aquatic life, altering the quality water for their own purposes or to alter the ecological balance in general.

The Secretariats of Public Health, Natural Resources and National Defense and Public Safety, will be responsible for exercising control over the management of inland and marine waters, noting the technical standards and regulations established by the sectoral laws and regulations.

Article 33: It is prohibited to place human settlements, military bases, industrial plants or any other type in the areas of influence of sources of water supply to populations or irrigation of agricultural crops intended for human consumption, whose residues even if treated, present potential risks of contamination, the municipalities ensure the correct application of this regulation.

Article 41.- By protected flora and fauna should be understood those species of plants and animal that must be subject to especial protection due to their rareness, their condition on the ecosystem or for their condition as endangered species. Their exploitation, hunting, trapping, commercialization or destruction is prohibited.

Article 42: Animals that can be hunted are those wild animals that can be hunted, after obtaining a license granted by the Wildlife Department of the Honduran Forest Development Corporation (COHDEFOR). For the rational use of these species, after the required technical and scientific studies have been performed, and in coordination with the municipalities, species, closed seasons, permitted hunting areas, maximum sizes of capture, sex, age and permitted amount will be established.

Article 48: The land of the national territory should be used rationally and compatible with its natural vocation, trying to maintain its productive capacity, without altering the balance of ecosystems.

Its potential use is determined by considering socio-economic, physical, ecological, factors in the framework of the relevant land management plans.

Article 51: The usage of urban land will be object of plannifications on behalf of the corresponding municipalities, considering among others, the civic residential sectors, commercial, industrial, residential and recreational sectors, complying the quality of life of the inhabitants and the protection of the environment.

Article 54 -. Discharge and disposal of solid and liquid waste from any source, toxic and nontoxic can only be made in locations assigned by the competent authorities and in accordance with the relevant technical regulations and pursuant to the corresponding municipal bylaws.

Article 59: is of public interest the activity tending to avoid air pollution by the presence of harmful gases, smoke, dust, particulate matter, radioactive materials or other discharges that are harmful to human health, to public or private property flora and fauna and the ecosystem in general.

Article 60: In order to prevent the negative physiological effects on people, flora and fauna, the Executive Power, through the Secretariat of State for Public Health, in consultation with the National Environment Council and other competent bodies, will identify the technical regulations establishing the permissible emission levels and emission of pollutants, for which it will issue the necessary regulations.

The motor vehicles, industries and other fixed or mobile, public or private facilities which discharge gases or other pollutants in the atmosphere, are bound to observe such standards, including treatment systems that may be relevant. The municipalities in their corresponding jurisdictions, shall have authority to supervise the compliance with those standards.

Article 61: The Executive Branch through the Ministry of Public Health, will regulate the tolerance indexes of noise, vibration and emissions of smoke and dust.

Article 66: The solid and organic wastes from domestic, industrial or agricultural, livestock, mining, and other public uses, sources technically be treated to prevent alteration in the soils, rivers, lakes, lagoons and generally in maritime waters and terrestrial, and to prevent air pollution.

Article 68: The State shall exercise in accordance with the Health Code, the laws of Vegetal Health and Animal Health and other related provisions, control over the manufacture, formulation, importation, distribution, sale, transport, storage, use and disposal of toxic or hazardous agrochemicals and products used in agriculture, livestock, industry and other activities.

Toxic or hazardous substances shall not be subject to manufacturing, storage, importation, marketing, transport, use or disposal if they have not been duly authorized by the Secretariat of State for Public Health in the department of authority. Once the authorization has been given it must be enrolled in the corresponding special registers. Article 70: The anthropological, archaeological, historical, artistic, cultural and ethnic heritage as well as its natural setting, are under state protection.

Article 70: The anthropological, archaeological, historical, artistic, cultural and ethnic heritage as well as its natural setting, are under state protection.

Article 78: The natural or legal persons, public or private, who want to do any work or activity that could seriously alter or impair the environment including natural resources, are required to report the same to the competent authority in respect of the matter and prepare an environmental impact assessment (EIA) in accordance with the provisions of Article No. 5 of this Act

Included within these activities: chemical, petrochemical, steel, oil, tannery, paper, sugar, cement, beer, shrimp, liquor, coffee and agribusiness in general; generation and transmission of electricity, mining; construction and operation of pipelines; transport; final disposal, treatment or disposal of waste and hazardous substances, projects in the sectors of tourism, recreation, urbanization, forestry, human settlements and any other activities that can cause severe damage to the ecological balance.

Article 79 The work or activity which the preceding Article relates to cannot be executed without having an assessment and corresponding authorization.

Article 83: State agencies that have jurisdiction in environmental matters shall exercise any inspection and supervision, and to that effect its officers and employees are vested enough to inspect premises, facilities or specific areas or to demand to the appropriate authority, information to verify compliance with the relevant legal provisions.

The municipalities shall comply inspection and surveillance activities in the areas of its competence and jurisdiction. The regulation will develop this disposition.

2.2.1.4 Regulation of the National System of Environmental Impact Assessment

Article 1: In accordance with Articles 5, 9, and letter ch and 11 d, of the General Environmental Law mandating the creation and development of the "National System of Environmental Impact Assessment", this regulation is issued.

Article 2: The objectives of this Regulation are to:

- a) Organize, coordinate and regulate the National System of Environmental Impact Assessment (SINEIA), establishing the connections between the Secretariat of Environment; public institutions, private and international sectors.
- b) Ensure that plans, policies, programs and projects, industrial facilities or any other public or private activity may contaminate or degrade the environment, are subjected to an evaluation of environmental impact to avoid damage to the environment.
- d) Implement policies, standards, procedures to update the SINEIA in line with the economic, political, social, legal, cultural and environmental development of the country, always seeking the compatibility of development and the environment.

Article 24: Any project, work or public or private activity must have an environmental permit before starting execution.

Article 29: The projects, Works or activities are ordered in an Environmental Categorization Table exhaustively, that draws on the International Standard System ISIC, International Standard Industrial Code of all productive activities. With this, a standardized system that provides information to users of the system, guidance on procedures to follow environmental assessment, allows better coordination with other state authorities and makes possible a better and more effective statistical control of the management processes.

Article 30 -. Projects, Works or activities are categorized into four different categories 1, 2, 3 and 4 taking into account the factors or conditions that are relevant in terms of their characteristics, nature, potential environmental impacts or environmental risk.

- Category 1 corresponds to projects, Works or activities considered of low potential environmental impact or environmental risk.
- Category 2 corresponds to projects, Works or activities of moderate potential environmental impact or environmental risk.
- Category 3 corresponds to projects, Works or activities with high potential environmental impact or environmental risk.
- Category 4 corresponds to projects, Works or activities considered high potential environmental impact or environmental risk. Mega development projects are considered part of this category.

All the projects, Works or activities that by their nature, are below those of Category 1, are classified as very low environmental impact or environmental risk. As such, not subject to meet proceedings of Environmental License, however, will be subject to comply with current environmental legislation and also in all that applies in the Code of Good Environmental Practices of Honduras.

2.2.1.5 Act of Municipalities

Article 13: Municipalities have the following attributions:

5. Construction and maintenance of public roads on its own or in collaboration with other entities;
7. Protection of ecology, the environment and promotion of reforestation;
8. Control on public roads, sidewalks, parks and beaches, including their ordering, occupation, road signs, urban and interurban transport terminals and will be responsible for care of those goods;
15. Conclusion of contracts for construction, maintenance or management of local public services or Works with other public or private entities, at their convenience, pursuant to the Act

When the Municipalities granted the Concession Agreement for the construction of Works or provision of municipal services to private companies with resources from these, they may authorize them to recover their costs and earn a reasonable profit by means of the most appropriate charge system, without prejudice to the rights corresponding to the municipality: of public roads, in collaboration with the National Electricity Company (ENEE).

2.2.1.5.1 Regulation of the Municipalities Act

Article 132: Institutions that have the responsibility to control and manage the natural resources of the country, as COHDEFOR, the Secretariat of Natural Resources, etc., should establish agreements of mutual cooperation and responsibility with the municipalities within whose jurisdiction these natural resources are located, whether in individual, ejido, national, etc. in order to obtain optimum benefits for the Municipality in palliation of this Act and its Regulations.

To this purpose the Municipality may Concession the permit exploitation of renewable and non-renewable natural resources, after developing a technical study approved by the corresponding secretariat or institution.

3. Achieving social and material welfare of the Municipality, performing public Works programs and services;
4. Preserving cultural heritage and civic traditions of the municipality; disseminate and promote them if or in collaboration with other public or private entities
6. Protect the environment and local ecosystem;...
8. Rationalize the use and operation of municipal resources according to the priorities and programs of national development.

2.2.1.6 Forestry Law, Protected Areas and Wildlife

This law states in Article 1 that "... the legal regime to which shall be subject the administration and management of Forest Resources, Protected Areas and Wildlife, including protection, restoration, utilization, conservation and development, fostering sustainable development, according to the social, economic, environmental and cultural interest of the country".

And resolves objectives, outlined in Article 3:

- b) Ensure the protection of Forest Areas, Protected Areas and Wildlife and improving them and rationalize the exploitation, industrialization and commercialization of forest products.
- e) Declare and manage protected areas and wildlife;

- f) Preventing the illegal occupation or fragmentation of public forest areas.
- p) Promoting co-management as a basic mechanism to incorporate the participation of civil society in the management of protected areas and improve the quality of life of communities; and,
- q) Promote reforestation.

As to the Fauna and wild Flora the following items of interest are mentioned:

Article 115: Protection Management and Administration of the wild Flora and Fauna. Corresponds to the National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF), the protection, management and administration of wildlife from around the Country.

Article 117: Hunting Or Capture of wild Fauna. Hunting or capture of threatened or endangered species is prohibited.

The National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF), previous to a study involving the Municipal Corporations and communities make the declaration of a species as threatened or endangered, also taking into account the Conventions and International Treaties.

Hunting or catching species of wild fauna for commercial and sports means, not included in the above category shall be subject to the provisions of the corresponding Municipal Corporations and the hunting license issued by the National Institute of Forest Conservation and Development Areas, Protected Areas and Wildlife (ICF). The National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF), also declare closed seasons, times of hunting or capture allowed, and other technical regulations that correspond. On use of marine, river and lake species is regulated by the Fisheries Act.

Article 118: Endangered Flora. Managing exploitation of endangered flora shall be in accordance with the policies and strategies issued by the National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF), which will be in accordance with International Conventions and Treaties signed and ratified by Honduras.

The National Institute of Forest Conservation and Development, Protected Areas and Wildlife (WILDLIFE) (ICF), make the declaration of endangered species of flora; to declare that end seasons and other technical regulations that apply.

In **conservation and protection of land and water**, in Chapter IV of this Act, the following items are highlighted:

Article 120: Handling Watershed. The National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF) is responsible to lead the processes to develop and implement management plans and integrated management of river basins, watersheds and micro sub-basins, with emphasis on conservation of resources, soils, forests and water.

Article 123: Protection of water Sources and flows. The villages Adjacent to watercourses areas shall be subject to a special regime of protection; however, in all circumstances the following regulations must be observed:

- a) The high hydrological recharge or watershed areas are exclusive protection areas, all activity is prohibited in these areas when these basins are legally declared as water supplying areas. These areas will be determined by the area of the basin covered by fifty meters (50mts) below the river birth until water part coming within the upper part of the basin.
- b) When there is a water birth in hydrological recharge areas upstream or within an area that has no legal declaration of water suppliers zone, an area will be protected within two hundred fifty meters (250 meters) from the center of the water birth or watershed;
- c) Shelterbelts of hundred fifty (150 meters) will be established in rivers and streams, measured in horizontal projection from the shore line, if the slope of the basin is equal to or greater than thirty percent (30%); and fifty meters (50 meters) if the slope is less than thirty percent (30%); within forest areas of the urban perimeters, regulations of the Municipalities Act will apply; and,

d) The marine and lacustrine coastal forest areas shall be protected by a strip no less than one hundred meters (100 m) wide from the highest tide line or the highest level or to reach the Lagoon or Lake.

In these buffer zones it is prohibited to cut, damage, burn or destroy trees, shrubs and forests in general. Similarly, the construction of any type of infrastructure prohibits the execution of agricultural and livestock activities and all others that endanger the purpose intended. Except hydric infrastructure management and water management and road infrastructure, notwithstanding the environmental impact study. Agricultural activities existing at the effective date of this Act shall be respected, but simultaneously will encourage and support agroforestry projects aimed at the protection and proper management of natural resources and the environment.

This law has its corresponding regulations, this being the General Regulation of the Forestry Law, Protected Areas and Wildlife. Executive Decision No. 031-2010.

*Measures for **Protection and Development***

Article 134 - Technical Assistance. The National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF) will provide free technical assistance and training to owners of land and Forestry, as well as organized communities, agroforestry organizations, farmers and forestry companies natural or legal persons who carry out actions of afforestation or reforestation and protection of degraded forest land, according to previously approved plans and agreements are signed to that effect.

Management Plans. First Section

Article 172: The Forest Management Plans and Forest Operational Plans shall be elaborated by appropriately collegiate Forestry Professionals, in accordance with Article 70 of the Law

The management plan should include, at least, the following Programs:

- 1) Management, defined as the projection of interventions by compartment or stand along the rotation period.
- 2) Forestry, indicating the treatments to apply to the crop or forest management, including regeneration, debushing, thinnings, pruning and others that are technically necessary.
- 3) Protection, including measures for the prevention and control of fires, pests and diseases, illegal logging or protection areas, debris and changes in land use, grazing or habitat reduction of wildlife.
- 4) Exploitation, determining the volumes of forest products and services, according to the criteria established in the Act, this Regulation and the relevant technical standards.
- 5) Infrastructure, including road planning, roads and medios de saca and other that correspond .
- 6) Prevention and mitigation, taking into account the negative environmental impacts that may occur as a result of forestry activities.

2.2.1.7 General Water Law

General Water Law. Decree No. 181-2009, "This law aims to establish the principles and regulations applicable to the proper management of water resources for the protection, conservation, enhancement and utilization of water resources to promote the integrated management of the resource at the national level" .

Article 36: Conservation: The conservation actions of waters are intended to conserve or increase the volumes of water intervening ecosystems that generate it or influencing the activities that diminish or affect its biodiversity through the instruments established by this Act .

Article 43: Protection of Water Resources: The protective actions are aimed to preserve or increase levels of water quality and quantity, before the destructive effects of natural phenomena and human actions of resource degradation and pollution.

Article 44: Discharge of sewage: The Water Authority or Municipality may authorize, in accordance with the active environmental and technical regulations and only in the allowed spaces, the direct or indirect discharge of wastewater into a body of water, provided that these discharges do not contain pesticides, fertilizers and any other product or substance toxic or pollutant.

Except for what is established in the previous paragraph, the treatment of wastewater discharges resulting from domestic, agricultural, livestock and industrial activities is mandatory. Reuse or recycling of discharged water will be authorized under the same conditions.

Article 45: The protection in the Construction of Works: During execution of Works duly authorized, shall include measures to prevent the discharge of sediment to the stream and bodies of water in rivers, reservoirs, lakes, lagoons and coastal areas; such Works shall be on account of the promoter and/or executor of the work, who also shall indemnify for damages that might be caused.

Rule 46: Removal of Aggregates of Rivers, Lakes and other water spaces: No extractions are allowed within five hundred (500) meters upstream and five hundred (500) meters under bridges, levees, dams or any other urban hydric infrastructure .

Article 59.-Use Rights: The use of water for private benefit or by any public entity may only be made pursuant to a right of use Granted under concession under this Act, provided it is of beneficial used and does not harm third party rights.

Article 61.-Principles for Utilization: The use of hydric resources shall be governed by the principles of:

- Optimal human, social and economic benefit;
- Durability and resource protection; and,
- Generation of minimal environmental impacts;

These criteria will be applied at the basin level, sub-basins and micro-basins and pointed out in the organization and planning instruments under this Act

Article 62.-Types of Concessions of use: The Concessioning of rights of water use will be in accordance with the following classifications:

Depending on the type of use:

- Consumptive, not obliged to return the water after being used; and,
- No consumptive, forcing to return the water after use or used without removing it from its source in the conditions that determines its title.

According to the continued use:

- Permanent, allows to obtain water whenever resources are available at the source; and,
- Eventually, allows to obtain water only after having satisfied the Concessions of the permanent exercise, excess resources exist in the source.
-

Article 63.-**Use of underground waters**: The use of underground waters is subject to studies and research, regulating plans and hydric zoning maps in order to maintain proper hydric balance and quality in these aquifers. Its commercial and industrial use shall be described in the Regulation of this Law.

Relevant studies for exploitation or drilling of wells will be conducted to determine its potential and use, it shall have a permit issued by the Water Authority, prior authorization from the corresponding Municipality.

Article 66 Instruments to document usage rights: All right is Granted under concession through permits, licenses and Concessioning at the request of an interested party or by tender, in accordance with the provisions of this Act and the rules of ordering and hydric planning. No right can be given that prejudices uses legitimately Granted under concession, affecting the balance between recharge and extractions of surface and underwater waters, aquifers or restricts the use of water for drinking.

2.2.1.8 General Mining Law. Decree 283-2012

The objective of the law is to regulate mining and metallurgical activities in the country; therefore it is of public order, general interest and of mandatory application. Article 1.

In case of mining activities they will be safeguarded under the Concession Figure of the Mining Permit or in case of small-scale and artisanal mining, commercialization is made through a registration system. Article 6.

The Classification of Mining Rights defined in the Articles 8 to 11; the exploitation activities are regulated in Articles 18 to 23 and the close activities from Articles 28 to 31. Similarly, article 32 states that the competent authority must verify restoration activities.

The commercialization is regulated by Articles 37 and 38 and the obligations of the Concessionaire are regulated in Article 54. Transfer of mining rights by articles 60 and 61 is regulated.

The requirements for the Concessioning of Concessions are defined in Article 69 and 70. Cutting activities, filling and leveling are standard in Article 95, which stipulates that the permits will be Granted under concession by the relevant municipalities also that surplus should not be commercialized and intended only for public purposes.

Article 96 establishes the creation of the Honduran Institute of Geology and Mines (INHGEOMIN).

2.2.1.9 Traffic law 205-2005

Article 1. This Law aims to preservation of public order, protection of life, physical integrity of persons, protection of goods and the promotion of social welfare by the legal regulation of the use and circulation of land motor vehicles and the mandatory police registration thereof.

All persons who drive any type of vehicle and its passengers are subject to its provisions when driving on roads, streets and other public or private in all of the national territory included in all the national territory, and pedestrians; and, where appropriate, the owners of such vehicles, livestock owners or others that also make use of such roads public or private.

These regulations include in regards to what is applicable, car parking lots, public or private, buildings built for car parking lots, campuses and terminals for transporting of people and cargo, gas stations, sports tracks, road courses and other similar analog sites where services are provided or vehicles can circulate.

This Act and Regulations are public and of social interest.

Article 2.- The material scope of validity of this Act, includes:

- 1) The ordering and referent road signs:
 - a) Design the ordering; and,
 - b) The installation of road signals on the road system
- 2) The control of vehicular traffic that includes:
 - a) Control of road traffic;
 - b) Patrol and control operations;
 - c) Electronic surveillance and detection of committed offenses;
 - d) Investigation of accidents;
 - e) Actions relating to the vehicular property crimes; and;
 - f) Emergency plans.

Article 25. The Traffic Engineering Section will have these functions:

- 1) Conduct feasibility studies in both urban and rural areas, aimed at developing design of Works and traffic regulations for the safety and flow of vehicular and pedestrian traffic, coordinating these features with the competent authorities;
- 2) Collaborate with the municipalities and the State Secretariats in the Offices of: Public Works, Transport and Housing (SOPTRAVI); and Natural Resources and Environment, to establish the criteria and / or recommendations for the placement of

signs, traffic regulating devices on the location of the passenger and cargo transport terminals , as well as in the development of plans for the management of circulation, in order to achieve maximum performance of the existing road network;

- 3) Assist the municipalities in developing studies in speeds, parking, user behavior, census and installation of traffic lights;
- 4) Conduct studies and submit recommendations to the competent authorities in relation to sanitation of the rights of way;
- 5) Conduct studies and scientific research, developed from models aimed at finding workable solutions to the problems of road ways; and,
- 6) Establishing the technical capacity criteria, specific uses, for private vehicles, public transport of passengers and cargo and industrial uses.

Article 82. Road signs should be well placed and maintained in order to facilitate traffic of vehicles and pedestrians, this includes:

- 1) Warning signs or danger;
- 2) Regulatory Signs;
- 3) Informative signs;
- 4) Route or destination signs;
- 5) Markings on the roadway; and,
- 6) Traffic signals and other intersection signs.

The installation of road signals indicated in paragraphs 1), 2), 5) and 6) is strictly enforced and will be designed as provided in the Act and its Regulations.

Article 83. The installation and maintenance of road signs in urban areas is under the responsibility to the municipal authorities in the area of its jurisdiction, the Secretariat of State in the offices of Public Works, Transport and Housing (SOPTRAVI) , in the highways and rural area.

2.2.2 3.2.2 Legislation relevant to the project (environmental and sectoral regulation for environmental relevance)

There is some legislation pertaining to different sectors of the public administration, whose policy is relevant to the components of the environment, this sectoral legislation, of environmental relevance encompasses a broad spectrum. Sets of rules presented below are attached to the vital regulations of compliance for the Project development.

2.2.2.1 Health Code

The following general provisions are set out in the Code of Health:

Article 1: Health is considered as an integral, biological, psychological, social and ecological state of wellbeing, well-being it is an inalienable human right and it corresponds to the State as well as to all natural or legal persons, promoting their protection, recovery and rehabilitation.

Article 3: The definition of national health policy, standardization, planning and coordination of all activities public and private in the health field are a responsibility of the Secretariat for State for Public Health, which for the purposes of this Act shall be called "The Secretariat". In the departmental and municipal levels it will act through regional headquarters and sanitary areas, correspondingly, under a rational principle of coordination and administrative decentralization.

With respect to Paper I, unique title of the Rights and Duties related to Family and community health and to the environment, the following articles are highlighted:

Article 9: Everyone has the right to live in a healthy environment, in accordance with this Code and the other regulations, and the general duty to protect and improve the surrounding environment.

The secretariat is responsible for ensuring the environmental conditions in order to comply with the provisions of this Article.

Meanwhile, in Book II, of the Promotion and Protection of Health, Title - Sanitation of Environment, states that: "For purposes of the application of this Code and other health regulations, the term environment, is set of natural resources, which preservation and renewal by the State and of all the inhabitants, are necessary to ensure the health and general welfare. "(art. 25).

Article 26: Water usages are classified as follows:

- a) For human consumption;
- b) For home use;
- c) For the preservation of flora and fauna;
- d) For agricultural and livestock use; and,
- e) For industrial use

2.2.2.1.1 Potable and waste water

Article 34: It is prohibited to use water as a site for disposal of solid waste, having to strictly adjust the regulations set to be established.

Article. 35 All discharges of liquid waste into waters shall be subject to the requirements and conditions established by the regulations taking into account the characteristics of the sewage system and the corresponding receiving source.

Article 41: The excreta, sewage, and storm water shall be disposed properly and sanitarily, in order to prevent contamination of soil, air and water sources for human consumption as well as the formation of breeding disease vectors.

Article 43: Any building, concentration of buildings or any other work of urban development, located outside the range of the public sewage system, prior to construction, should develop a proper system of waste disposal, to abide standards established in the regulations of this Act, and shall be approved by the municipal authority where the system is located.

2.2.2.1.2 From air and its contamination

Article 46: The term air pollution is defined as deterioration of its purity, by the presence in excess of the permitted concentrations of agents such as solid particles, dust, smoke, radioactive material, spread sound waves and others that the Secretariat defines as pollutants, as well as the presence or emanation of odors which jeopardize the welfare of people.

Article 47: The secretariat defines the conditions in accordance with regulations on air quality.

Article 48: When the emissions from a fixed or mobile source of pollutants, pass or may exceed the limits set in standards we shall proceed to apply treatment systems set for that purpose by the Secretariat.

Article 48: When the emissions from a fixed or mobile source of pollutants, pass or may exceed the limits set in standards we shall proceed to apply treatment systems set for that purpose by the Secretariat.

Article. 50 The use of fuels that contain substances or additives in a grade of concentration which resulting atmospheric emissions overpass the fixed security limits, will not be allowed.

2.2.2.1.3 Of Solid wastes

Article 52: Garbage of any kind should be eliminated sanitarily - is up to the municipalities to organize, recruit and take responsibility for the cleaning services, collection, treatment and disposal of waste in compliance with the regulatory standards.

Article 53: The properties previously authorized by the municipalities with the assent of the secretariat may be used as high garbage disposal.

Article 57: If due to the location or volume of waste produced, the responsible entity for cleaning cannot make the pickup, it will be up to the individual or producer establishment, to transport and final disposal in the authorized sites by the Municipalities in accordance with the provisions of Article 53 of this Code.

2.2.2.1.4 Of occupational health

Article 101: The health of workers is an indispensable condition for the socio-economic development of the country. Its preservation, conservation and restoration are declared as social and health interest activities, in which the government, the private sector, workers and the community in general should be involved.

Article 114: In all workplaces the necessary steps are taken to avoid the presence of chemical, physical and biological agents in the air, in such concentrations and levels that they pose risks to the health and welfare of workers or the general population .

Article 115: The Secretariat will require companies to disclose among staff potentially exposed to risk, the measures to prevent accidents, as well as the adoption of the necessary measures in case of emergency

2.2.2.1.5 Of industrial safety

Article 120: In every workplace there should be an available trained staff member, equipment and devices for firefighting, that can be used immediately and with maximum efficiency. Such equipment and devices shall be subject to inspection by the specialized governmental entity .

Article 121: The manufacture, storage, handling, transport and trade of flammable or explosive substances will be regulated.

Article 122: All equipment, tools, facilities and electricity netWorks must be designed, constructed, installed, maintained, operated and marked in such a way to prevent risk of fire and avoid contact with the elements under tension.

2.2.2.2 Regulation of Environmental Health

This regulation includes regulations for:

- The final disposal of black, sewage and excreta storm water (Article 28 to Article 50)
- Of air its contamination and control (Article 51 to Article 60)
- Of Solid Waste (Garbage) (Art. 61 to 84)
- Disaster and emergency (Article 135 to Article 146)

2.2.2.3 Territorial Ordinance Plan Act

"This Act establishes the Territorial Ordinance Plan it constitutes a state policy that incorporated into national planning, promotes comprehensive, strategic and efficient management of all national resources, human, natural and technical, by implementation of policies, strategies and plans that ensure effective human development in dynamic, homogeneous, equal in opportunities and sustainable, in a process that reaffirms the human person as the supreme end of society and at the same time its most precious resource. "(Art. 1)

Article 8: The organization for the LAND MANAGEMENT (PLAN LAND ORDINANCE) constitute the set of government institutions and instances of citizen participation that by designation, delegation or integration will assume under the provisions of this Act, the functions of rectory, coordination, operation and monitoring of the process of land management generally promoting standards, arranging policies, designing strategies and implementing tools that makes it viable and permanent.

Article 46: Technical instruments of the territorial planning, which were subordinate instruments that contain guidelines of the land management indicated in article 40 of this Act, and are the following:

- National land ordinance plan: technical and political instrument that contains general rules governing land use, management of natural resources and the integral occupation of the territory. For its long-term nature orients activities of the economic, environmental and social sectors at national, regional, municipal areas and areas under special regime, serving as a frame of reference for the various sectoral plans and strategies, and is constituted by the plans of use and occupation of the territory in the corresponding levels;;
- Regional plan of land management: it is a technical instrument that guides the activities of the economic, environmental and social sectors at the regional level and provides a reference to the various sectoral plans and strategies, and is constituted by use plans and land occupation to a regional level. The system of regions will be established by the Central Government;
- Municipal plan of land management: it is a technical instrument that guides activities of economic, environmental and social sectors at a municipal level and provides a reference to the various sectoral plans and strategies and consists of plans of use and territorial occupancy at a municipal level;
- Land ordinance plan of areas under special arrangements: Technical Instrument of territorial regulation of these spaces; and,
- Other ordinance plans: Required for managing the land management in circumstances justifying the judgment of the Executive Committee of land management, particularized ordinances.

2.2.3 Standards on environmental issues

2.2.3.1 Air quality

In this section we expose the technical regulations relative to air quality, with the following existing regulations:

- Regulations for Control of Emissions of Toxic Gases, Fumes and dust from motor vehicles and
- Regulations for the control of emissions from stationary sources.

2.2.3.2 Water quality

For the water topic the reference to the following standards is:

- • Technical standards for wastewater discharges to the sanitary sewage system. Agreement No. 058, which aims to:
 - a) To regulate wastewater discharges to receiving bodies and sanitary sewage system,
 - b) Encourage the development of waste minimization programs, installing treatment systems and wastewater disposal, to reduce the production and concentration of pollutants discharged into the environment.

2.2.3.3 Regulations for Solid Waste Management. Agreement 378-2001

Whose objective is to (Art. 1) regulate the integral management of solid waste, including the operations of prevention, reduction, storage and conditioning, transport, treatment and final disposition of such residues, encouraging its use in order to avoid health and environmental risks.

Article 3 stipulates that the present law will be of national implementation and of obligatory compliance for the Municipalities and to every natural and legal person, public or private, that as a consequence of its activities, generates or manages solid waste, be it as a producer, importer, distributor or user of a good.

The classification and composition of the waste is define on the articles 16 through 19, and its hazard characteristics are defined on article 20; on the Articles 21 and 22 the phases for management of special solid waste are defined. Regarding storage and treatment of special waste 28-32 and 33. Final dispositions are indicated in articles 34-43.

Non-special solid waste are regulated on articles 44 through 65, while articles 72 and 73 regulate the management of inert solid waste.

2.2.3.4 GENERAL REGULATIONS OF PREVENTIVE MEASURES OF OCCUPATIONAL INJURIES AND DISEASES - REFORMED

This Regulation applies to the entire territory of the Republic, aims to establish, develop and provide legal, technical and administrative mechanisms for the prevention of occupational accidents and diseases in the workplace.

The provisions of this Regulation shall apply in everywhere and in any kind of work, whatever its legal form of its organization and benefit; They shall also govern the actions to promote and protect the health of workers.

All public and private employers, contractors, subcontractors and workers and their organizations, and public and private entities are subject to the provisions laid down in this Regulation.

Article 4

Additionally, this regulation defines the guidelines for Safety and Health Programs at Work, in articles 44 to 49. Personal Protective Equipment articles 107, 108 and 392.; Noise and Vibration Articles, articles 351-366 377-381 Chemical products.; First Aid 424-428.

2.2.4 MUNICIPAL TAXATION FRAMEWORK

BELOW ARE PRESENTED THE TAXATION FRAMEWORK OF THE MAIN MUNICIPALITIES IN THIS TRANCHE:

2.2.4.1 MUNICIPALITY OF SANTA CRUZ DE YOJOA

The Tax Plan of the Municipality of Santa Cruz de Yojoa is presented below:

Table 3.2 Tax Plan of the Municipality of Santa Cruz de Yojoa

Environmental Aspect	Articles	Observations
Resources Extraction or Exploitation	68-80,164	<ul style="list-style-type: none"> - Temporary or permanent extraction or exploitation of natural resources within the municipality - Environmental license request procedures for people engaged in the exploitation of non-renewable resources from rivers - Control of mine exploitation within the municipality - Tax declaration on extracted resources - Penalties and fines payment
Solid Waste	92-93,182	<ul style="list-style-type: none"> - Service of cleaning, collecting and final disposal of solid waste - Best practices manual for solid waste haulers - Prohibitions, penalties and fines

Environmental Aspect	Articles	Observations
Environmental Conservation	97-99,181	<ul style="list-style-type: none"> - Tree logging fees - Timber and fuel wood transfer certificate fee - Payment of fines and penalties for the following activities: <ul style="list-style-type: none"> a) Illegal tree logging b) Illegal Fuel wood transportation c) Environmental pollution d) Pollution of water sources or tributaries
Sewage	105-106	Connection permits, service payments
Certifications, Records	130	Certifications for environmental inspections

Source: Own compilation

MUNICIPALITY OF SANTA RITA

The Tax Plan of the Municipality of Santa Rita is presented below:

Table 3.3 Tax Plan of the Municipality of Santa Rita

Environmental Aspect	Article	Observations
Environmental Services	3,105-109,138-145	<ul style="list-style-type: none"> - Tax payment over natural resources extraction or exploitation - Connection to the sewerage system - Greenhouse effect gases mitigation - Prohibition to cut down trees near rivers - Environmental Licensing Process, environmental certificates
Natural Resources Extraction or Exploitation	48-69	<ul style="list-style-type: none"> - Payment for the extraction of renewable and non-renewable resources in the municipality - Environmental certificate request procedures regarding the exploitation of natural resources - Request permits from municipal and government authorities - Request permission for the exploitation of non-renewable natural resources - Permission for cutting and pruning trees - Illegal tree logging and burning prohibition - Permissions for tree logging - Non-compliance penalties and fines
Water Bodies Pollution	70-83	<ul style="list-style-type: none"> - Prohibition and care of water sources - Prohibition to discharge raw sewage within the municipality limits - The discharge of treated wastewater can only be done with approval from the Municipal Environmental Unit

Environmental Aspect	Article	Observations
Sewage	97,114-116	<ul style="list-style-type: none"> - Service of connection, operation, and maintenance of the sanitary sewer system - Approval of latrines installation and certificates issued by the Municipal Environmental Unit - Penalties or fines
Solid Waste	98,117-124	<ul style="list-style-type: none"> - Prohibition to deposit solid waste outside the landfill - Prohibition to accumulate tires - Prohibition to burn trash - Penalties and fines
Sonic, visual and radioactive pollution control	125-127	<ul style="list-style-type: none"> - Prohibition to exceed the decibel limits

Source: Own compilation.

2.2.4.2 MUNICIPALITY OF EL PROGRESO

The following is the Taxation Framework of the Municipality of El Progreso:

Table 2.2. TAXATION FRAMEWORK OF THE MUNICIPALITY OF EL PROGRESO

Environmental Aspects	Articles	Observations
Extraction of Non-Renewable Resources	40-48	<ul style="list-style-type: none"> - Fee for extraction of renewable and nonrenewable natural resources. Hunting of aquatic species up to 200 meters deep. - Request for records at the Municipal Environmental Unit. - Presentation of plan for closing usage areas. - Permit for domestic usage of non-metallic mining. - Requirement for Environmental License.
Solid Wastes	54, 109-117	<ul style="list-style-type: none"> - Cleaning, collection and disposal of solid waste. - Service charge rates. - Contamination of water bodies by sedimentation or siltation as a result of earthWorks or improper stacking of material and without erosion control Works is prohibited. - Disposal of solid waste shall be regulated anywhere outside the municipal crematorium or Municipal landfill, La Municipality, businesses and people in charge of transporting the waste to the municipal proper place. - It is strictly forbidden to place inside or outside the crematorium or Municipal landfill all bacteriological sludge from treatment plants of industrial wastewater without having been treated previously as is so for any other pharmaceutical, chemical or hospital product or of other that is about to reach maturity

Environmental Aspects	Articles	Observations
		- The accumulation of tires or any container with features that can generate vector proliferation is prohibited
Wastewater	55, 118-119	<ul style="list-style-type: none"> - Operation and maintenance of the sanitary sewage system. - The discharge of chemical substances, fuel, oils, greases and hydrocarbons in general into the sanitary sewage systems is prohibited and will be subject to a fee of Lps. 5,000.00 and Lps. 10,000.00 in case of recidivism. - It is prohibited to discharge to the sanitary sewage system any storm and industrial water that by their characteristics could alter the physical, chemical or bacteriological conditions of the receiver waters of the effluents of the sewage systems, therefore provoking damages to the tube lines. Those that are considered illicit tube lines
Extraction of Water for Industrial and Commercial Use		<ul style="list-style-type: none"> -Rate charge for use of the resource. - Permit or License of Resource Utilization To the Municipality. - Penalties.
Environmental Services	75-77	<ul style="list-style-type: none"> - Implementation of regulatory framework to guide and allow direct control and sustainable use of natural resources. - The municipality is responsible to preserve and protect the ecological balance and environmental protection.
Forests and green areas.	78-90	<ul style="list-style-type: none"> - Prohibition of cutting trees. - The rate of pay for cutting trees. - Forest fires are prohibited. - Prohibition of logging. - Permission request to cut trees. - Penalties.
Water for human consumption and pollution of water bodies.	91-97	<ul style="list-style-type: none"> - Prohibition on the following activities: <ul style="list-style-type: none"> a) Installation of human settlements. b) Discharge of raw sewage on bodies of water. - The discharge of treated wastewater will only be permitted by the Municipal Environmental Unit. - Any operator of the water supply for human consumption should be sticking to the technical standard for consumption of drinking water. - Application for permit for drilling.
Environmental Sanitation	98-102	<ul style="list-style-type: none"> -All excreta, sewage, wastewater and storm water must be connected properly. - All buildings must be connected to the system
Regulation of Latrines	106-108	- Installation of latrines in places where coverage of sewage systems exists is prohibited or within 250 meters with respect to a

Environmental Aspects	Articles	Observations
		water birth and 150 meters on both sides of a permanent water course or lagoons. - Penalties.
Control of visual, sonic and radioactive contamination.	120-127	- It is strictly forbidden to exceed the noise levels or maximum sound allowed, which will be established according to zones and schedules.

SOURCE: OWN COMPILATION

2.2.4.3 Municipality of Tela

The taxation framework of the Municipality of Tela is presented as follows:

Table 2.3. Taxation framework of the municipality of Tela

Environmental Aspect	Articles	Observations
Resource extraction or use.	30, 31,84,85,86	Extract or use of stone quarry or pits, minerals, hydrocarbons, forests and fisheries and their derivatives.
Potable Water.	39 clause 4, 21	Use of underground waters. Collection for performing physical and chemical analysis to industries and water boards.
Sanitary sewage system service	40-43	Charges and facilities.
Solid wastes	44-54	Service charge for solid waste collection and use of the sanitary filling
Environmental permits	78-80	Permissions, registrations, authorizations, judgments and environmental records. Here are some collections that are made: - Inspection and preparation of records. -Permission to use coconut. - Registry of chainsaws. - Permission for cutting, grading and filling of urban and rural land areas. - Environmental Inspection of projects that have an environmental license in any category.
Cutting, Pruning and stripping trees and/or vegetation change.	81	Description of the amount payable according to the diameter of the tree. Mitigation activities for the cut and pruning of trees.
Authorization for Auditive Publicity.	82	Authorization of auditive publicity and its corresponding collection.
Fines and Penalties of the Municipal Environmental Unit.	153-177	-Contamination of drinking water for human consumption. -Contamination of inland and marine waters. - Damage to the forest to nearby water sources. - Cuts of trees, damage to green areas and forests. - Use of land resources. - Air pollution. - Visual pollution. - Sonic pollution. - Penalties and fines.
Discharges to the public sanitary	178-183	- Prohibitions on discharges to the sanitation sewage system.

Environmental Aspect	Articles	Observations
sewage system.		<ul style="list-style-type: none"> - Prohibitions on construction of latrines or septic tanks where the sanitary sewage system exists. - Fines and penalties. - Prohibited on connections of discharge of wastewater and any liquids and/or solid wastes to the storm water network system.
Solid waste pollution.	184-188	Prohibition and penalties of dumpster in unauthorized sites.
Other Environmental Violations.	189	Imposition of penalty for the following activities: <ul style="list-style-type: none"> - Performing unauthorized fillings in environmental susceptible areas, wetlands, natural water courses, winter streams etc.). - Implementation of activities in protected areas. - Prohibition of beach activities. - Prohibition of construction. - Penalties and fines.
Control and Monitoring of Mitigation Measures Contracts.	190-192	<ul style="list-style-type: none"> - The Governments' private and mixed projects established within the municipality who has their Mitigation Measures Contract, shall comply with all the recommendations described by the Natural Resources & Environment Secretariat (hereinafter called SERNA). - Penalties and fines.

Source: Municipality of Tela. Own compilation.

2.2.1 3.2.1 ENVIRONMENTAL GUIDE FOR SOPTRAVI ROAD PROJECTS

THE CONCESSIONAIRE SHOULD ALSO COMPLY WITH THE PROVISIONS OF THE ENVIRONMENTAL GUIDE FOR ROAD PROJECTS OF SOPTRAVI:

Table 2.4. ENVIRONMENTAL GUIDE FOR SOPTRAVI ROAD PROJECTS

Environmental Aspect applied to the design, construction and rehabilitation of road projects	Numeral	Observations
Provisions during the design phase	11.1	<ul style="list-style-type: none"> - Selection of the best route of the new road or highway. - Environmental criteria for the selection of the route that should be considered. - Road Marking - Stop booths - Crosswalks
Provisions during the construction phase	11.2	<ul style="list-style-type: none"> - Prevent erosion during the progress of the work - Set the exploitation of sites of detected borrows. - Train staff
Description of typical activities in construction projects, rehabilitation and maintenance of roads and highways	11.3	Generals
	11.3.1	Removal of plant material and stripping
	11.3.2	Scarification and conformation of the
	11.3.3	Extraction of stone material

Environmental Aspect applied to the design, construction and rehabilitation of road projects	Numeral	Observations
	11.3.4	Blasting
	11.3.5	Removal and disposal of waste material
	11.3.6	Filling with coarse rock material
	11.3.7	paving
	11.3.8	Conformation of ditches
	11.3.9	Cleaning of box and tubular culverts
	11.3.10	Cleaning and conformation of the riverbed
	11.3.11	Drainage Works
	11.3.12	Rehabilitation of bridges
	11.3.13	Installation of road signals
	11.3.14	Transportation of hazardous materials
	11.3.15	Installation of camps
	11.3.19	geotextiles
Control procedures, monitoring and environmental audits of Works	12	- Environmental Compliance and Supervision
Environmental considerations and criteria for typical activities in construction projects, rehabilitation and maintenance	Annex 6 File 1	Criteria and environmental considerations on the construction of ditches.
	Annex 6 File 2	Criteria and environmental considerations about building counter ditches
	Annex 6 File 3	Criteria and environmental considerations on building slopes and landslide rehabilitation.
	Annex 6 File 4	Criteria and environmental considerations on the construction of sewers.
	Annex 6 File 5	Criteria and environmental considerations about stripping and pruning
	Annex 6 File 6	Criteria and environmental considerations on bridge rehabilitation
	Annex 6 File 7	Criteria and environmental considerations on scarification and conformation of the
	Annex 6 File 8	Criteria and environmental considerations on extraction of disposable material
	Annex 6 File 10	Criteria and environmental considerations on pavement (asphalt treatment)
	Annex 6 File 11	Criteria and environmental considerations on transport of hazardous materials
	Annex 6 File 13	Criteria and environmental considerations on Paving (lining)
	Annex 6 File 14	Criteria and environmental considerations on cleaning and shaping of the riverbed
	Annex 6 File 15	Criteria and environmental considerations on installation of stone quarries or pits, asphalt plants, landfills and other temporary sites
	Annex 6 File 16	Criteria and environmental considerations on drainage structure cleaning

Environmental Aspect applied to the design, construction and rehabilitation of road projects	Numeral	Observations
	Annex 6 File 17	Criteria and environmental considerations on installation of road signals
	Annex 6 File 18	Criteria and environmental considerations on extraction of stone material.

SOURCE: OWN COMPILATION.

3 PROJECT DESCRIPTION

3.1 Project Area

Total area of the project (Apt) in m²

The total project area is 1,465,000 m². Within this area, 40 meters of the existing road easements are included, two areas for location of camps 5,000 m² (0.5 ha) throughout the length of the alignment La Barca – El Progreso, 36.5 km.

Net area of the project (Apn) in m²

The net area of the project (Apn) is 1,465,000 m². Within this area 40 meters of existing road easements are included, and one area for location temporary facilities throughout the length of the tranche La Barca – El Progreso 36.5 km.

Total area to build in m²

The construction area will be 839,500 m². This area is defined taking as reference a typical average section of 23 meters by the longitude of the tranche with 36.5 km in length. The 23 meters of the typical section include, for each side, the following: bottom of the slope (2 m), shoulder (1.5 m), (7.30 m) and dividing wall (0.70 m).

Area of influence of the project

In the Environmental Evaluation and Control Guidebook – by SERNA 2009, the area of influence of the project is considered as: The project environment that is located outside the overall area of the project and extends from its boundaries to a distance of 500 meters.

Based on this definition and for this specific project, the area of influence will correspond to the existing road area of the road easements of the tranche (40 meters) plus 500 meters on either side of the easement, in a length of 68.5 km (which includes the area of the bypass).

3.1.1 Geographical Location and Limits

1.1.1 Geographic Location and Boundaries

The tranche La Barca – El Progreso, runs thru the central sector of the Sula valley. It starts on the intersection of the road CA-5 (that communicates the cities of Tegucigalpa and San Pedro Sula), by the La Barca town in the municipality of Santa Cruz de Yojoa, in the department of Cortés, then continues its alignment through the municipality of Santa Rita, ending at the Rio Pelo bridge, in the municipality of El Progreso, department of Yoro, becoming an alternate route to the city of San Pedro Sula and being a connector to the Atlantic zone of Honduras, in order to promote the development of tourism in the area, as well as to intercommunicate large livestock and agricultural regions.

Figure 3.1. Geographic Location of the Project



Source: <http://www.sinit.hn/index.php>

3.1.2 Administrative location

The tranche La Barca – El Progreso is located in the departments of Cortés and Yoro, passing through the Municipalities of Santa Cruz de Yojo, in the Department of Cortés, and the Municipalities of Santa Rita and El Progreso in the Department of Yoro.

3.2 Components of the project and its phases

PLANNING PHASE

At this phase the following activities will be undertaken:

- Award from the State of the affected land. At this phase the physical environment of the new road is determined (including easements) and technical records are made to start the indemnification process that SOPTRAVI will carry out, to acquire private lands that may be necessary to develop the work.
- Dissemination of the project through the Citizen Participation Plan. The awarded project is presented in the media and outreach meetings begin with all stakeholders, both representatives of civil society, institutions and the community in general.
- Preparation of technical environmental Documents and Application for the Environmental License. Parallel with the aforementioned, and with the proposal in hand, the preparation of the Technical Environmental Documents begins, as per the instrument indicated for each category, for later submission to SERNA , to obtain the corresponding environmental license. (Regulation of the National System of Environmental Impact Assessment SINEIA - Agreement No. 189-2009).
- Relocation of Public Services utilities. The Concessionaire shall prepare the final design plans for the relocation of public utilities (electricity, water supply, sewage system, drainage and communications), obtain approval from all

Concessionaires to make the necessary Works to prevent any cut or interruption of service during the construction phase.

- Processing of the corresponding permits. The CONCESSIONAIRE must take the steps required by the UGA (Environmental Management Unit) - SOPTRAVI for all the activities to be performed, for example, tree pruning permit, use of water resources from SERNA, use of authorized sites by the municipal authorities (UMA's) for the disposal of solid waste and construction waste, among others.
- Preparation of work program. The Concessionaire shall prepare or update a detailed work program and present it to SOPTRAVI for its approval.
- Development of Traffic Detours Plan during the construction, including traffic studies and Works for the adequacy of minor roads, as required.
- Location of construction materials supply sources. Similarly, the Concessionaire should find the best construction materials supply sources and provide in its work schedule a continued provision to decrease the quantities and storage areas. For borrow pits that have a Concession, documentation containing a mining Concession must be provided, along with the corresponding license issued by the Natural Resources & Environment Secretariat (Hereinafter called SERNA) and make the implementation of the stipulated measures. Otherwise, the material pit that does not have a Concession for exploitation issued by the Transportation & Civil Works Secretariat (SOPTRAVI), shall request the corresponding permit before the Honduran Mining and Geology Institute (hereinafter called INHGEOMIN) for the Concession of the pits to be exploited.

At this phase, the Concessionaire Company should begin to train workers so that an appropriate training for health protection and the environment of persons is ensured and at the same time, the preparation of the terms of reference for the firms to be outsourced should initiate, in order to ensure compliance with environmental regulations in-force in that moment.

SELECTIVE REHABILITATION AND MAINTENANCE PHASE

As pointed out in the Concession Agreement, the term selective rehabilitation and maintenance are the activities of selective rehabilitation with tendency to renew the initial condition of the road, so that they meet the service levels specified in the Concession Agreement.

The first phase to be undertaken is the selective rehabilitation and maintenance of the tranche existing between El Progreso – Tela, which will last 10 months. The activities included in this phase are described as follows:

- **Location and Operation of Temporary Facilities:** This activity includes site selection for the installation, construction and/or purchase or rental of temporary facilities next to the worksite and the operation of these during the time provided under the work plan (they can be temporary or semi-permanent, during the construction phase). These facilities will at least be the following:
 - Field Offices for engineers and for the administrative sector.
 - Provisional repair Shops.
 - Rest areas, food and sanitary services for workers.
 - Storage area for materials and equipment

According to the needs of the project, the use of these temporary facilities will be associated to its size and location, and can range from the establishment of offices, shops and storage, and provisional equipment parking . Similarly, the following aspects have been included in the plan: the change in land use, land leveling, removal of vegetation, construction of offices, sanitary infrastructure (water and sanitary drainage) including septic tanks to handle gray waters, enabling and implementing machinery parking sites in which storages of fuel, lubricants and other supplies will be included, petty (formwork and masons), mechanical repair shops, construction or rehabilitation of access roads, parking area adequacy and whatever is necessary for security (perimeter fencing) and comfort of workers.

- **Preparation of the worksite:** Planned actions include: cleaning, cutting and removal of grasslands on both sides of the roadway and central strips along the alignment. Cutting of grass and shrubs will be performed on both sides of the road, up to a length of 1.0 meters from the outside of the gutter (concrete, stone or formed in the natural soil). Priority will be given to the curves, bridge access, intersections and areas of poor visibility. It also includes pruning of trees that are located in the central strip that have now reached high altitudes, thereby interfering with power lines and preventing visibility of users.
- **Paving of the roadway:** This activity involves the placement, distribution and compacting of the base (usually a crushed granular base), transport and placement of the pavement layer, of the material (asphalt) and thickness defined in the design, from the site of preparation (asphalt concrete plant) to the site of placement. For this case operating asphalt plants located in San Pedro Sula will be used, and the Concessionaire will have to request the owner thereof the corresponding environmental license issued by SERNA.
- **Maintenance of the drainage Works:** it consists of cleaning and removal of debris, dirt, residue, sand or any other material from the gutters, inlets and culverts, minor repairs to gutters, drains, sewers, discharge heads or any other work of drainage that may require it.
- **Use of water sources:** This activity consists on obtaining and transporting water resources from surface water bodies within the area of influence of the project to where it is required for those Works that require it, compaction, concrete casts, irrigation , etc.). This resource is usually obtained by pumping from the providing body (river with permanent or semi-permanent flow) to a temporary storage tank from where it will be transported to the worksite.

Tabla 3.1. Listado de cuerpos de aguas superficiales

Name	Location
Rio Zacatales	5+400
Rio Humuya	10+900
Rio Guacamaya	26+060
Rio Camalote	34+660

Source: The Concessionaire

The corresponding permits must be requested from the Directorate of Water Resources – SERNA, paying and requesting, accordingly, in the Municipality, for the management and use, if applicable.

- **Bridge maintenance:** This activity is more specific and is based on the structural inspection that makes up bridges (e.g. brackets, stirrups, beams, etc.) as well as the cleaning and repair of joints, guardrails, drainage, pavement layer, etc. The purpose of this activity is to keep the bridge under good condition, repairing damaged secondary members, keeping the channel free of obstructions for the free flow of water and keeping clean the superior and inferior areas of the bridge.
- **Building:** The buildings that are covered by this activity include the toll booth and the administrative offices for staff and the National Police. This activity is subdivided into the foundation, construction of concrete structures and steel (considering: columns, structural walls, beams, etc.), masonry (those jobs that can be done with concrete blocks or terracota blocks, as shown in the plans), placement of doors, windows, stairs, installation of ceilings or roofs, finishes, furnishings (only considering the design, specification, quantity, size and location in the final plan), interior and exterior lighting, bathroom and kitchen.

- **Management and use, and transportation of materials from borrow pits:** This activity involves cutting (exploitation) and transport of stone material to be used for the construction of fillings or embankments from its borrow source (pit, dry or alluvial) to the Worksite. This activity requires greater mobilization of trucks, equipment and construction machinery, and will initiate securing the area with protective barriers that will limit traffic through the internal roads of the Worksite. This action will ensure the safety of pedestrians and workers.

The Concessionaire has identified ten (7) potential borrow pits for obtaining supplies for the selective rehabilitation and maintenance undertakings and construction. If the borrow pits do not have identified a current Concession, then the Concessionaire will process the appropriate permissions before the HONDURAN GEOLOGY AND MINES INSTITUTE (HEREINAFTER CALLED INHGEOMIN) through the UGA (Environmental Management Unit) of the TRANSPORTATION, CIVIL WORKS AND HOUSING SECRETARIAT (SOPTRAVI). The description and details of these borrow sites are presented under Table 3.2:

Table 3.2. List of borrow pits identified for this tranche

No.	Banco	Uso	Ubicación	Volumen (m³)	Coordenada N	Coordenada W
1	Las Benjamins	Banco para sub-rasante	En el municipio de Santa Rita, departamento de Yoro, a una distancia de 2.00 km del desvío que conduce a Yoro.	200,000	15°12' 06.2"	87° 52' 06.9"
2	Sabanetas	Banco para sub-rasante	En el municipio de Santa Rita, departamento de Yoro, a una distancia de 2.60 km tomando el desvío de terracería hacia el este del puente Bailey.	100,000	15°11' 24.62"	87° 52' 1.58"
3	El Bálsamo	Banco para sub-rasante	En la comunidad de El Bálsamo, en el km 20 sobre la carretera pavimentada que conduce de Santa Rita hacia El Progreso.	100,000	15°15' 38.45"	87° 52' 06.16"
4	Urraco Sur	Banco para sub-rasante	En la comunidad de Urraco Sur, en el km 22 sobre la carretera pavimentada que conduce de Santa Rita hacia El Progreso.	20,000	15°16' 41.6"	87° 51' 40.8"
5	Caracol	Banco para sub-rasante	En la comunidad de Caracol, ubicada sobre la carretera CA-5, a 1.5 km del desvío al oeste del puente Caracol.	500,000	15° 08' 56.75"	87° 57' 47.37"
6	Rio Humuya	Banco para sùbase, base granular densa, concreto hidráulico, y concreto asfáltico.	500 metros aguas arriba del puente sobre el rio Humuya, Santa Rita departamento de Yoro.	500,000	15° 11' 39.16"	87° 52' 50.40"
7	La Barca	Banco para carpeta asfáltica, concreto hidráulico, base granular	Estación 2+000, lado izquierdo de la carretera La Barca – Santa Rita.	550,000	15° 07' 9.53"	87° 55' 13.37"

- **Road signals and illumination:** Consists on the repair or replacement of signage, both vertical and horizontal and light poles; and verify the operation and programming of traffic lights and luminaries.
 - brush from the surroundings is cleaned.
 - The installation of horizontal road signals or painting the dashed centerline on the pavement and the continuous line that runs along the edges with white paint. The edges of the islands in the central part of the road should be painted with yellow line. The purpose of this activity is to define the traffic lanes for drivers to stay within them and have a guide or reference.
 - The vertical signals that are deteriorated will be restored..
- **Management of construction waste and solid waste:** This activity involves the collection, separation, transportation, and disposal of surplus materials or construction waste generated during the construction of the work in any of the activities mentioned above (including the restoration or removal of temporary facilities), as well as solid and domestic waste and the activities of the construction generated by the operation of the temporary facilities.

CONSTRUCTION PHASE (EXTENSION)³

³ At this phase, the construction of the bypass in the City of El Progreso is introduced, with a length of 5.9 km.

After the selective rehabilitation and maintenance undertakings are completed, the extension work will begin in the Construction Phase, which will last 12 months and includes some of the activities selective rehabilitation and maintenance undertakings and other construction activities:

- **Installation and Operation of Temporary Facilities:** This activity was described in the selective rehabilitation and maintenance undertakings.
- **Preparation of the Worksite:** Removal of topsoil and trees, demolition of existing buildings or infrastructure, construction of temporary traffic detours (mainly at intersections with other roads) and utilities relocation within the road layout is required.

The material from this operation shall be removed with front loaders and dump trucks, and under no circumstances will it be burnt. All wood from this activity may be used by the Concessionaire for the activities of the Works and land (organic layer) from the clearing will be used in the areas where grass or other vegetation needs to be planted.

According to the General Regulations of the Forest Act. Protected Areas and Wildlife - Agreement No. 378-2009, the felled trees will be sold by the owner of the land to be affected as long as he proves its dominance. In the case of national public areas, their use is for social projects at the request of the neighboring communities or community organizations that are under the Social Forestry System and by the municipalities for development of Works. For this a Reforestation Plan will be developed and implemented during the construction phase..

Excavation, cutting and conformation of fillings: the actions include the excavation or slope cuts in the hillsides with heavy machinery and earthmoving. However, the formation of fillings or embankments, is the placement, distribution and compacting of the filling material, either from quarry or from the cuts, according to the required specifications in the design.

- **Excavation, cutting and conformation of fillings:** Its actions correspond to the excavation or slope cuts in the hillsides with heavy machinery and earthmoving. However, the formation of fillings or embankment, is the placement, distribution and compacting of the filling material, either from quarry or from the cuts, according to the required specifications design.
- **Management, use and transportation of material from borrow pits:** This activity was described in the selective rehabilitation and maintenance undertakings, and includes possible places to be used for obtaining the Work's material.
- **Use of water sources:** This activity was described in the Selective Rehabilitation and Maintenance phase.
- **Construction of drainage Works:** It consists on understanding the necessary tasks for placement of sewers, sub-drains, ditches, and other Works that facilitate drainage of rainwater, longitudinally and transversely.
- **Bridge construction:** For bridge construction, independently of the length, height or design, the activities consist of the adequacy of river flow and construction of the temporary detour (if feasible and required), the actual construction of the bridge, by digging for the foundation of the supports and portions (substructure), the cast or placement of pillars according to the height and separation of design, placement of concrete beams and the adequacy of the superstructure and finally the return of the river flow to its original condition. The bridges and boxes to be built are listed below:

Table 3.3. List of bridges to build

ESTACION INICIAL APROXIMADA	NOMBRE	LONGITUD TOTAL	Carriles	Ubicación lado del Puente nuevo
5+400	Rio Zacatales	60.00	4 carriles	derecha
10+900	Puente sobre Río Humuya	240.00	4 carriles	derecha

12+100	Puente Negro	30.10	2 carriles	Centro (*)
17+800	Quebrada Agua Blanca	24.90	2 carriles	Centro (*)
20+400	Río Bálsamo o Piedras de Afilas	14.75	4 carriles	Derecha
26+000	Quebrada Guacamaya	24.60	2 carriles	Derecha
26+600	Quebrada Las Minas	74.60	2 carriles	Derecha
34+650	Río Camalote	50.05	2 carriles	Izquierda

- **Placement of the pavement layer:** This activity involves the placement, distribution and compacting of the base (usually a crushed granular base), transport and placement of the pavement layer, of the material (asphalt) and thickness defined in the design, from the preparation site (asphalt concrete plant) to the place of placement.
- **Installation of road signals, lighting and architectural finishes:** It involves the supply, installation and placement of light poles with luminaires containment barriers (New Jersey type) and signs of both vertical and horizontal traffic signaling, including accessories such as poles, frames and boards, which are regulatory, preventive, informative and permanent, along all roads in accordance with the technical specifications of the Ministry of Public Works, Transportation and Housing (SOPTRAVI).
- **Removal of temporary facilities and equipment:** This activity refers to the removal or restoration or decommissioning of temporary facilities. The key actions include the cleaning and restoration of the area (within restoration we can include soil scarification, removal of any structure that is to be discarded, placing topsoil, replanting and reforestation, if applicable).
- **Management of construction waste and solid waste:** This activity involves the collection, separation, transportation, and disposal of surplus materials or construction waste generated during the construction of the work in any of the activities mentioned above (including the restoration or removal of temporary facilities), as well as solid and domestic waste and the construction activities generated by the operation of the temporary facilities.

OPERATION AND MAINTENANCE PHASE

The operational phase begins with the complete delivery of road work and when open to the general public, both road users and those living adjacent to the road. The operation will be continuous and permanent, with a long 30 year term.

For the road to be kept in operational safe conditions within the design horizon, maintenance activities must be performed.

The following activities are executed during the operation phase:

- **Maintenance of the roadway:** Includes scheduled cleaning or sweeps of the roadway, minor repairs the pavement layer (patching) and painting on the roadway.
- **Maintenance of the drainage Works:** it consists of cleaning and removal of debris, dirt, residue, sand or any other material from the gutters, inlets and culverts, minor repairs to gutters, drains, sewers, discharge heads or any other work of drainage that may require it.
- **Maintenance of bridges:** This activity is more specific and is based on the structural inspection of bridges (e.g. Brackets, stirrups, beams, etc.) as well as the cleaning and repair of joints, rails, drainage, the pavement layer, etc.
- **Maintenance of road signals and lighting:** Consists on the repair or replacement of signage, both vertical and horizontal and light poles; and verification of the operation and programming of traffic lights and luminaries.

Besides the aforementioned, the Concessionaire will provide, free of charge, the road safety service and will include the following:

1. Central Emergency Services which will operate twenty-four (24) hours a day. The Concessionaire shall respond to emergency requests and/or accidents which have occurred in the tranche, through the Emergency Center, communicating them or referring requests to the National Police, a hospital, doctor, clinic or similar, or an insurance company, as applicable.
2. Communication System in Real Emergency Time. The terminals shall be located at a distance of twenty-five (25) miles between each other. This system should at least allow the execution of free calls exclusively to the Emergency Central.
3. For the attention of the injured and transfer to another hospital center, medical center, polyclinic, as applicable
4. Transfer of vehicles that have been damaged on the road to the nearest service station, distance must not exceed seventy (70) miles.
5. An office to be used by the National Police of Honduras This office should be adjacent to areas each toll unit, with its basic equipment, and should measure at least 70 m².

RESTORATION PHASE

One of the main measures to be adopted as part of the policy during the execution of the Works, in view of the environmental aspects, is an adequate restoration of each of the sites intervened during the execution of the Works.

However, during the restoration phases, of each of the sites, including: location of sewers, drainage Works, support roads, camps, sites of borrow pits, etc...should undergo a thorough review of the area in order to remove all contaminated soil.

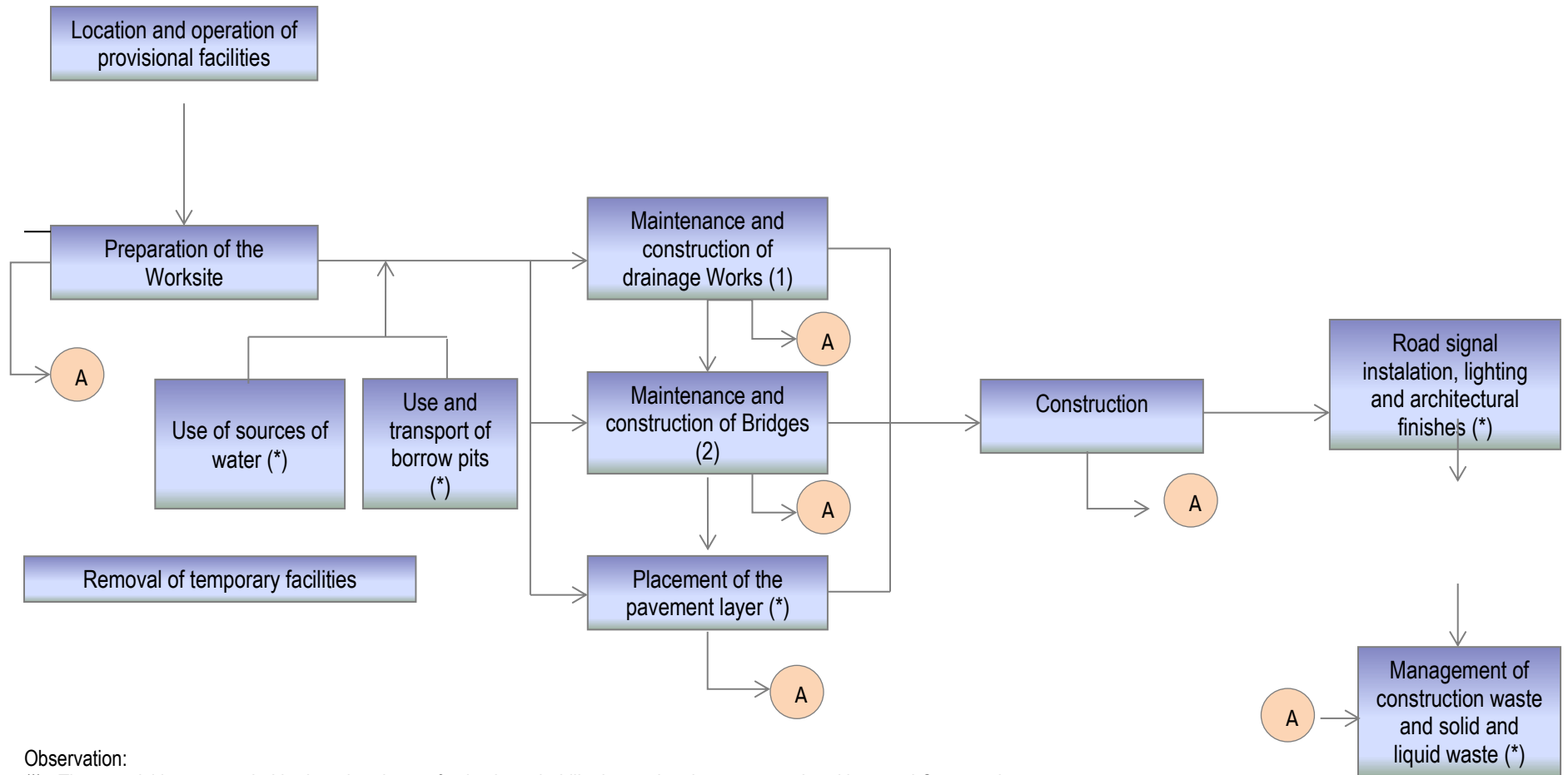
All sites intervened by the Concessionaire shall be thoroughly cleaned upon leaving each one of them.

In order to facilitate cleaning tasks during the restoration phase of each site, it is recommended that the Concessionaire perform all of his work in a clean environment with techniques to avoid contaminating the resources located in the vicinity of the intervention.

3.2.1 Flowchart of activities

A flow chart is presented under figure 4.13, showing the activities to be performed on the project Tourism Corridor of Honduras: Tranche El Progreso - Tela, including the Selective Rehabilitation and maintenance Undertakings of the tranche that will be carried out in a 10 month period, after the expansion of the two lanes and the new tranche of the bypass, which shall be executed in a 12 month period:

Figure 3.2. Activity flowchart of the project



Observation:

(*) These activities are carried both at the phase of selective rehabilitation and maintenance undertakings and Construction

(1) The maintenance of drainage Works will be executed during the selective rehabilitation and maintenance undertakings and the construction of drainage Works within the phase of construction

(2) Bridge maintenance will be performed during the selective rehabilitation and maintenance undertakings and construction of bridges during the phase of construction

Source: The Concessionaire

3.3 Infrastructure to develop

The infrastructure to be developed is: the construction of roads, installation of road signals and drainage in an alignment of 36.5 km (includes the bypass), the construction of sanitation Works in urban areas and relocation of utilities.. This is embodied in general, on roads, as follows:

- Implementation of controlled excavation and necessary fillings .
- Profiling of existing asphalt concrete (where necessary).
- Restoration of the pavement structure in the existing lanes (where needed).
- Placement of select material and base layer to form an embankment on natural terrain. • Pipe laying for drainage
- Construction and rehabilitation of bridges.
- Construction of sidewalks, curbs, gutters and drainage inlets
- horizontal and paint finishes.
- Pedestrian Sidewalk
- Road Lighting.

3.4 Equipment and machinery to be used

With regards to equipment used during construction, operation and maintenance of the Project we have the following (see Table 4.5):

Table 3.4 Equipment list – Construction Phase

Phase	Activity	Machinery and Equipment
Rehabilitation and Maintenance Construction	Stripping	Moto grader, dump truck, flatbed, others (saws), retro shovel
	Preparation of the Worksite	Bulldozer, front loader, dump truck, platform truck, other (chainsaw).
	Hauling and placement of stone material	Moto bulldozer, compacting roller, front loader, dump trucks, backhoe, flatbed, tanker
	Construction of drainage Works and bridges	Excavator, backhoe, dump trucks, flatbed
	Placement of the pavement layer	Moto bulldozer, double drum roller, pneumatic compactor, asphalt setter, dump trucks, flatbed
	Management of Construction and Solid Waste	Backhoe, dump trucks
	Installation of road signals. Illumination and architectural finishes	Crane Truck
	Withdrawal of Provisional Facilities and Equipment	Front loaders, dump trucks, flatbed

Source: The Concessionaire

3.4.1 Vehicular Equipment

The traffic flow, resulting from the activities of the project will consist mainly on moving raw material needed for Works and waste disposal, truck fuel dispenser or asphalt distributors. It also includes inspections, operation personnel and field supervisors transport.

Because the construction of various infrastructure Works and various tranches will be occurring simultaneously, the peak period for traffic flow depends on the timetable of the execution of the work. Additionally, some routes have been planned for the management of equipment, materials and waste material, which will be transported by the Concessionaire and its subcontractors to and from the different work sites.

3.5 Labor force in the selective rehabilitation and maintenance undertakings, Construction and Operation

3.5.1 Selective rehabilitation and maintenance undertakings

The jobs that are expected to be needed during the selective rehabilitation and maintenance undertakings of the Project are shown under Table 4.6. The list refers to 49 jobs, not including administrative staff:

Table 3.5. Jobs during the Construction

AMOUNT	DESCRIPTION
1	Master of Paving Work
1	Master of Mechanical Works
1	Work Master of the Crushing Plant
1	Topographer
2	Prism holder
1	Assistant of the Topographer
1	Tractor operator
1	Front loader operator
8	Dump truck operator
1	Finisher Operator
1	Sweeper - Blow Operator
1	Asphalt tank driver
1	Asphalt tank driver
1	Crushing Plant Operator
1	Horizontal Signal Equipment Operator
8	Construction Assistants
2	Mechanic
1	Electrician
1	Welder
2	Greasers
1	Lube truck driver
3	Light Vehicle Drivers
1	Environmental Specialist
1	Environmental Specialist Assistant
1	Manager of workplace safety
1	Assistant Clerk of workplace safety
4	Flaggers
49	Total

Source: Own compilation.

3.5.2 Construction Phase

Table 3.6, shows the jobs that are expected to be needed during the selective rehabilitation and maintenance undertakings. The list refers to 132 jobs for this phase without the administrative staff.

Table 3.6. Jobs during the Construction

AMOUNT	DESCRIPTION
1	Master of Paving Work
1	Earth movement work master
1	Bridge work master
1	Master of Sewer Work and Boxes
1	Master of Mechanical Works
1	Work Master of Crushing Plant
1	Topographer
2	Assistant of the Topographer
1	Tractor operator
8	Motor grader operator
4	Vibrocompactors Operator
3	Front Loader Operator
3	Dump Truck Operator
20	Water Tank Operator
3	Road Recovery Operator
1	Excavators
3	Finisher Operator
1	Sweeper - Blower Operator
1	Assistant of the topogropher
1	ASPHALT TANK Driver
1	ASPHALT TANK Driver
1	Crane Operator
1	Crushing Plant Operator
1	Horizontal Signal Equipment Operator
3	Carpenters
10	Masons
25	Construction Assistants
4	Mechanic
1	Electrician
1	Welder

AMOUNT	DESCRIPTION
4	Greasers
1	Lube truck driver
5	Light Vehicle Drivers
12	Flaggers
1	Environmental Specialist
1	Environmental Specialist
1	Manager of workplace safety
1	Assistant Clerk of workplace safety
132	Total

Source: Own compilation.

3.5.3 Operation and Maintenance Phase

4.7 shows jobs that are expected to be needed during the phase of selective rehabilitation and maintenance. The list refers to 41 jobs for this phase without the administrative staff.

Table 3.7. Jobs at the Operation Phase

AMOUNT	DESCRIPTION
1	Master of pavement Works
1	Master of mechanical Works
1	Topographer
2	Prism Holder
1	Assistant of the topographer
1	Tractor Operator
1	Front loader operator
5	Dump truck operator
1	Concrete truck operator
1	Crushing plant operator
1	Concrete plant operator
1	Compressor operator
1	Water tank operator
1	Horizontal sign installation operator
2	Masons
5	Construction assistants
2	Mechanics
1	Electrician
1	Welder
2	Greasers
1	Lube truck driver
2	Light vehicle driver
4	Flaggers
1	Environmental specialist

AMOUNT	DESCRIPTION
1	Head of occupational security
41	Total

Source: Own compilation.

3.6 Disposal of solid waste in the construction, operation and restoration phases

Waste generation from the various activities that make up the project throughout the different phases will be handled as shown below.

3.6.1 Selective rehabilitation and maintenance undertakings and Construction

Solid waste will be generated during the rehabilitation, refinement and construction undertakings, due to the development of activities related to the removal of vegetation and of existing infrastructure, as well as due to the reduction of activity, which will be sorted out to be used as filler material along with the rest of the waste. For safety reasons, this will be taken directly to authorized sites for the landfill project. (See SINEIA, section 8.2)

Table 3.8, shows a general characterization of the waste that will be deposited directly into these authorized dumps:

Table 3.8. General Characterization of non-toxic waste to be disposed in authorized landfills

Non-toxic solids
Empty water containers
Demolition debris
Metal and plastic waste
Domestic solid waste
Remains of sand, cement and gravel

Source: Own compilation.

All the remains from the demolition of concrete slabs of Portland Cement or other material may be reused/recycled.

The temporary storage of debris shall be set up for a proper drainage so that no pools of water are generated, to avoid affecting the movement of equipment and staff. This will also avoid the invasion of lands or properties outside the areas authorized for the Works and will avoid causing damage to the surrounding vegetation.

The remaining solid waste coming from human activities necessary for the implementation of the construction Works will be arranged conventionally, subcontracting a garbage collection service for its daily removal either with a collection company or by the municipal authority's own means (UMA's) dump, selected for this work.

Waste that can be recycled: it is advised to contact the responsible recycling companies and proceed to sale it.

3.6.2 Operation

The solid waste produced during the operation and maintenance phase will be of a domestic type (food waste, paper, glass and plastics), produced by road users and workers of the company in charge of the maintenance activities. These wastes will be collected and disposed of in the authorized landfill site.

Periodically metal waste, concrete (slabs), wood or plastic (replacement parts), paint cans, among others, from maintenance operations, will be handled by companies specializing in these tasks (they must have their corresponding permits).

Residue considered hazardous or toxic will be handled, collected, transported and placed in final disposal sites authorized by a manager (must have a permit from the competent authority) to handle these substances.

3.6.3 Restoration

During the phase of restoration, of each of the sites, like sewers, drainage Works, support roads, camps, industrial plants, etc.. should undergo a thorough review of the area in order to remove all contaminated soil.

If the Works are to be stopped for a long time (over three months), the Concessionaire shall perform the following tasks prior to the demobilization of personnel and equipment:

- Mark the areas that may cause danger to the general population, or prohibiting the passage indicating the precautions to be taken. (e.g. danger deep pit road under construction, unstable zone, etc..).
- Cover the pits on stand-by thus avoiding the disposed solid waste in them to be open on the surface.
- Remove from Works all traces of fuel, grease, or other elements that may cause danger of explosion or fire.
- Remove tools and equipment that stand some threat to the surrounding population.

3.6.3.1 Restoration of provisional installations

All the fixed and dismantable installations that were installed for the execution of the work must be dismantled, and then the scrap, debris, and fences must be removed and buried in the dump sites authorized by the UMA's, Municipality of El Progreso and Tela.

At this phase, the measures issued by the UGA / SOPTRAVI for those cases in which there is a closure or restoration of Works.

3.6.3.2 Restoration of borrow pits

The following must be done:

Demolish built structures or instalations (deposits of materials and equipment) as well as the stability of these slopes. Use the removed overload during cleaning, to place it on the surface where the extraction is done and level the land.

Holes, pits, trenches, etc. that were done during extraction shall be filled. Similarly, it is important to make sure that storm water drains normally over the surface, so that the necessary leveling is made before leaving the site.

Consider also that, depending on the angle of the slope or terraces, the same shall be covered with topsoil.

3.7 Description of the liquid waste generated in the construction, operation and restoration phases

3.7.1 Rehabilitation, refinement and construction

During the rehabilitation, refinement and construction phase liquid waste will be generated mainly from oils and lubricants used for the maintenance of machinery. These will be stored temporarily in the site properly destined for this, until their recollection by an authorized manager, who will have the responsibility to treat and dispose them in an authorized disposal site.

A toilet must be installed for every 10 persons or workers of the same sex, plus one more if a lady is part of the team. Toilets must be reasonable accessible and all work sites and they must not exceed a distance of 60 m from the work site. In these provisional installation areas, the installation of a septic tank will be necessary for the management of grey waters, deriving from washing of machines and camp area cleaning.

Toilets must be properly maintained and cleaned, serviced by specialized companies which must have all of the permits required by the national legislation for this activity and (the same applies to the septic tank).

3.7.2 Operation

During the operation phase, liquid waste will be generated mainly from oils and lubricants used for the maintenance of machinery. These will be stored temporarily in the site properly destined for this, until their recollection by an authorized manager, who will have the responsibility of treating and disposing them in an authorized disposal site.

Similarly for workers, portable toilets will be provided and for camping areas or temporary facilities a septic tank to handle gray water shall be installed, as described in the construction phase.

3.7.3 Restoration

In the dismantling of provisional installations, work sites, and borrow pits, special care will be given to the collection of hazardous liquid residue that might have been left as a result of the development of activities during the execution of the Work.

The transport of materials, specially those with potential contamination, like grease, oils, fuel, asphaltic mixtures, among others; must be done with the proper precaution measures, from the site of origin to the site of disposal. They will be managed, collected, transported, and placed on the final disposal site by an authorized manager (must have the corresponding permit).

4 IDENTIFICATION, CHARACTERIZATION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

The objective of this identification process is to provide an initial indicative information base for further quantitative evaluation. A matrix was prepared which allowed us to contrast the different activities of the project with the resources and natural processes that could be affected by the activities. The likely impacts were identified by each consultant depending on their area of expertise.

For the Impact Identification Matrix, the environment used was divided into seven (7) components or means in which the potential impacts associated with the project are presented, as indicated below:

1. Aquatic (water):
 - 1a. Alterations of the hydric regime (courses and drainage of water)
 - 1b. Alterations of the water table
 - 1c. Deterioration in the quality or water pollution.
2. Atmospheric (air):
 - 2a. Deterioration in the quality or air pollution
 - 2b. Dust generation and / or foul odors
 - 2c. Increased noise levels.
3. Terrestrial (land):
 - 3a. Effect on soil compacting or leveling
 - 3b. Quality deterioration or contamination of soil
 - 3c. Extraction or soil loss
 - 3d. Increase in soil erosion
 - 3e. Decreased fertility and suitability of land use
4. Biotic (flora and fauna):
 - 4a. Loss of vegetation cover
 - 4b. Disturbance or alteration of terrestrial or aquatic fauna
 - 4c. Increased risk of abuse of wild animals
 - 4d. Increased risk of abuse of wild animals
5. Socioeconomic:
 - 5b. Modifications to the local vehicular traffic
 - 5c. Increased local and regional economy
 - 5e. Increased risk of disease transmission
 - 5f. Increased risk of occupational accidents
 - 5g. Employment generation (+)
 - 5h. Increased public health issue because of the generation of solid and liquid waste
 - 5i. Nuisance to the surrounding communities by the project Works
 - 5j. Changes in land use
 - 5k. Alteration of public services
 - 5l. Savings in travel time
 - 5m. Decreased concentrations of toxic gases from mobile sources
 - 5n. Savings in fuel costs
 - 5o. Reducing the risk of road accidents and increase road safety
6. Historical and cultural:
 - 6e. Impact on historic and archaeological sites
7. Landscape related:
 - 7e. Alterations or changes in the landscape and aesthetics of the environment

Furthermore, the activities and sub-activities contemplated for this work are listed by phases:

A. Selective rehabilitation and maintenance undertakings

- A.1 Installation and Operation of Temporary Facilities (site selection, installation and / or purchase or lease, operation of facilities).
- A.2 Preparation of the Worksite (cleaning, clearing)
- A.3 Use of water sources (collection and transport of water resources)

- A.4 Maintenance of drainage Works
- A.5 Placement of the pavement layer
- A.6 Bridge maintenance
- A.7 Building. Foundation, construction of concrete and steel structures (considering: columns, structural walls, beams, etc.) and masonry.
- A.8 installation of road signals and lighting
- A.9 Operating and transport of borrow pits(cut and transport the material).
- A.10 Removal of temporary facilities and equipment (removal or restoration or decommissioning of temporary facilities).
- A.11 Waste Management of construction and solid waste (collection, separation, transportation, and disposal of materials).

B. Construction Phase (Expansion)

- B.1 Installation and Operation of Temporary Facilities (site selection, installation and / or purchase or lease, operation of facilities).
- B.2 Preparation of the Worksite (cleaning, clearing)
- B.3 Excavation, cutting and shaping of fillings.
- B.4 Use of water sources (collection and transport of water resources)
- B.5 Construction of drainage Works (excavation and placement of sewers, ditches and underdrains).
- B. 6 Placement of the pavement layer (placement, distribution, compacting of the base and transportation and placement of the pavement layer).
- B.7 Building Bridges (adequacy of runway, construction of temporary detour, construction and rehabilitation of bridges).
- B.8 Installation of road signals. Lighting and architectural finishes (installation of barriers, signs and light poles).
- B.9 Operating and transport of borrow pits (cut and transport the material).
- B.10 Removal of temporary facilities and equipment (removal or restoration or decommissioning of temporary facilities).
- B.11 Handling of construction waste and solid waste (collection, separation, transportation, and disposal of materials).

C. Operation and Maintenance Phase

- C.1 Commissioning of the Project (operation of the road and complementary Works)
- C.2 Periodic and routine road maintenance (maintenance of the , drainage, bridges, installation of road signals and Lighting).
- C.3 Night lighting

For the identification of environmental impacts, a matrix of interaction between "Actions or activities of the project" and "environmental factors" was developed. This impact identification was performed following the Leopold Matrix model (modified).

Table 4.1. Impact Identification by Leopold Matrix modified – selective rehabilitation and maintenance undertakings

Impacts		Selective rehabilitation and maintenance undertakings activities									
Id	Manifestation of Impact	A1-Location and Operation of Temporary Facilities	A2- Preparation of Worksite	A3-Use of Water Sources	A4- Maintenance of drainage Works	A5-Placement of the pavement layer	A6- Maintenance of bridges	A7- Edification	A8-Usage and transportation of materials pits	A9 - Installation of road signs, lighting and finishes	A10-Waste Management Construction
1	Aquatic (water)										
1a	Alterations of the water regime (courses and drainage of water)	• B (-)		• B (-)					• M (-)		
1b	Deterioration in the quality or water pollution	• B (-)	• B (-)	• B (-)	• B (-)				• M (-)		• B (-)
1c	Alterations of the water table			• B (-)							
2	Atmospheric (air)										
2a	Deterioration in the quality or air pollution	• B (-)				• M (-)	• B (-)	• B (-)	• M (-)		• B (-)
2b	Dust generation and / or foul odors	• B (-)	• B (-)		• B (-)	• M (-)	• B (-)	• B (-)	• M (-)		• B (-)
2c	Increased noise levels.	• B (-)	• B (-)		• B (-)	• M (-)	• B (-)	• B (-)	• M (-)		• B (-)
3	Terrestrial (land)										
3a	Effect on soil compacting or leveling	• B (-)									
3b	Quality deterioration or contamination of soil	• B (-)	• B (-)			• B (-)		• B (-)			• B (-)
3c	Extraction or soil loss							• B (-)	• M (-)		
4	Biotic (Flora and Fauna)										
4a	Loss of vegetation cover	• B (-)	• B (-)								
4b	Disturbance or alteration of terrestrial or aquatic fauna	• B (-)	• B (-)	• B (-)	• B (-)				• B (-)		• B (-)
5	Socioeconomic										
5b	Modifications to the local vehicular traffic	• B (-)	• B (-)	• B (-)		• M (-)	• B (-)		• B (-)		• B (-)
5c	Increased local and regional economy (+)	• M (+)				• M (+)	• B (+)	• B (+)	• M (+)		
5e	Increased risk of disease transmission	• B (-)									
5f	Increased risk of occupational accidents	• B (-)	• B (-)		• B (-)	• M (-)	• B (-)	• B (-)	• B (-)	• B (-)	• B (-)
5g	Employment generation (+)	• M (+)	• M (+)		• M (+)	• M (+)	• B (+)	• M (+)	• M (+)	• M (+)	• M (+)
5h	Increased public health issue of the generation of solid and liquid waste	• B (-)			• B (-)	• B (-)	• B (-)		• B (-)		• B (-)
5i	Nuisance to the surrounding communities by the project Works	• B (-)	• B (-)			• M (-)	• M (-)	• B (-)	• M (-)		• B (-)
5j	Changes in land use	• B (-)									
5l	Savings in travel time (+)										
5m	Decreased concentrations of toxic gases produced by mobile sources (+)										
5n	Savings in fuel costs (+)										
5o	Reducing accidents and improving road safety (+)										
6	Historical and cultural										
6a	Impact on historic and archaeological sites										
7	Landscape related										
7a	Alterations or changes in the landscape and aesthetics of the environment	• B (-)						• B (-)		• B (-)	

Observation: • B = Low, • M = Medium, • A= High Source: The Consultant

Table 4.2. Impact Identification by Leopold Matrix modified – OPERATION AND MAINTENANCE PHASE

ACTIONS		Activities of the Construction Phase											Activities of the Operation and Maintenance Phase			
		B1 - Location and operation of Provisional facilities	B2 - Preparation of the Worksite	B3 - Excavation, Cut and Conformation of fillings	B4-Use of water sources	B5 - Construction of drainage Works	B6- Placement of the pavement layer	B7-Construction of bridges	B8-installation of road signals, lighting	B8-Installation of road signals, lighting	B10-Withdrawal of Provisional inst and machinery	B11- Construction Waste Management	C1 - Commissioning of the Project	C2 - Periodic and routine Maintenance	C3 - Night Lighting	
Id	FACTORS															
1	Aquatic (water)															
1a	Alterations of the water regime (courses and water drainage)	• B (-)	• B (-)	• M (-)	• B (-)	• M (-)		• A (-)		• M (-)			• B (-)	• B (-)		
1b	Alterations of the water table		• M (-)	• M (-)	• B (-)					• B (-)						
1c	Deterioration in the quality or water pollution	• B (-)				• B (-)		• M (-)		• M (-)						
2	Atmospheric (air)															
2a	Deterioration in the quality or air pollution	• B (-)	• M (-)	• M (-)		• B (-)	• M (-)	• B (-)		• M (-)	• B (-)	• B (-)	• B (-)	• B (-)		
2b	Dust generation and / or foul odors	• B (-)	• M (-)	• M (-)		• B (-)	• M (-)	• B (-)		• M (-)	• B (-)	• B (-)		• B (-)		
2c	Increased noise levels.	• B (-)	• M (-)	• M (-)		• B (-)	• M (-)	• B (-)		• M (-)	• B (-)	• B (-)	• B (-)	• B (-)		
3	Terrestrial (land)															
3a	Effect on soil compacting or leveling	• B (-)	• M (-)	• M (-)				• B (-)		• B (-)						
3b	Quality deterioration or contamination of soil	• M (-)	• B (-)	• M (-)			• M (-)	• B (-)		• M (-)			• B (-)	• B (-)		
3c	Extraction or soil loss			• M (-)		• M (-)		• M (-)		• M (-)						
3d	Increase in soil erosion		• B (-)	• M (-)		• B (-)		• B (-)		• M (-)			• B (-)			
3e	Decreased fertility and suitability of land use.		• B (-)	• B (-)						• B (-)						
4	Biotic (Flora and Fauna)															
4a	Loss of vegetation cover	• B (-)	• M (-)							• M (-)						
4b	Disturbance or alteration of terrestrial or aquatic fauna	• B (-)	• M (-)	• M (-)	• B (-)	• M (-)	• B (-)	• M (-)		• M (-)	• B (-)	• B (-)	• B (-)	• B (-)	• B (-)	• B (-)
4c	Increased risk of collision with wild fauna												• B (-)			
5	Socioeconomic															
5b	Modifications to the local vehicular traffic	• B (-)	• B (-)	• B (-)	• B (-)		• M (-)	• M (-)		• B (-)		• B (-)	• A (+)	• B (+)		
5c	Increased local and regional economy (+)	• M (+)				• B (+)	• M (+)	• M (+)		• M (+)				• M (+)		
5e	Increased risk of disease transmission	• B (-)														
5f	Increased risk of occupational accidents	• B (-)	• M (-)	• M (-)		• B (-)	• M (-)	• M (-)	• B (-)	• M (-)	• B (-)	• B (-)		• B (-)		
5g	Employment generation (+)	• M (+)	• M (+)	• M (+)		• M (+)	• M (+)	• M (+)	• M (+)	• M (+)		• M (+)		• M (+)		
5h	Increased public health issue of the generation of solid and liquid waste	• B (-)	• B (-)	• B (-)			• B (-)			• B (-)	• B (+)	• B (-)		• B (-)		
5i	Nuisance to the surrounding communities by the project Works	• B (-)	• M (-)	• M (-)			• M (-)	• M (-)		• M (-)	• B (+)			• B (-)		
5j	Changes in land use	• B (-)	• M (-)					• B (-)			• B (+)					
5k	Alteration of public services		• B (-)													
5l	Savings in travel time (+)												• M (+)			
5m	Decreased concentrations of toxic gases produced by mobile sources (+)												• B (+)			
5n	Savings in fuel costs (+)												• M (+)			
5o	Reduced risk of accidents and increase road safety (+)												• M (+)			
6	Historical and cultural															
6a	Impact on historic and archaeological sites															
7	Landscape related															
7a	Alterations or changes in the landscape and aesthetics of the environment	• B (-)	• M (-)	• B (-)			• B (-)		• B (-)	• M (-)	• B (+)					• B (-)

Observation: • B = Low, • M = Medium, • A= High Source: The Consultant

A description of the involvement or impact the project will generate in different media and environmental variables is presented. This description is derived from the identification of impacts previously presented under Tables Table 5.1 and Table 5.2, using modified Leopold Matrix.

4.1 Air Emissions - Atmospheric Environment

In general terms, it can be said that the air quality along the road tranche is good. This tranche crosses both rural areas and urban areas with presence of some industries and population centers and fluid traffic. Similarly, the project is developed in a completely open area, thus allowing the dispersion of particles.

Rehabilitation, refinement and Construction phase

The major impacts on quality or air pollution are associated with the rehabilitation, refinement and construction phase. All vehicle equipment and construction equipment of the work produce emissions.

Contribution of particulate matter (dust)

Significant amounts of particulate matter (dust), deriving from archaeological excavations and earthworks both in the areas of extension of the road as in the borrow pits will be generated, as well as by activities in dirt roads and by the operation of equipment on bare soil, and the increase of heavy traffic (machinery).

The implications that can bring significant increase in particulate matter (dust) in the areas of work are those that cause effects on the health of workers, specially when they do not count with the necessary protective equipment. Another effect is that it can harm the health of the residents of the neighboring towns close to the road work.

- **Emission of particles generated in combustion engines of the equipment**

Emissions of gases and particles from the combustion engines of the equipment and machinery represent an additional contribution of pollutants to the air quality of existing agents, although this additional contribution does not significantly affect air quality if the mitigation measures specified in this EMP are used, specially those which refer to good conditions and maintenance of construction machinery.

- **Increased noise levels**

The placement of the pavement layer and the exploitation and transportation of materials from borrow pits, requires the use of heavy equipment and machinery, so noise levels will increase in the site where the activity takes place. This will directly affect staff who is involved in the job, but this impact can be mitigated using the corresponding protective equipment.

Operation and Maintenance Phase

After the expansion of the road, the air quality is affected by emissions from vehicles. There is no data available on the levels of contamination by combustion engines of vehicles on this road tranche as to identify how affected the air quality is due to this type of pollution; however, due to the characteristics of the area described in the previous paragraph, no significant alteration on air quality from combustion engines of vehicles that circulate daily on the tranche is being considered.

During the maintenance work, air pollution will be generated by the emissions from equipment, vehicles and maintenance work equipment.

4.2 Production of common toxic, hazardous solid waste,

Many of the activities to be undertaken through the Project, include the generation of common solid waste and in some cases hazardous waste, that is why a Management Program for Solid Waste is established in this EMP.

Rehabilitation, refinement and construction phase

During the construction phase, solid waste will be generated during the rehabilitation, refinement and construction undertakings, due to the development of activities related to the removal of vegetation and of existing infrastructure, as well as due to the reduction of activity, which will be sorted out to be used as filler material along with the rest of the waste. For safety reasons, this will be taken directly to authorized sites for the landfill project.

In the operation phase

The solid waste produced during the operation and maintenance phase will be of a domestic type (food waste, paper, glass and plastics), produced by road users and workers of the company in charge of the maintenance activities. These wastes will be collected managed managed, collected, transported and placed on the final disposal sites by an authorized manager (must have the corresponding permit from the competent authority by the municipal authority (UMA's) for the project.

4.3 Production of storm water, wastewater, domestic and industrial

4.3.1 Storm water

The cuts and excavation Works must move in coordination with the drainage of the project, such as sewers, drains and construction of underdrains. During the construction work, the corresponding tranche, must be kept properly drained to prevent damage to both the environment and the construction itself.

The Concessionaire shall ensure the proper management of surface water and infiltration before and during the execution of any surface excavation or excavation area or filling, as well as temporary storage areas and in general, all of the work areas where runoffs of surface water can be generated specially during the rainy season that drag sedimentable material, so it is important to prevent this from being deposited in bodies of water, sewers or drains. For this the channels, pipes, ditches and any other means of drainage shall be kept clean or have equipment needed to divert or remove water from these areas of work.

4.3.2 Wastewater

As for wastewater, it is generally expected to come from these camps and machine yards (mainly from washing machinery and equipment) and portable toilets that will be placed on work fronts and camps. For camps and machinery parking, there are mitigation measures for the management of these liquid wastes consisting mainly of sedimentation tanks or sand traps and grease traps; the final discharge will be monitored to comply with environmental regulations of Honduras, anticipating that final discharge will be some superficial body by direct discharge.

During the construction phase, liquid wastes are generated primarily in the areas of work and / or temporary facilities. They shall have a septic tank for handling of gray water and for the disposal of sewage portable toilets are to be provided (1 toilet for every 10 workers of the same sex) or discharge them on the septic tank of the camp. The sanitary facilities shall be serviced with proper maintenance by specialized companies, provided they have all the required national legislation permits for this activity.

4.4 Regarding the management of raw materials and supplies

Regarding the management of raw materials and other materials, this work contemplates the cut (exploitation) and transport of material from borrow pits used for building the fillings or embankment from its borrow source stone quarry to the Worksite.

The main environmental impacts to be prevented are associated with the alteration of the hydric regime drainage or runoff of waters, the deterioration of the quality of air by the elision of contaminant gases coming from equipment and construction machinery, the generation of dust and noise, the impact on soil for compactation and leveling, the extraction

or loss of soil, the increase of the erosion processes of soil, the decrease in fertility and land use limitations, the disturbance or alteration of terrestrial fauna by the presence of the Works and its equipment and construction machinery, the modification of local vehicular traffic for extraction material transport, increase of occupational accidents, change of land use and the alteration or change of landscape. Among the positive impacts that are perceived in the generation of jobs and the increase of the local and regional economy.

In order to face the impacts related to the management of raw construction materials, this EMP poses the Surveillance and Control Program that includes the delimitation of the areas of influence to avoid damages and the Program for Camp Management and provisional installations. A Local Provider Management Plan is defined to mitigate the impact deriving from the increase of the local and regional economy.

4.5 Regarding natural hazards

Like the rest of the region, the area of the municipalities of Santa Cruz de Yojoa, Santa Rita and El Progreso in this tranche of La Barca – El Progreso are vulnerable to tropical storms, hurricanes and earthquakes, but there are no areas or sites prone to landslides in this tranche. Regarding floods, the designs will be made in such a way to make sure that the Works are strong enough to stand these types of phenomena and through the hydrology and hydraulics, structures to stand this type of events must be considered. When facing a natural threat, the EMP provides for a risk prevention plan and an emergency and contingency plan.

4.6 Regarding soil and underground water

5.6.1 Soil

Some impacts on soil resources will occur with the implementation of this project, mainly related to project activities that involve cutting vegetation (cleaning and clearing), earthworks (i.e. excavation and filling for the dirt roads), and the presence and operation of the equipment. These actions occur mainly during the phase of construction.

The intensity and importance of these impacts depends on the one hand on the environmental value and use of the land affected, and second, on the degree of alteration and surface being involved.

Construction phase

Among the main impacts on the terrestrial environment, is the effect on soil from compacting and extraction or soil loss and increased erosion processes, all as a result of the preparation activities for the Worksite, excavation, cutting and shaping fillings, and the use and transportation of stone materials from pits in tranches being expanded and the area of the new bypass in the city of El Progreso. The interventions of the Works directly cause disintegration or compacting of soil due to the construction of the road itself and the earthworks to be performed, in addition to the removal or loss of soil specifically material pits and slope cutting areas. Meanwhile, an increase in erosion happens when the soil surface is left without vegetation cover and is subject to the direct action of water and wind.

With the development of activities such as the preparation of the Worksite, excavation, cutting and shaping of the filling, use and transportation of material from the borrow pits and placement of the pavement layer in the phases of rehabilitation, refinement and construction, the impact of soil contamination by accidental spillage of fuels and/or lubricants, as well as waste products or asphalt will be presented. This impact has been considered as of medium importance, since the adoption of good engineering practices and maintenance of machinery thus reduces the impact generated.

Operation phase

During the operation phase impacts on soil are reduced to the exploitation of the same in order to obtain material for maintenance activities, mainly patching. The amounts of soil required, the short duration of these activities and the use of areas already exploited previously, make of the impact generated, a low importance level impact.

5.6.2 Underground waters

The use of water sources will be made only from superficial bodies crossing alignment. This activity will not generate any impact in terms of the effect on underground water from the bodies that are going to be used.

The construction of the bypass of the city of El Progreso, tranche El Progress - Tela, will create a barrier for natural runoffs which will modify its direction; furthermore, the paving of the bypass will generate a small change in the local runoff and possibly decrease water infiltration into groundwater. However, due to municipal zoning of land uses in the areas surrounding the bypass (conservation defined areas ZPN-1), it's possible that the impact of the decline in the infiltration area not be significant.

5.7 Regarding local biodiversity and protected areas

Near the Tourism Corridor project in Honduras: tranche La Barca – El Progreso, we find Mico Quemado National Park, Lancetilla Botanical Garden and Punta Sal National Park. Despite the existence of these areas with high local biodiversity, the project under this environmental assessment falls outside the boundaries of these protected areas declared by the SINAPH, approximately at a distance of 1 km in the closest part of the alignment. The impacts or effects that are generated on the fauna and flora of the environment are related to the cleanup and removal activities of herbaceous vegetation and deforestation due to the extension of the existing two lane roadway to four lanes.

Impacts or effects that are generated on the fauna and flora of the environment are related to the cleanup and removal of herbaceous vegetation and deforestation due to the expansion of the roadway from two lanes to four lanes within the easement area.

In addition to the effect on the flora of the area, some disturbance or alteration to the terrestrial and aquatic fauna will be generated. The latter, specifically in the bridge construction sites and in the tranche of construction of the new bypass of the city of El Progreso.

Taking into account that within plant species that are reported in the road tranches, commercial species are found, it is recommended that prior to the cut and before the construction, an estimate of the timber resource is made and the harvesting and reforestation plan is developed. Furthermore, it is important to request from ICF or the corresponding UMAs in the corresponding municipalities, permits and compensation measures for every tree being cut and the action for the use of such resources.

5.8 Regarding the socio-economic and cultural environment in the project area and surrounding communities

For analysis of the socio-economic component we have considered those communities that could be influenced and benefited by the implementation of the Project Tourism Corridor of Honduras: Tranche La Barca – El Progreso in what has been called socioeconomic area of influence (AISE in Spanish). Thus, the socioeconomic study area is limited to the municipalities of Santa Cruz de Yojoa, Santa Rita and El Progreso.

In the selective rehabilitation and maintenance & the construction phases

One of the positive impacts in the construction phase, is the creation of jobs. The activities of this project will employ much local labor, mainly in the area of socio-economic influence of the Project (Municipalities of Santa Cruz de Yojoa, Santa Rita and El Progreso), for which purpose this EMP proposes education and training plans for a better performance of the staff and to achieve environmental conservation in the workplace and in all activities performed. It is noteworthy that the Concession Agreement establishes the requirement for the Concessionaire to employ local labor in the areas of influence.

Moreover, with the development of the project, a high demand for products and services necessary for the work is created, increasing in this way the local and regional economy by implementing a program of selection of local and regional suppliers.

As socioeconomic impacts of the project, the alteration of traffic is proposed, along with the an increase in the risk of accidents, the increase of transmission of diseases and the increase of public health problems due to the generation of liquid and solid waste.

As negative socioeconomic impacts of the project environment, we have: traffic disturbance, increased risk of occupational accidents, increased risk of disease transmission and increase public health problems due the generation of liquid waste and solids. But these will have a magnitude considered either low or medium (depending on the assessed activity) and its duration is limited ton the refinement, rehabilitation and construction the phases.

Inconvenience to road users by the Works of the project, is also a negative socioeconomic impact that has been identified for this project. Many of the activities contemplated by this work, generate discomfort to the users and the communities near the project alignment, that is why the Concessionaire will have to implement a work plan, where the schedules are set to avoid damages to the daily activities of the communities in the area of socio-economic influence of the Project. Furthermore, permanent communication with the community is proposed, through the Communication Plan and the Disclosure Campaign Project.

The relocation of utilities is expected dirung the preparation activities of the Worksites, due to the expansion of the roadway to four lanes. Given this impact, there is a need to have a Relocation Program for Public Services (utilities), through which, when facing an affectation to the public service, coordination can be made in advance with the corresponding authorities and the Concessionaires. The relocation of that service should be performed within 24 hours, which includes notifying the affected parties by delivering flyers, radio spots or notifications in any other mass media, within (3) days, and establish compensatory measures, such as electricity generators (in extreme cases), etc.

In the Operation Phase

In the operation phase, certain benefits or positive impacts to users with the commissioning of the project are observed:

The project will generate a reduction in travel time and fuel costs for users, which currently has two lanes one in each direction on this tranche. By expanding to two additional lanes, people can reduce their travel time from La Barca – Progreso.

In addition to this, both the decrease in travel time and fuel savings, will significantly decrease the concentrations of toxic gases produced by mobile sources, and a better management will be achieved to count with a more pleasant environment and good health of the communities surrounding the road.

Maintenance activities generate waste and construction waste due to the cleaning and repairs of the roadway. Waste management will be in compliance with the Solid Waste Management included in this EMP.

As a positive impact from project implementation, a reduction of road accidents is expected along with an increased safety on the road due to the improvements and services offered by the Concessionaire in this tranche.

Is worth mentioning that the Commissioning of the Project, will generate a negative impact in the economy of users due to the new payment of toll in this tranche. This impact has not been evaluated because the location of the toll booth and the collection rate to be applied to users are not yet clear.

5.9 Regarding landscape aspects

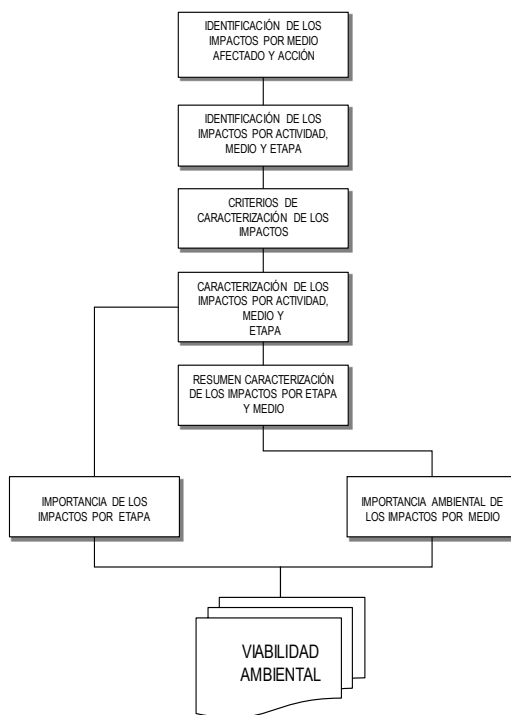
The area where the Tourism Corridor of Honduras tranche La Barca - Progreso will be developed, is an area that was previously intervened when the construction of the road occurred. The selective rehabilitation and maintenance works to be done, and the expansion of lanes, will concentrate within the existing road easements.

Some activities that will affectd the landscape have been planned: the installation and operation of temporary facilities, preparation of the Worksites, excavation and shaping of fillings, exploitation of borrowing sites, installation of road signals and night lighting.

6. ASSESSMENT OF IMPACTS AND SYNTHESIS

The methodology used for the categorization and evaluation of impacts is explained through the process of Figure 6.1. The results are embodied in an interactive matrix that allows the evaluator clearly discriminate the most affected and environmental factors over which more attention should be paid to during the implementation of mitigation measures and environmental management that prevents, reduces, controls, compensates or encourages such impacts; and to determine the level of these measures.

Figure 6.1. Flowchart of the impact assessment process



The identification of impacts in an Environmental Study is to determine which of the activities associated with the project cause changes to the characteristics of the factors / components and environmental attributes.

The objective of the identification is to provide a first indicative information as a basis for further qualitative and quantitative impact assessment. This section will evaluate global impacts from the Project Tourism Corridor. The methodology for the identification of impacts and subsequent evaluation consists of the following elements:

- Review of existing documentary information and consultation with specialists who have conducted some type of evaluation in the project area.
- Baseline Surveys, depending on the fieldwork conducted by each of the consultants.
- Identification of environmental variables that will be affected by the Project.
- Development of an Impact Identification Matrix, taking as a base the Leopold Matrix, which will contrast the different activities of the project with the resources and natural processes that could be affected by the activities performed. The likely impacts were identified by each consultant depending on your area of interest and submitted at the beginning of the studies for further verification at the end of fieldwork.
- • Development of the "Importance Matrix of Environmental Impact" (MIIA) like impacts assessment methodology applied to the impacts that have been identified previously as "Moderate" or "High" (obtained from the modified Leopold Matrix).

For the identification of the impacts we will consider that the project will be developed in three phases (same as described in section 4.2):

- a) Selective rehabilitation and maintenance
- b) Construction and expansion
- c) Operation and maintenance

The categories used for the categorization of impacts are the following (see Table 6.1):

Table 6.1. Characterization of Impacts

Classification	Typology	Description
Nature of the Impact		The nature of the impact that indicates how the impact acts on its environment; can be positive (+) or negative (-).
Sign	+/-	The sign refers to the beneficial impact character (+) or detrimental (-) of the various actions that will act on the various factors considered.
Intensity	I	This term refers to the degree of impact of the action on the factor in the particular field in which it operates. The valuation range will be between 1 and 12, in which 12 expressed a total destruction of the factor in the area in which the effect occurs, and 1 minimal involvement. Values between these two terms reflect intermediate situations.
Extension	EX	Refers to the area of theoretical influence of impact in relation to the project environment (area%, relative to the environment, in which the effect manifests). If the action produces a very localized effect, it is considered that the impact has a punctual character. If, however, the effect does not allow a precise location within the project environment, having a pervasive influence on all of it, the impact will be Total; considering the intermediate situations, by gradation, such as Partial and Comprehensive impact. For the effect to be punctual but occurs at a critical spot, you are confer worth four units higher than it should be based on the manifested percentage extension.
Moment	MO	The term impact manifestation refers to the of time between the onset of action and early effect on the factor of the considered medium . When the time is null, the time will be Immediate, and if it is less than one year, Short Term. If a period of time ranging from 1 to 5 years, medium-term, and if the effect takes to manifest more than five years, Long Term.
Persistence	PE	Refers the time in which the effect remains since its inception and until the affected factor would return to the pre-action conditions, by natural means or by introducing corrective measures . If it lasts less than a year, we believe that the action produces a Fleeting effect. If it lasts between 1 and 10 years, Temporal; and if the effect is longer than 10 years in duration, we consider the effect as permanent.
Reversibility	RV	It refers to the possibility of restoration / regeneration of the factor affected by the project; that is, the possibility of returning to the initial conditions set to action, by natural means, once that fails to act on the medium. May be Short Term, Medium Term or Irreversible.
Recoverability	MC	It refers to the possibility of reconstruction, total or partial, of the affected factor resulting from the project. In this case, the possibility of returning to the pre-action initial conditions, through human intervention (introduction of mitigation or corrective measures). The effect is fully recoverable, as it is immediate (> 1 year) and medium term (between 1 and 10 years), if it is partial, i.e. not fully recovered, the effect is mitigated. Finally, the effect cannot be recovered, when the impossible alteration of repair, both by natural action and human. In case of being unrecoverable, but there is the possibility of introducing compensatory measures, the effect behaves as mitigated.
Synergy	SI	This attribute provides the reinforcement of two or more simple effects. The total component of the demonstration of simple effects, caused by actions acting simultaneously is higher than would be expected from the manifestation of effects when actions that provoke act independently not simultaneous.
Accumulation	AC	This attribute gives an idea of the progressive increase of the demonstration effect, when it persists continuously or repeated the action that generates it.
Effect	EF	This attribute refers to the cause-effect relationship, i.e. the form of manifestation of the effect of a factor as a result of an action. The effect may be direct or primary, being in this case the impact of the direct result of this action. In the event that the effect is indirect or secondary manifestation is not a direct as a result of the action, but occurs from a primary effect, acting as a second order action.
Periodicity	PR	The frequency refers to the regular manifestation effect either constant in time (Continuous effect) cyclic or recurrent (periodic effect) so unpredictably over time (Irregular effect), or constant over time (continuous effect).

Source: Conesa, 2003

To assess the significance of impacts of the project, the methodology established in the "Document 07 - Methodology for the assessment of environmental impacts" of the Guidebook of Environmental Evaluation and Control Natural Resources & Environment Secretariat (hereinafter called SERNA), Honduras, 2009), has been taken into account, as presented below (see Table 6.2):

Table 6.2. Valuation of Impacts

Classification	Values	Classification	Values
Nature		Intensity (I)	
Beneficial Impact (Positive)	+	Low	1
Harmful Impact (Negative)	-	Medium	2
		High	4
		Very High	8
		Total	12
Extension (EX)		Moment (MO)	
Punctual	1	Long Term	1
Partial	2	Medium Term	2
Extensive	4	Immediate	4
Total	8	Critical	(+4)
Critical (International)	(+4)		
Persistence (PE)		Reversibility (RV)	

Classification	Values	Classification	Values
Fleeting	1	Short Term	1
Temporary	2	Medium Term	2
Permanent	4	Irreversible	4
Synergy (SI)		Accumulation (AC)	
No Synergism (Simple)	1	Simple	1
Synergistic	2	Accumulative	4
Very Synergistic	4		
Effect (EF)		Periodicity (PR)	
Indirect (Secondary)	1	Irregular Or Discontinuous	1
Direct	4	Periodic	2
		Continuous	4
Recoverability (MC)		Importance (I)	
Immediately Recoverable	1	$I = \pm (3 I + 2 EX + MO + PE + RV + SI + AC + EF + PR + MC)$	
Recoverable In The Medium Term	2		
Mitigated	4		
Irrecoverable	8		

Source: Conesa, 2003

The major impact is represented by a number that is derived by the proposed model in the above Table. Impacts identified are grouped taking its environmental importance, according to the following pattern (see Table 6.3):

Table 6.3. Hierarchization of Impacts

Environmental importance	Score
Impacts with irrelevant environmental importance	<25
Environmental Impacts with moderate importance	25 a 50
Impacts with severe environmental importance	50 a 75
Important critical environmental impacts	>75

Source: Conesa, 2003

6.7 Evaluation of environmental impacts

The Importance Matrices of Environmental Impact Assessment (MIIA) are presented in the following tables, for each significant impact on the (middle and high importance) both positive and negative, identified by the modified Leopold Matrix developed for the Project Tourism Corridor of Honduras: tranche La Barca – El Progreso. These MIIA are presented by phases, selective rehabilitation and maintenance, Construction and Operation / Maintenance.

Table 6.4. MIIA Hydrological Regime Alteration (-) – Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACTS		Water							
		Hydrological Regime Alteration (water course and drainage)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
Low 1	•Punctual 1	•Long term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately recoverable 1
•Middle 2	•Partial 2	•Medium term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium term recoverable 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very synergistic 4			•Continuous 4	•Partially recoverable, Mitigated and/or compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	4	4

Importance I	31
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate

≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.5. MIIA Quality deterioration or water contamination (-) – Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACT		Quality deterioration or water contamination							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, sporadic aperiodic and discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	Cumulative 4	• Direct 4	• Periodic 2	• Medium-term recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially recoverable, Mitigated and/or compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	4	4

Importance I	31
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe

≥ 75	Critical
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Table 6.6. MIIA Quality Deterioration or Air Contamination and Dust and Foul Odor Generation (-)

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Air							
POTENTIAL IMPACT		Quality Deterioration or Air Contamination and Dust and Foul Odor Generation							
intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic y discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	1	1	1	1	4	1	1

Importance I	24
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.7. MIIA Increase in noise levels (-)

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Bearing Layer Placement / Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Air							
POTENTIAL IMPACT		Increase in Noise Levels							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and non-continuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	1	1	1	1	4	1	1

Importance I	22
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.8. Effects on Soil due to Compacting or Leveling (-) – Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Ground							
		Effects on Soil due to Compaction or Leveling (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic y discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	4	4	1	1	4	4	4

Importance I	34
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.9. MIIA Extraction or loss of soil (-) – Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Ground							
POTENTIAL IMPACT		Extraction or Loss of Soil (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or periodic and discontinuous	•Immediately Recoverable 1

								in u o u s 1	
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially recoverable, Mitigated and/or compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	4	4	1	1	4	4	8

Importance I	44
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.10. MIIA Modifying the Local Vehicular Traffic (-) – Bridge Maintenance and Placement of Bearing Layer

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Bridge Maintenance / Placement of Bearing Layer							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Modifying the Local Vehicular Traffic (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC

Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
* Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	4	1

Importance I	33
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.11. MIIA Disruption to surrounding communities due to project execution (-)

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Placement of Bearing Layer / Bridge Maintenance							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Disruption to Surrounding Communities due to Project Execution (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, sporadic or aperiodic and discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
4	4	4	2	1	1	1	4	2	4

Importance I	36
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.12. MIIA Increased risk of workplace accidents (-) – Placement of Bearing Layer

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Placement of Bearing Layer							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Increased Risk of Workplace Accidents (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	2	1	1	1	4	4	1

Importance I	32
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.13. MIIA Hydrological Regime Alteration (-) – Excavation, Cutting and Shaping of Filling / Drainage Works Construction

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Excavation, Cutting and Shaping of Filling / Drainage Works Construction							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACT		Hydrological Regime Alteration (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No Synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	2	4

Importance I	29
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.14. MIIA Hydrological Regime Alteration (-) – Bridge Construction

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Bridge Construction							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACT		Hydrological Regime Alteration (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	2	2	1	1	4	2	2

Importance I **32**

Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.15. MIIA Hydrological Regime Alteration (-) – Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACT		Hydrological Regime Alteration (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	4	2

Importance I **29**

Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.16. Quality Deterioration or Water Contamination (-) (-) – Exploitation and transport of material from borrow pits and bridge construction

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Exploitation and transport of material from borrow pits to Warehouse / Bridge Construction							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACT		Quality Deterioration or Water Contamination (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No Synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	2	2

Importance I	32
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.17. MIIA Quality deterioration or air contamination and dust and foul odor generation (-) Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite preparation/Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Air							
POTENTIAL IMPACT		Quality Deterioration or Air Contamination/ Dust and Foul Odor Generation (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	1	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.18. MIIA Increase in noise levels (-) – Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite preparation/Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Air							
POTENTIAL IMPACT		Increase in Noise Levels (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic y discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	1	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.19 MIIA Effects on Soil due to Compacting or Leveling (-) – Worksite Preparation and Excavation, Cutting and Shaping of Filling

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite Preparation / Excavation, Cutting and Shaping of Filling							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Ground							
POTENTIAL IMPACTS		Effects on Soil due to Compacting or Leveling (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	4	4	4	4	1	1	4	4	4

Importance I	40
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.20. MIIA Quality Deterioration or Soil Contamination (-) – Construction Activities

STAGE/ACTIVITY		Construction Activities: Location and Operation of Provisional Facilities/ Excavation, Cutting and Shaping of Filling / Placement of Bearing Layer / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Ground							
POTENTIAL IMPACT		Quality Deterioration or Soil Contamination (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	4	4	1	1	4	1	4

Importance I	31
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.21. MIIA Extraction or Loss of Soil (-) – Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Excavation, Cutting and Shaping of Filling / Drainage Works Construction / Bridge Construction / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Ground							
POTENTIAL IMPACT		Extraction or Loss of Soil (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	4	4	4	4	1	1	4	4	4

Importance I	40
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.22. MIIA Increased Erosion Processes (-)

STAGE/ACTIVITY			CONSTRUCTION STAGE						
			Excavation, Cutting and Shaping of Filling / Exploitation and transport of material from borrow pits						
IMPACTED MEDIUM			Physical						
IMPACTED FACTOR			Ground						
POTENTIAL IMPACT			Increased Erosion Processes (-)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	2	4	1	1	1	2	4

Importance I	27
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.23. MIIA Loss of Vegetation Cover (-) – Worksite Preparation and Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite Preparation and Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Biotic							
IMPACTED FACTOR		Flora							
POTENTIAL IMPACT		Loss of Vegetation Cover (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	4	4	4	2	1	1	4	2	4

Importance I	42
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.24. MIIA Disruption or Alteration of Fauna (-) – Worksite Preparation and Bridge Construction

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite Preparation /Excavation Cutting and Shaping of Filling/Drainage Works Construction/ Exploitation and transport of material from borrow pits / Bridge Construction							
IMPACTED MEDIUM		Biotic							
IMPACTED FACTOR		Fauna							
POTENTIAL IMPACT		Disruption or Alteration of Terrestrial or Aquatic Fauna (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	1	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.25. MIIA Modification to Traffic (-) – Placement of Bearing Layer

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Placement of Bearing Layer							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Modification to Local Traffic (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction

*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Apperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4

•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	2	1

Importance I	26
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.26. MIIA Modification of Traffic (-) – Bridge Construction

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Bridge Construction							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Socioeconomic							
		Modification to Local Traffic (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4

•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	2	1	1	1	4	2	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.27. MIIA Modification of Traffic (+) – Project Deployment

STAGE/ACTIVITY		OPERATION AND MAINTENANCE							
IMPACTED MEDIUM		Project Deployment							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Socioeconomic							
		Modification to Local Traffic (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8

•Total 12	•Critical (+4)								
Chosen Value									
4	8	4	4	2	1	1	4	4	2

Importance I	50
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.28. MIIA Increased local and regional economy (+) – Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE Location and Operation of Provisional Facilities / Placement of Bearing Layer / Bridge Construction / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Increased Local and Regional Economy (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								

Chosen Value									
4	8	4	2	1	1	1	4	4	1

Importance I	46
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.29. MIIA Increased Local and Regional Economy (+) – Maintenance Activities

STAGE/ACTIVITY		OPERATION AND MAINTENANCE STAGE							
IMPACTED MEDIUM		Maintenance Activities							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Increased Local and Regional Economy (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								

Chosen Value									
2	2	4	2	1	1	1	4	2	1

Importance I	26
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.30. MIIA Increased Risk of Workplace Accidents (-) – Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite preparation/Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Bridge Construction and Drainage works							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Increased Risk of Workplace Accidents (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								

Chosen Value									
4	1	4	1	1	1	1	4	1	1

Importance I	28
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.31. MIIA Employment Generation (+) – Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Construction Activities							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Employment Generation (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No Synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								

Chosen Value									
4	8	4	2	1	1	1	4	4	1

Importance I	46
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.32. MIIA Employment Generation (+) – Maintenance and Operation Activities

STAGE/ACTIVITY		OPERATION AND MAINTENANCE STAGE Operation and Maintenance Activities							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Employment Generation (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								

Chosen Value									
2	4	4	2	1	1	1	4	2	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.33 MIIA Disruptions to Surrounding Communities due to Project Activities (-) – Construction Activities

STAGE/ACTIVITY		CONSTRUCTION STAGE Worksite preparation/ Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Exploitation and transport of material from borrow pits / Bridge Construction							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Disruptions to Surrounding Communities due to Project Activities (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	•No Synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term recoverable term 2
• High 4	• Extended 4	• Immediate 4	•Permanent 4	• Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							•Irrecoverable 8
• Total 12	•Critical (+4)								
Chosen Value									

4	2	4	2	1	1	1	4	2	1
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Importance I	32
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.34. MIIA Changes in the Use of Soil (-) – Worksite Preparation

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Worksite Preparation							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Socioeconomic							
		Changes in the Use of Soil (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
4	2	4	4	4	1	1	4	4	4

Importance I	42
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.35. MIIA Savings in Travel Times and Savings in Fuel Costs (+) – Project Deployment

STAGE/ACTIVITY		OPERATION AND MAINTENANCE STAGE							
IMPACTED MEDIUM		Project Deployment							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Savings in Travel Times and Savings in Fuel Costs							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	• Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
4	8	4	4	2	1	1	4	4	2

Importance I	50
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.36. MIIA Reduction of Accidents and Increased Road Safety (+) – Project Deployment

STAGE/ACTIVITY		OPERATION AND MAINTENANCE STAGE							
IMPACTED MEDIUM		Project Deployment							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Socioeconomic							
		Reduction of Accidents and Increased Road Safety (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
4	4	4	4	2	1	1	4	4	2

Importance I	42
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Table 6.37. MIIA Altered Landscape and Aesthetics of the Environment (-) – Worksite Preparation and Exploitation and transport of material from borrow pits

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Worksite Preparation and Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Landscape Related							
POTENTIAL IMPACT		Landscape Related							
POTENTIAL IMPACT		Altered Landscape and Aesthetics of the Environment (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No Synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
2	4	4	4	1	1	1	4	4	4

Importance I	37
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7 Synthesis of Environmental and Social Impacts Associated with the Project

This is a synthesis of the environmental and social impacts associated with the project:

4.7.1 SELECTIVE REHABILITATION AND IMPROVEMENT STAGE

The most relevant environmental and social impacts in the Selective Rehabilitation and improvement Stage are described in the following section:

4.7.1.1 Hydrological Regime Alteration and Water Quality Deterioration (I=31)

During the activity of exploitation and material transport to the warehouse, it is possible to have an alteration in the hydrological regime, due to the activities of extracting material from the river bed, forming pools that must be leveled once the activities are concluded. In evaluating impacts, this impact was considered of moderate importance (I=31) (See **Error! Reference source not found.**). As a mitigation measure, in compliance by the concessionaire to the technical requirements established by INHGEOMIN (Honduran Geology and Mines Institute) for the extraction of sediment banks.

On the other hand, the Selective Rehabilitation and improvement Stage will generate an impact on the quality or contamination of waters, during the activity of exploitation and transport of floodplain soils, which increase turbidity, due to the suspension of river bed material and possible oil spills from the machinery's engines. This impact has moderate importance (I=31) See **Table 6.4. MIIA Hydrological Regime Alteration (-) – Exploitation and transport of material from borrow pits**

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACTS		Water							
		Hydrological Regime Alteration (water course and drainage)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
Low 1	• Punctual 1	• Long term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, sporadic or aperiodic and discontinuous 1	• Immediately recoverable 1
• Middle 2	• Partial 2	• Medium term 2	• Temporary 2	• Medium term 2	• Synergistic 2	• Cumulative 4	• Direct 4	• Periodic 2	• Medium term recoverable 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very synergistic 4			• Continuous 4	• Partially recoverable, Mitigated and/or compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									

2	2	4	2	1	1	1	4	4	4
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Importance I	31
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.1.2 Quality Deterioration or air Contamination and Increase in Noise Levels

Other impacts are presented in this Stage, but their importance is less relevant including the generation of dust and foul odors, air quality deterioration and increase in noise levels with importance values of 22 and 24 respectively. See **Table 6.5. MIIA Quality deterioration or water contamination (-) – Exploitation and transport of material from borrow pits**

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACT		Quality deterioration or water contamination							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, sporadic aperiodic and discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	Cumulative 4	• Direct 4	• Periodic 2	• Medium-term recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially recoverable, Mitigated and/or compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									

2	2	4	2	1	1	1	4	4	4
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Importance I	31
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

and Table 6.6. MIIA Quality Deterioration or Air Contamination and Dust and Foul Odor Generation (-)

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Bearing Layer Placement / Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Air							
POTENTIAL IMPACT		Quality Deterioration or Air Contamination and Dust and Foul Odor Generation							
intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic y discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	1	1	1	1	4	1	1

Importance I	24
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Points	Type
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< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

During the Selective rehabilitation and improvement Stage, these impacts will not be significant because the activities do not involve moving soil or removing vegetation. In regards to the increase in noise levels, there will be few machines and the work schedule will be regulated.

4.7.1.3 Compacting or Soil Leveling (I=34)

During the activity of exploitation and transport of dry borrow pits, there will be compacting of soil due to the constant movement of machinery in the sites. This impact has been considered of moderate importance (I=34) See **Table 6.7. MIIA Increase in noise levels (-)**

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Air							
POTENTIAL IMPACT		Increase in Noise Levels							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and non-continuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	1	1	1	1	4	1	1

Importance I	22
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

. In this case we suggest a surveillance and control program to mark off the work areas and reduce damage to other areas.

4.7.1.4 Extraction or Loss of Soil (I=44)

The extraction or loss of soil specifically arises from the activity of exploitation and transport of material from borrow pits, this factor is of moderate importance (I=44) (See **Table 6.8. Effects on Soil due to Compacting or Leveling (-) – Exploitation and transport of material from borrow pits**)

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Ground							
POTENTIAL IMPACT		Effects on Soil due to Compaction or Leveling (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic y discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	4	4	1	1	4	4	4

Importance I	34
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

), since the intensity of this impact is high and of partial extension. The floodplain soils used for extraction are expected to recover since these rivers flow permanently so there will always be natural reposition of material. To curb this impact, the exploitation has been planned in a sustainable way, considering the technical requirements for the exploitation of sediment banks with the same machinery to level the extraction zone.

4.7.1.5 Traffic Modification (I=33)

As negative impacts in the socioeconomic aspect of the Selective rehabilitation and improvement Stage, the modification of local traffic has been considered of medium importance (I=33) See **Table 6.9. MIIA Extraction or loss of soil (-) – Exploitation and transport of material from borrow pits**

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Ground							
POTENTIAL IMPACT		Extraction or Loss of Soil (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1		•Immediately Recoverable 1

•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially recoverable, Mitigated and/or compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									

4	1	4	4	4	1	1	4	4	8
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Importance I	44
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

. This modification to local traffic will occur during the bridge construction and bearing layer placement activities.

In this sense, as a mitigation measure to this impact, a Traffic Management Plan will be implemented to include detours and temporary closures due to the installation of road signals. This measure will be applied in compliance to the requirements of the Honduran National Transit Direction.

4.7.1.6 Disruptions to the Community (I=36)

The disruptions to the communities surrounding the highway, will specifically occur during the bridge construction and bearing layer placement activities in the Selective rehabilitation and improvement Stage, since some lanes will need to be partially closed during the development of activities, this impact is considered of moderate importance (I=36), See **Table 6.10. MIIA Modifying the Local Vehicular Traffic (-) – Bridge Maintenance and Placement of Bearing Layer**

STAGE/ACTIVITY		SELECTIVE REHABILITATION AND IMPROVEMENT STAGE							
IMPACTED MEDIUM		Bridge Maintenance / Placement of Bearing Layer							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Socioeconomic							
		Modifying the Local Vehicular Traffic (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
* Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4

•Very High 8	•Total 8	•Critical (+4)								•Irrecoverable 8
•Total 12	•Critical (+4)									
Chosen Value										
4	2	4	1	1	1	1	4	4	1	

Importance I	33
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

As a mitigation measure, we propose the implementation of a work plan that establishes work shifts to avoid affectations to the daily activities of local communities in the area of socioeconomic influence of the project, including the promotion and permanent communication with the community through the Communications Plan and the Project Promotion Campaign.

4.7.1.7 Increased Risk of Workplace Accidents (I=32)

All of the activities of the Selective rehabilitation and improvement Stage convey the risk of causing workplace accidents, impact that has been considered of moderate importance (I=32), See **Table 6.12**. To reduce the risks in the increase of accidents the workers and equipment operators will receive training about safety and the use of personal protection equipment, among other measures outlined in the Accident Prevention Plan.

All workplace areas must have first aid kits, including heavy machinery and the project's vehicles, there will also be permanent contact with local private hospital or ambulance services in case of an accident.

4.7.2 Construction Stage – Expansion and Operation

The most relevant social and environmental impacts during the Construction Stage- Expansion and Operation are described in the followings section:

4.7.2.1 Hydrological Regime Alteration (I=32)

The shaping of the filling will create a barrier for natural runoff that will modify its direction, also the pavement of the tranche, will generate a small change in local runoff and will probably reduce water infiltration to the water table. However, since the project area includes highly-productive aquifers, it is possible that the impact due to the reduction of the infiltration may not be significant. This impact has been assigned moderate importance (I=29) with medium, partial, and temporary intensity and medium term recovery value. See Table 6.13.

During the execution of the bridge construction activities there will be an alteration of the hydrological regime, because it is necessary to divert the course of the river, while the foundations and portions of each bridge is built. The diversions produce

changes in runoff systems and the distribution of surface waters causing local erosion processes and sedimentation. This impact has been evaluated with a moderate importance (I=32). This impact has a high intensity and is punctual. This impact will be temporary a recoverable in a medium term through human means. See Table 6.14

During the activity of exploitation and transport of material from borrow pits; there is a possible alteration to the hydrological regime, due to the activities of riverbed material extraction, causing the formation of pools that must be leveled once activities are concluded. This impact has been evaluated as moderate (I=29), and is established as a mitigation measure, in compliance by the concessionaire to the technical requirements established by INHGEOMIN (Honduran Geology And Mines Institute) for the extraction of sediment banks. See **Table 6.14. MIIA Hydrological Regime Alteration (-) – Bridge Construction**

STAGE/ACTIVITY			CONSTRUCTION STAGE						
			Bridge Construction						
IMPACTED MEDIUM			Physical						
IMPACTED FACTOR			Water						
POTENTIAL IMPACT			Hydrological Regime Alteration (-)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	2	2	1	1	4	2	2

Importance I	32
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe

≥ 75	Critical
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4.7.2.2 Quality Deterioration or Water Contamination (I=32)

The Construction Stage will generate an impact on the quality or water contamination, during the activity of material transport from floodplain soils and the construction of bridges, which will increase turbidity, due to the suspension of riverbed material and possible oil spills from the machinery's engines. This impact is of moderate importance (I=32), due to its high intensity, it's considered partial, fleeting, and of medium term recovery. See Table 6.16

4.7.2.3 Phreatic Level Alteration (I=33)

The shaping of the filling in the construction area of the bypass intersection is approximately 9.5 kms, it will create a barrier for natural runoff that will alter its direction, the pavement of the tranche will also generate a small change in local runoff and will possibly reduce infiltration to the water table, However, since highly productive aquifers predominate the project's area, the reduction of infiltration may not be significant. Table 6.17

4.7.2.4 Deterioration of Air Quality and Dust and Foul Odor Generation (I=30)

During the Construction Stage, there will be a significant generation of suspended particles (dust), due to the worksite preparation, the excavation, cutting, and shaping of the filling, and land movements in the road expansion area and the borrow pits, as well as the land movement activities due to the operation of heavy equipment on soils devoid of vegetation. The evaluation of this impact yields a moderate importance. (I=30) See **Table 6**.

The gas and particle emissions resulting from engine combustion from equipment and machinery will produce a significant addition of contaminating agents to current air quality, although this additional release will not significantly affect air quality, if mitigation measures are implemented in regards to preventive maintenance of all machinery used in the project.

4.7.2.5 Increase in Noise Levels (I=30)

The noise levels through the highway are not currently significant because traffic conditions and road characteristics do not allow the agglomeration of vehicles in the tranches where most communities are located. Furthermore, the highest levels of noise are not continuous enough to become a disruption to the communities. This impact yields a moderate importance (I=30) See **Table 6**, because it has a high intensity, is partial and fleeting and of immediate recovery.

The worksite preparation, excavation, cutting and shaping of the filling, the placement of the bearing layer, the exploitation and transport of material from borrow pits, all require the use of heavy machinery and equipment, which increases noise levels that indirectly affect surrounding communities. To regulate this, there will be a work schedule for the operation times of the machinery.

During the Selective rehabilitation and improvement and Construction stages, the noise generated by the different activities will take place exclusively during day hours between 6:00 am and 6:00 pm which is the normal schedule for this type of work. The noise levels generated depend on the equipment that is functioning; the disruptions will be conditioned to the distance from the houses or the workers quarters.

Due to the difficulty of measuring noise levels on site during the Selective rehabilitation and improvement and Construction Stage, the following chart establishes noise levels that OSHA has estimated for equipment similar to the one used for this activity:

Table 6.17. Noise Levels in dBA Produced by Construction Equipment

Origin	Intensity(approximate)
Truck	83-93 dBA
Tractor	73-93 dBA
Loader	72-85 dBA

Source: EPA, EUA, 1972

As can be seen, with the exception of the loader, both the trucks and the tractors to be used, are potential sources of noise above 85 dBA, which is the maximum value according to the General Regulation of Preventive Measures for Accidents and Professional Diseases of the Republic of Honduras that a person can be exposed to for a maximum of 8 hours.

Due to the previous information, all workers are required to have auditory protection equipment to minimize exposure risks.

During the Operation Stage, even with the estimated increase in vehicular volume, the initial conditions of particle and pollutant concentration are not expected to increase, due mainly to the location of the tranches in completely open areas that ease the dispersion of particles and pollutants.

4.7.2.6 Effects on Soil due to Compacting or leveling (I=40)

The project interventions, specifically the activities of worksite preparation and the excavation, cutting and shaping of the filling, generate a direct destruction and or compacting of the ground due to the road construction and land movements. Not only are the fillings and embankments affected, but also the auxiliary works (access roads, camps, borrow pits) due to the transit of heavy machinery. This impact is of moderate importance (I=40) See **Table 6.18. MIIA Increase in noise levels (-) – Construction Activities**

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite preparation/Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Air							
POTENTIAL IMPACT		Increase in Noise Levels (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-	•Temporary	•Medium	•Synergistic	Cumulative	•Direct 4	•Periodic 2	•Medium-term

		term 2	2	term 2	2	4			Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	1	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

The affected areas must be recovered at the end of the project through a Reforestation Plan established in the Environmental Management Plan.

Deterioration or Ground Contamination (I=31)

The main potential contaminating agents for the ground are accidental spills of oils and fuels. The risk of spilling and ground contamination must be prevented by the concessionaire adopting a series of procedures during operations with oils, fuels and dangerous materials, in regards to storage, transport and supply of machinery and vehicles and residue management. Contaminated soil will have to be withdrawn and discarded in adequate locations. This impact is of moderate importance (I=31) See **Table 6.19 MIIA Effects on Soil due to Compacting or Leveling (-) – Worksite Preparation and Excavation, Cutting and Shaping of Filling**

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite Preparation / Excavation, Cutting and Shaping of Filling							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Ground							
POTENTIAL IMPACTS		Effects on Soil due to Compacting or Leveling (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the	Change in the	Enhancing the	Progressive Increase	Cause-Effect	Regularity of the Manifestation	Human Reconstruction

	on	Effect	Alteration	Manifestation	Relations				
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	4	4	4	4	1	1	4	4	4

Importance I	40
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

, due to its medium intensity, it is punctual and partially recoverable. The mitigation measures for this impact comply with the Risk Prevention Program and the Management Program for liquid and solid residues.

4.7.2.7 Extraction or Loss of Soil (I=40)

During the activities of excavation, cutting and shaping of filling, the construction of drainage works, the construction of bridges and the exploitation and transport of material from borrow pits , there is a loss of soil. This impact is of moderate importance (I=40), because according to evaluation this impact is of medium intensity, is permanent, irreversible, extended in the area of influence of the project and partially recoverable See **Table 6.20. MIIA Quality Deterioration or Soil Contamination (-) – Construction Activities**

STAGE/ACTIVITY		Construction Activities: Location and Operation of Provisional Facilities/ Excavation, Cutting and Shaping of Filling / Placement of Bearing Layer / Exploitation and transport of material from borrow pits							
IMPACTED MEDIUM		Physical							
IMPACTED FACTOR		Ground							
POTENTIAL IMPACT		Quality Deterioration or Soil Contamination (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC

Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	4	4	1	1	4	1	4

Importance I	31
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.8 Increase in Erosion Processes (I=27)

This impact is produced when extensive land surfaces are left without vegetation cover, subject to the direct action of wind and water. This impact is presented in the activities of excavation, cutting and shaping of filling; exploitation and transport of material from borrow pits. The erosion of soil presents different environmental consequences: it affects hydrological flows, provokes air pollution, increases the risks of slope instability, and causes damages or destructions to areas of geological interests. In this case the impact has been assessed as moderate (I=27) See **Table 6.21. MIIA Extraction or Loss of Soil (-) – Construction Activities**

STAGE/ACTIVITY	CONSTRUCTION STAGE
	Excavation, Cutting and Shaping of Filling / Drainage Works Construction / Bridge Construction / Exploitation and transport of material from borrow pits
IMPACTED MEDIUM	Physical
IMPACTED FACTOR	Ground
POTENTIAL IMPACT	Extraction or Loss of Soil (-)

Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	4	4	4	4	1	1	4	4	4

Importance I	40
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Proposed mitigation measures include the implementation of Erosion and Sediment Control in areas of greater risk.

4.7.2.9 Loss of Vegetation Cover (I=42)

The worksite preparation and the exploitation and transport of material from borrow pits will generate a loss of vegetation cover with a moderate impact (I=42) See **Table 6.22. MIIA Increased Erosion Processes (-)**

STAGE/ACTIVITY	CONSTRUCTION STAGE
	Excavation, Cutting and Shaping of Filling / Exploitation and transport of material from borrow pits
IMPACTED MEDIUM	Physical
IMPACTED FACTOR	Ground
POTENTIAL IMPACT	Increased Erosion Processes (-)

Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	1	4	2	4	1	1	1	2	4

Importance I	27
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

Worksite preparation requires removing vegetable cover and trees located within the road in order to add the expansion of two additional lanes. In the site of the borrow pits, it is necessary to remove vegetation. There are no large trees in these areas only herbaceous vegetation and smaller shrubs.

4.7.2.10 Disturbance or Alteration to Terrestrial or Aquatic Fauna (I=30)

As a result to the activities of worksite preparation and the exploitation and transport of material from borrow pits that require removing vegetation there will be a disturbance or alteration in terrestrial fauna.

The bridge construction activity, will produce a disturbance to aquatic fauna, due to works on the riverbed, and also that for this specific tranche, it includes the construction of the new by-pass intersection to the city of El Progreso. There has been no intervention in this area before, and it has been declared in the El Progreso Zoning Plan as a Zone of Natural Aquifer Protection,

in which there will be an alteration of aquatic flora and fauna so this impact has been evaluated as moderate (I=30) See **Table 6.23. MIIA Loss of Vegetation Cover (-) – Worksite Preparation and Exploitation and transport of material from borrow pits**

STAGE/ACTIVITY			CONSTRUCTION STAGE						
			Worksite Preparation and Exploitation and transport of material from borrow pits						
IMPACTED MEDIUM			Biotic						
IMPACTED FACTOR			Flora						
POTENTIAL IMPACT			Loss of Vegetation Cover (-)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	4	4	4	2	1	1	4	2	4

Importance I	42
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.11 Modification to Traffic (I=30)

During the construction of bridges, there will probably be a modification to local traffic, which will require temporary detours and partial lane closures, which will cost an alteration of traffic in this tranche. This impact is of moderate importance (I=30), with a high intensity it is punctual and immediately recoverable. See **Table 6.24. MIIA Disruption or Alteration of Fauna (-) – Worksite Preparation and Bridge Construction**

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite Preparation /Excavation Cutting and Shaping of Filling/Drainage Works Construction/ Exploitation and transport of material from borrow pits / Bridge Construction							
IMPACTED MEDIUM		Biotic							
IMPACTED FACTOR		Fauna							
POTENTIAL IMPACT		Disruption or Alteration of Terrestrial or Aquatic Fauna (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or aperiodic and discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	2	4	1	1	1	1	4	1	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

The placement in the bearing layer activity will also cause a modification to local traffic, and so this impact acquires a value of (I=26), being of medium importance, partial temporary and immediately recoverable See **Table 6.25. MIIA Modification to Traffic (-) – Placement of Bearing Layer**

STAGE/ACTIVITY			CONSTRUCTION STAGE						
IMPACTED MEDIUM			Placement of Bearing Layer						
IMPACTED FACTOR			Socioeconomic						
POTENTIAL IMPACT			Modification to Local Traffic (-)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1		•Immediately Recoverable 1

•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	2	1

Importance I	26
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

During the Operation Stage there is a positive impact during project deployment, because providing maintenance to the roadway is considered beneficial to traffic and positive for the users. This impact during the operation stage acquires a severe importance (I=50), with a high intensity, in the area of influence of the project. See **Table 6.26. MIIA Modification of Traffic (-) – Bridge Construction**

STAGE/ACTIVITY	CONSTRUCTION STAGE Bridge Construction
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IMPACTED MEDIUM			Socioeconomic						
IMPACTED FACTOR			Socioeconomic						
POTENTIAL IMPACT			Modification to Local Traffic (-)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	2	1	1	1	4	2	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.12 Increase in Local and Regional Economy (I=46)

Due to the characteristics and type of project, the project will require labor for the diverse activities of the project. The project will generate indirect sources of employment with the companies that supply goods and services to the project thus increasing local and regional economy. Considering this impact of moderate importance in certain project activities such as the installation of

provisional facilities the replacement in the bearing layer, bridge construction and exploitation and transport from material to borrow pits, due to the grist demand of products and raw materials that the development of these activities require. This impact has been assigned high intensity in the total area and influence of the project with a moderate importance See **Table 6.27. MIIA**

Modification of Traffic (+) – Project Deployment

STAGE/ACTIVITY			OPERATION AND MAINTENANCE						
IMPACTED MEDIUM			Project Deployment						
IMPACTED FACTOR			Socioeconomic						
POTENTIAL IMPACT			Modification to Local Traffic (+)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	8	4	4	2	1	1	4	4	2

Importance I	50
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

During the operation stage, this impact will be present but it will have a lesser and moderate importance (I=26), because the demand for goods will be lower than during the construction stage See **Table 6.28. MIIA Increased local and regional economy (+) – Construction Activities**

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Location and Operation of Provisional Facilities / Placement of Bearing Layer / Bridge Construction / Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Increased Local and Regional Economy (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	8	4	2	1	1	1	4	4	1

Importance I	46
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.13 Increased Risk of Work Place Access (I=28)

All of the activities to be executed during the selective rehabilitation and improvement stage convey the risk of workplace accidents, impact that has been considered of moderate importance (I=28) See **Table 6.29. MIIA Increased Local and Regional Economy (+) – Maintenance Activities**

STAGE/ACTIVITY			OPERATION AND MAINTENANCE STAGE						
IMPACTED MEDIUM			Maintenance Activities						
IMPACTED FACTOR			Socioeconomic						
POTENTIAL IMPACT			Increased Local and Regional Economy (+)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	2	4	2	1	1	1	4	2	1

Importance I	26
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

To reduce the risk of workplace accidents there will be training sessions for the workers and machinery operators, about safety and the use of personal protection equipment amongst other measures outlined in the Accident Prevention Plan.

There will be First Aid Kits in all areas of the project including heavy machineries and project vehicles, in case of an accident there will be contact with local hospitals or ambulance services.

4.7.2.14 Generación de empleos Employment Generation

This impact has been valued of moderate importance (I=46 – See **Table 6.30. MIIA Increased Risk of Workplace Accidents (-) – Construction Activities**)

STAGE/ACTIVITY		CONSTRUCTION STAGE							
		Worksite preparation/Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Bridge Construction and Drainage works							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Increased Risk of Workplace Accidents (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	1	4	1	1	1	1	4	1	1

Importance I	28
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe

≥ 75	Critical
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) positive, because all project activities generate jobs, with a high intensity and total extension for the project.

One of the direct effects is that staff must be hired for the selective rehabilitation and improvement and constructions stages, including skilled and unskilled labor including engineers, architects, masons, carpenters, equipment operators, etc. This staff, will receive direct benefits from the activities for at least 24 months, with the consequence of multiplying indirect jobs, this impact is valued as positive for all activities.

During the Operation Stage jobs will be created, but in lesser quantities because the activities will be reduced. Thus the impact has been evaluated has moderate (I=30), of medium intensity; it is extensive in the area of influence in the project and is temporary See **Table 6.31. MIA Employment Generation (+) – Construction Activities**

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Construction Activities							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Employment Generation (+)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No Synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
4	8	4	2	1	1	1	4	4	1

Importance I	46
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design

≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.15 Disruptions to Surrounding Communities due to the Project (I=32)

Disruption to surrounding communities will specifically occur during the activities of worksite preparation, excavation, cutting and shaping of filling, placement of the bearing layer, bridge construction, and the exploitation and transport of material from borrow pits. This impact has been considered of moderate importance See **Table 6.32. MIIA Employment Generation (+) – Maintenance and Operation Activities**

STAGE/ACTIVITY			OPERATION AND MAINTENANCE STAGE						
IMPACTED MEDIUM			Socioeconomic						
IMPACTED FACTOR			Socioeconomic						
POTENTIAL IMPACT			Employment Generation (+)						
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
*Low 1	•Punctual 1	•Long-term 1	•Fleeting 1	•Short term 1	•No synergy (simple) 1	•Simple 1	•Indirect (secondary) 1	•Irregular, Sporadic or Aperiodic and Discontinuous 1	•Immediately Recoverable 1
•Medium 2	•Partial 2	•Medium-term 2	•Temporary 2	•Medium term 2	•Synergistic 2	Cumulative 4	•Direct 4	•Periodic 2	•Medium-term Recoverable term 2
•High 4	•Extended 4	•Immediate 4	•Permanent 4	•Irreversible 4	•Very Synergistic 4			•Continuous 4	•Partially Recoverable, Mitigated and/or Compensable 4
•Very High 8	•Total 8	•Critical (+4)							•Irrecoverable 8
•Total 12	•Critical (+4)								
Chosen Value									
2	4	4	2	1	1	1	4	2	1

Importance I	30
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

, it has been considered of high intensity, partial, temporary and of immediate recovery if the activity is stopped

As a mitigation measure, the project will implement a work plan that establishes the working schedule to avoid affecting daily community activities in the area of socioeconomic influence of the project, including the promotion and permanent communication with the community through the Communication Plan.

4.7.2.16 Changes in the Use of Soil (I=42)

It will be necessary in the worksite to change the use of the soil specifically during the construction of the new intersection bypass in the city of El Progreso. According to the El Progreso Zoning Plan, this area is located in a natural preservation zone 1, which corresponds to the highly productive aquifers of El Progreso declared and limited by the municipality. This impact has been considered of medium importance (I=42), because of its high intensity. See **Table 6.33 MIA Disruptions to Surrounding Communities due to Project Activities (-) – Construction Activities**

STAGE/ACTIVITY		CONSTRUCTION STAGE Worksite preparation/ Excavation, Cutting and Shaping of Filling Placement of Bearing Layer / Exploitation and transport of material from borrow pits / Bridge Construction							
IMPACTED MEDIUM		Socioeconomic							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Disruptions to Surrounding Communities due to Project Activities (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No Synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	• Cumulative 4	• Direct 4	• Periodic 2	• Medium-term recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								

Chosen Value									
4	2	4	2	1	1	1	4	2	1

Importance I	32
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.17 Savings in Time and Fuel Expenses (I=50)

During the Operation Stage there are certain benefits or positive impacts for users with the deployment of the project, because the project will generate minimal savings in travel time and few expenses with the maintenance of the road ways. These savings in time and fuel will considerably reduce the concentration of toxic gasses produced by vehicles. This impact is of severe importance (I=50), it has been valued with high intensity; it is extended in the total area of influence in the project it is permanent and continuous See **Table 6.34. MIIA Changes in the Use of Soil (-) – Worksite Preparation**

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Worksite Preparation							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Socioeconomic							
		Changes in the Use of Soil (-)							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	• Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially Recoverable, Mitigated and/or Compensable 4
• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8

• Total 12	•Critical (+4)									
Chosen Value										
4	2	4	4	4	1	1	4	4	4	4

Importance I	42
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

4.7.2.18 Reduction of Accidents and Increase in Road Safety (I=42)

Another positive impact in the socioeconomic environment of the Operation Stage, is the reduction of accidents and the increase in road safety, these impacts are considered of moderate importance (I=42 – See **Table 6.35. MIIA Savings in Travel Times and Savings in Fuel Costs (+) – Project Deployment**

STAGE/ACTIVITY		OPERATION AND MAINTENANCE STAGE							
IMPACTED MEDIUM		Project Deployment							
IMPACTED FACTOR		Socioeconomic							
POTENTIAL IMPACT		Savings in Travel Times and Savings in Fuel Costs							
Intensity	Extension	Moment	Persistence	Reversibility	Synergy	Accumulation	Effect	Periodicity	Recoverability
IN	EX	MO	PE	RV	SI	AC	EF	PR	RC
Degree of Destruction	Area of Influence	Term of Manifestation	Permanence of the Effect	Change in the Alteration	Enhancing the Manifestation	Progressive Increase	Cause-Effect Relationship	Regularity of the Manifestation	Human Reconstruction
• Low 1	• Punctual 1	• Long-term 1	• Fleeting 1	• Short term 1	• No synergy (simple) 1	• Simple 1	• Indirect (secondary) 1	• Irregular, Sporadic or Aperiodic and Discontinuous 1	• Immediately Recoverable 1
• Medium 2	• Partial 2	• Medium-term 2	• Temporary 2	• Medium term 2	• Synergistic 2	• Cumulative 4	• Direct 4	• Periodic 2	• Medium-term Recoverable term 2
• High 4	• Extended 4	• Immediate 4	• Permanent 4	• Irreversible 4	• Very Synergistic 4			• Continuous 4	• Partially recoverable, Mitigated and/or Compensable 4

• Very High 8	• Total 8	• Critical (+4)							• Irrecoverable 8
• Total 12	• Critical (+4)								
Chosen Value									
4	8	4	4	2	1	1	4	4	2

Importance I	50
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Points	Type
< 25	Irrelevant or matching or environmental measures were contemplated in the design
≥ 25 , < 50	Moderate
≥ 50 , < 75	Severe
≥ 75	Critical

), because with the maintenance of the road way traffic accidents will be reduced and road safety will be increased for all users.

4.7.2.19 Altered Landscape and Aesthetics of the Environment (I=37)

The area where the Tourism Corridor Project Tranche will be developed is an area which was previously operated during the construction of the road, the activities of construction expansion will concentrate within existing road easements. Some of the activities have been considered to affect the landscape including: worksite preparation and exportation of material from borrow pits. See **Table 6**.

7 MITIGATION MEASURES

This section details the environmental programs that will be implemented to prevent, mitigate and compensate the negative environmental impacts identified in sections **Error! Reference source not found.**, and boosting the positive impacts.

The Mitigation Plan includes a series of actions that have been grouped according to nature and specific objectives, in a series of programs detailed in **Table 6.18**:

Table 6.18. Description of Impacts and specific mitigation measures for each environmental impact

ISSUE	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	DEGREE OF IMPACT	LEGAL FRAMEWORK	GUIDELINE	ENVIRONMENTAL MEASURES	OBLIGATION	RESOURCES	RESPONSIBLE	TERM
Water	Use of Hydrological Resources	1a. Hydrological Regime Alteration	Low to High	General Environment Law General Water Law	General Water Law: Art. 59, 61, 62, 63. Guidelines for the Exploitation of Floodplain Soils (INHGEOMIN)	<ul style="list-style-type: none"> Extraction activities must be done in adequate and specific sites not along the river bed. Enforce a Surveillance and Control Program, to avoid damaging other areas. Proper water usage in accordance to the Water Usage Permit 	<ul style="list-style-type: none"> Daily field verification Record worker's training on environmental issues 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
		1b. Phreatic Level Alteration	Low to Moderate	General Environment Law General Water Law	General Water Law: Art. 59, 61, 62, 63. Guidelines for the Exploitation of Floodplain Soils (INHGEOMIN)	<ul style="list-style-type: none"> Enforce a Surveillance and Control Program, to avoid damaging other areas. Proper water usage in accordance to the Water Usage Permit Follow the technical guidelines of INHGEOMIN for floodplain soils. 	<ul style="list-style-type: none"> Daily field verification Keep water consumption records 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Generation of wastes and hazardous substances	1c. Quality deterioration or water contamination	Moderate	General Environment Law General Water Law Health Code Regulation for Integral management of Solid Wastes	General Environment Law: Art. 32, 54, 66. General Water Law: Art. 36, 43, 44. Health Code Art, 34, 35, 41.	<ul style="list-style-type: none"> Management Program for Liquid and Solid Wastes Contingency program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.) 	<ul style="list-style-type: none"> Daily field supervision Separation of wastes at source, deposit placement. Final waste disposal record Record of the amount of substances disposed of in authorized containers. Record of worker's training on water contamination issues. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist Security Supervisor	Permanent Selective Rehabilitation and improvement Stage Construction Operation

ISSUE	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	DEGREE OF IMPACT	LEGAL FRAMEWORK	GUIDELINE	ENVIRONMENTAL MEASURES	OBLIGATION	RESOURCES	RESPONSIBLE	TERM
AIR	Contaminating gas emissions	2a. Quality deterioration or air contamination	Low to Moderate (Placement of Bearing Layer)	General Environment Law Health Code Regulation for Control of Contaminating Gases and Smoke Emissions from motor vehicles	General Environment Law : Art 60 Health Code : Art. 46, 48, 50 y 114. Parameters established by the Regulation for Control of Contaminating Gases and Smoke Emissions from motor vehicles	<ul style="list-style-type: none"> Construction Equipment and Vehicles Preventive Maintenance Plan Vehicular Emissions Compliance Control Program 	<ul style="list-style-type: none"> Monthly maintenance record Vehicular Emissions Maintenance Record (opacity %) Workers training record on air contamination. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist Security Supervisor	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Dust Emissions	2b. Dust and foul odor emission	Low to Moderate (Placement of Bearing Layer)	General Environment Law Health Code Municipal Taxation Plan	General Environment Law : Art 59, 61 Health Code : Art. 46, 48 y 50.	<ul style="list-style-type: none"> Dust and Foul Odor Emission control Program 	<ul style="list-style-type: none"> Daily water sprinkling on the road Photographic record of activities Cleaning of the street if necessary Inspection of canvas tarps for cargo trucks Disposal of wastes in designated areas 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist Security Supervisor	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Noise	2c. Increase in noise levels	Low to Moderate (Placement of Bearing Layer)	General Environment Law General Regulation of Preventive Measures for Accidents and Professional Diseases	General Environment Law : Art 61 Maximum noise levels established by the General Regulation of Preventive Measures for Accidents and Professional Diseases	<ul style="list-style-type: none"> Preventive Maintenance Program for vehicles and construction equipment Work Schedule: avoid as much as possible work during night hours or rest periods; if unavoidable notify affected populations in advance Provide auditory protection equipment for workers exposed to levels higher than 80 dBA. 	<ul style="list-style-type: none"> Record of monthly maintenance Compliance to work schedules established in the work plan. EPP review and measurement of noise and vibration levels workers are exposed to. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist Security Supervisor	Permanent Selective Rehabilitation and improvement Stage Construction Operation

ISSUE	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	DEGREE OF IMPACT	LEGAL FRAMEWORK	GUIDELINE	ENVIRONMENTAL MEASURES	OBLIGATION	RESOURCES	RESPONSIBLE	TERM
SOIL	Structural Alteration of the Soil	3a. Effects on soil due to compacting or leveling	Moderate	General Environment Law	General Environment Law : Art. 48.	<ul style="list-style-type: none"> Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas. If required at the end of operations, soil that has been compacted by the transit of heavy machinery or temporary facilities must be loosened and covered with topsoil for later revegetation. 	<ul style="list-style-type: none"> Daily field supervision Worker's training records on environmental issues. Identification of areas compacted by the transit of heavy machinery and/or temporary facilities and their readequation. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Generation of wastes and hazardous substances.	3b. Quality deterioration or soil contamination	Low	General Environment Law	General Environment Law : Art. 48, 66.	<ul style="list-style-type: none"> Contingency Program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.) Liquid and Solid Wastes Management Program 	<ul style="list-style-type: none"> Monthly record of incidents or spills in project area. Waste separation at source, storage in tanks Final waste disposal record Record of amounts of waste disposed of in authorized sites Worker's training record on soil compacting issues Daily field supervision 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Use of Material	3c. Extraction or loss of soil	Moderate	General Environment Law General Mining Law	Guidelines for the Exploitation of Borrow Pits (INHGEOMIN)	Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas.	<ul style="list-style-type: none"> Daily field supervision Execute exploitation activities within the area stipulated by the concession Request Environmental and Concession License For new exploitation of borrow pits request corresponding permit to the SOPTRAVI Environmental Management Unit in INHGEOMIN Follow the technical guidelines of INHGEOMIN for floodplain soils. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation

ISSUE	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	DEGREE OF IMPACT	LEGAL FRAMEWORK	GUIDELINE	ENVIRONMENTAL MEASURES	OBLIGATION	RESOURCES	RESPONSIBLE	TERM
		3d. Increase in erosion processes	Low to Moderate	General Environment Law	General Environment Law	Measures for erosion control and slope stabilization	<ul style="list-style-type: none"> Daily field supervision Compliance with construction specifications Execute cutting and shaping of filling activities in dry seasons. Protect bare soil at the end of activities. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
FAUNA AND FLORA	Pruning and vegetation removal	4a. Loss of vegetation cover	Low	General Environment Law	General Environment Law : Art. 41, 60	Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas.	<ul style="list-style-type: none"> Daily field supervision Worker's training record on flora and fauna issues 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Installation of camps/poaching	4b. Disturbance of terrestrial and aquatic fauna	Baja	General Environment Law	General Environment Law : Art. 41, 60	Surveillance And Control Program: Avoid predation and/or altering species' habitats	<ul style="list-style-type: none"> Daily field supervision Worker's training record on flora and fauna issues 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
SOCIO ECONOMIC	Road rehabilitation and maintenance	5b. Modification to local traffic	Moderate	Transit Law General Regulation of Preventive Measures for Accidents and Professional Diseases	Installation Of Road Signals according to the General Regulation of Preventive Measures for Accidents and Professional Diseases SOPTRAVI Road Manual	<ul style="list-style-type: none"> Work Schedule: execute installation of road signals as planned in the Traffic Management Program Coordinate with the National Transit direction for the permanent Information Campaign: Inform communities of planned activities 	<ul style="list-style-type: none"> Regulation of speeds, daily field supervision Necessary road signals required for activities Record of worker's training on transit regulations Presence of flagmen and safety cones when lanes are closed 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation

ISSUE	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	DEGREE OF IMPACT	LEGAL FRAMEWORK	GUIDELINE	ENVIRONMENTAL MEASURES	OBLIGATION	RESOURCES	RESPONSIBLE	TERM
	Camp installation	5e. Increase in the risk of disease transmission	Low	Health Code	Health Code: Art. 101, 114 y 115.	<ul style="list-style-type: none"> Health and Hygiene Program for the Prevention of Diseases 	<ul style="list-style-type: none"> Hold health fairs and vaccination campaigns Record of worker's training on contagious diseases 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist Security Supervisor	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Worksite accidents	5f. Increased risk of accidents	Low to moderate	Health Code General Regulation of Preventive Measures for Accidents and Professional Diseases	Health Code Art. 120 a 122. General Regulation of Preventive Measures for Accidents and Professional Diseases, Art 44 al 49, 107, 108 y, 392, 424 a 428.	<ul style="list-style-type: none"> Risk and Accident Prevention Program Keep first aid kits and ambulance services available 	<ul style="list-style-type: none"> Maintain PPE inventory Field inspections by the security supervisor Record of worker's training on accident prevention measures and hazardous material management Have first-aid kits, extinguishers, and necessary emergency equipment. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist Security supervisor	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Liquid and solid Waste generation	5h. Increase in public sanitation issues due to the generation of solid and liquid wastes	Low	General Environment Law Health Code Regulation for the Integral Management of Liquid and Solid Wastes	General Environment Law: Art 6, 32, 54, 60. Health Code Art 52 y 53.	<ul style="list-style-type: none"> Liquid and Solid Waste Management Program 	<ul style="list-style-type: none"> Separate wastes at source, installation of tanks Final disposal waste record Worker's training records on waste management issues. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
	Road maintenance and rehabilitation	5i. Disturbances to surrounding communities	Low to moderate	Transit Law General Regulation of Preventive Measures for Accidents and Professional Diseases		<ul style="list-style-type: none"> Work plan: establish a work Schedule to avoid disturbing nearby communities Permanent Information Campaign: Inform communities of planned activities 	<ul style="list-style-type: none"> Compliance with established work schedules Communication evidence (meetings, flyers, radio) Periodic supervision and implementation evidence for plans and programs 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation

ISSUE	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	DEGREE OF IMPACT	LEGAL FRAMEWORK	GUIDELINE	ENVIRONMENTAL MEASURES	OBLIGATION	RESOURCES	RESPONSIBLE	TERM
	Location of temporary camps and facilities	5j. Changes in the use of soil	Moderate	General Environment Law. Territorial Ordinance Plan	General Environment Law: Art 1, 48, 51. Territorial Ordinance Plan): Art. 46	<ul style="list-style-type: none"> Revise the El Progreso Territorial Ordinance Plan Request change in the use of soil to the municipality 	<ul style="list-style-type: none"> Develop activities planned in the Territorial Ordinance Plan 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation
Landscape	Modifications to landscape	7a. Alterations or changes in the landscape and aesthetics of the environment	Low	Transit Law	Installation Of Road Signals according to the Transit Law and RGMPATEP	<ul style="list-style-type: none"> Work Schedule: Execute the installation of road signals Surveillance And Control Program: Delimit the area of influence to avoid damage to other areas.	<ul style="list-style-type: none"> Daily field supervision Necessary road signals for the Selective Rehabilitation and improvement for the road operation issued. 	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation

Source: The Consultant

Cada Programa propuesto como medida de mitigación, se detalla a continuación.

Each program proposed as a mitigation measure is detailed as follows.

4.8 Activities to Comply to Each Mitigation Measure

4.8.1 Temporary Facilities Management Program

The construction and operation of temporary or provisional facilities will generate low importance impacts, and to mitigate the effects of this project activity, besides complying to the road manual, volume 8 of the environmental guide for road projects of SOPTRAVI (Transportation & Civil Works Secretariat) and any other program detailed in this section of mitigation measures in the applicable construction stage (e.g. Dust Control Program, preventive vehicle and construction equipment maintenance) the following mitigation measures must be applied:

- The construction and operation of temporary or provisional facilities will generate low importance impacts, and to mitigate the effects of this project activity, besides complying to the road manual, volume 8 of the environmental guide for road projects of SOPTRAVI (Transportation & Civil Works Secretariat) and any other program detailed in this section of mitigation measures in the applicable construction stage (i.e. Dust Control Program, preventive vehicle and construction equipment maintenance) the following mitigation measures must be applied:

- Strict compliance in the use of the areas designated for temporary facilities in the chosen areas. The location of small facilities or camps close to the service areas established for construction logistics shall not be authorized.
- The construction company must request to the competent authorities, owners or legal representatives of the area to be occupied (when these temporary facilities are located in private land), the permits for these temporary facilities.
- Before placing these temporary facilities the concessionaire must present a design that includes corresponding preventive and treatment measures in compliance to besides complying with the road manual, volume 8 of the environmental guide for road projects of SOPTRAVI (Transportation & Civil Works Secretariat). As a minimum it must contemplate the description of the characteristics of water proof surfaces, roofing, effluent treatment systems, runoff channeling, installation of road signals, distribution and orientation of the storage sites, solid waste management systems, etc.
- Before the operation of the temporary facilities these must be subjected to a process of risk analysis. The recommendations of the risk study must be implemented before occupying these temporary facilities.
- The camp must have an emergency response plan that must include as a minimum, the use of fire extinguishers and all fire protection equipment specified in the contract, located in strategic places and correctly marked to indicate the type of fire in which they can be used.
- Whenever possible, no tree shall be cut or any other plant species of special value, whether generic or landscape related. These facilities will preferable be located in previously intervened areas and away from water courses or water bodies. If it is necessary to cut down trees the required permit must be requested to the municipality, according to its local tax regulation.
- If necessary to remove vegetable material, it must be moved to other impact free zones and it must be adequately stored through conservation processes in order to place it again during the restoration of the area, as specified in the Environmental Recovery Abandoned Plan for each Area. The tree pruning residues must not be placed in water currents, it must be stacked in such a way it does not cost loss of equilibrium in the area and it must finally be transported and deposited in the site for final disposal of construction material. The incineration of these residues is not allowed.

- It is strictly forbidden to hunt; set traps, commercialize or disturb fauna. In the case of rescue and relocation of animal species they must be reported to SERNA (Natural Resources & Environment Secretariat) to comply with procedures established by this authority.
- The temporary facilities must have independent water sources, including deposits or cisterns, which will be filled with water from non-intermittent sources with proper authorization from SERNA.
- If there is no nearby connection to the public sanitation drainage system, a septic tank must be installed, complemented, if necessary, with mobile sanitation units. It is forbidden under any circumstance to discharge sewage or throw solids wastes to any body of water.
- Skid resistant material will be placed wherever the ground is moistened. (E.g. in bathrooms and open corridors)
- The construction of temporary facilities must have crossed ventilation so air currents pass freely through them.
- For larger fueling operations (i.e. the warehouse area), besides having a system and procedure for safe dispatch, there must be fire extinguishers according to the Risk Prevention Plan, which contemplated the capacity of the warehouse.
- The temporary facilities must have signals indicating evacuation routes and meeting points according to the Risk Prevention Plan.
- The ratio of portable toilets to people is one for every 10 persons or workers of the same sex and one more if there is a lady. The toilets must be reasonably accessible in all work fronts and not exceed 60 mts distance from each work station.
- A formally established company must be hired to provide maintenance and cleaning of the septic tank. The same applies for a toilet maintenance service that includes but is not limited to the removal of wastes, chemical recharge; cleaning and disinfection, and toilet paper supply. This company must keep offer receipts for their cleaning activities and disposal of organic wastes and the construction company must keep records of this activity. The service must be supplied at least three times per week or depending on the recommendations of the company hired for cleaning. The toilets will be removed at the end of the project.
- The temporary facilities must have public services (water energy, phone service, waste collectors etc.). There must be water for hand washing and fresh water for consumption by the workers.
- A procedure for electrical safety at the facilities must be developed and executed in compliance to general Honduran technical requirements or the guidelines established by the electric energy company.
- If cafeterias or dining rooms are established, they must be located inside the temporary facilities and comply with necessary hygiene guidelines.
- Water proof waste containers must be installed in different areas. To promote recycling and reuse of residues, color differentiation will be used in the containers to classify wastes according to origin or source, and later evacuated by the providers of these services for recycle or reuse.

- In the temporary facilities area an Environmental Recovery Abandon Plan must be implemented at the end of the construction stage to include, as a minimum, the removal of all signs, notifications, and billboards that may have been placed temporarily during the execution of the process temporary connections and services, and reestablishing natural landscape conditions.
- If the temporary facility has provisional storage of material these materials will be organized by type, covering those that generate particles to avoid dispersion through wind and/or water erosion and, the design of access routes for trucks coming and going with material.
- With the exception of authorized security personnel, the use and carrying of firearms is prohibited within the Project Area. It should be avoided that workers move out of project areas without authorization from the temporary facility manager.
- The machinery cleaning operations must take place away from water bodies or there must be a treatment system for the effluents (i.e. water and oil separators, sedimentary, etc.)
- If the temporary camp zone is located where there is no rainwater drainage system, and the activities take place during the rainy season, a channel to intercept rainwater and runoff must be built and directed to the nearest natural drainage to avoid erosive processes and/or stagnant water.
- If there are workshops near the camps where fuel, oil, and lubricant residues are produced, the floors must be waterproofed and temporary collection measures must be implemented. The recovered hydrocarbons must be regenerated and reused for other activities not harmful to the environment, to avoid water and soil pollution and the destruction of vegetation.

4.8.2 Construction Equipment and Vehicles Preventive Maintenance Plan

The most important impacts on the quality or air pollution are associated with the construction stage. All vehicles and construction equipment produce atmospheric emissions. To minimize the negative impacts the following measures must be observed:

Initial Activities:

- The staff chosen to operate the machinery, tools, or driving the vehicles must be trained before starting operations.
- The concessionaire will check that each of the vehicles have been subject to a technical and mechanical revision, which ensures perfect functioning of brakes, direction, suspension, permitted visual and auditory signals, and the exhaust system. The same applies for the condition of the tires and checking that the gas certificate for each vehicle has been updated.
- +
 - The concessionaire will provide SOPTRAVI (Transportation & Civil Works Secretariat) (one month before starting the construction stage) with a list with the description of each piece of equipment, vehicle, or machinery used for construction and the process for transport to the worksite specifying the routes for each transport.

The concessionaire will provide, before the construction stage, a monthly maintenance plan for the machinery and equipment used during Project construction; this plan must follow the specifications indicated in the manual or the requirements of the suppliers and distributors.

- If the maintenance of the equipment, machinery, or vehicles used during project construction must be done away from the temporary facilities, the concessionaire will provide a list of sites (shops, diagnostic centers) where the maintenance will take place.
- The maximum speed within the temporary facilities and workshops is 10 km/hr and a maximum of 45 km/hr in the supply roads.

Operation of Machinery and Equipment:

- The concessionaire, prior to starting the project, will check that all vehicles have the necessary road safety elements established by the National Transit Authority guidelines (DNT).
- The concessionaire will check that each one of the vehicles to be used has been subjected to a technical-mechanical revision, foreseen in the initial activities.
- The machinery will have proper identifications in a visible place indicating method of operation, load capacity, max speed, and danger warnings.
- In order to avoid excessive noise generation and non-compliance to maximum established limits according to national regulation, the concessionaire must consider noise levels, including the inspection of the mufflers of the machinery and occupational monitoring in compliance to the Environmental Monitoring Plan.
- Heavy machinery must have a preventive and corrective maintenance plan, specific to each piece of equipment or machine, indicating the date, the activities to be conducted, and the site where maintenance will take place, and the persons or departments responsible for this activity. The equipment maintenance will take place in the temporary facilities or in authorized diagnostic centers (in case of requiring a specialized center). There must be a record of the maintenance plan execution.
- Heavy equipment operators must inspect their machines daily, at the start and end of each workday, to ensure safe operating conditions.
- The vehicles used in the project must preferably include recent models, to avoid emissions that exceed the norm.
- The unnecessary operation of engines must be avoided to reduce disruptions to the environment produced by noise, exhaust gases, smoke, dust, and any other nuisance.

4.8.3 Vehicular Emission Control Compliance Program

In compliance to the Regulation for the control of toxic gas, smoke, and particle emission from motor vehicles, article 4 of this Regulation states, “In order for the motor vehicles not to emit pollution levels that exceed levels allowed by this regulation, each vehicle must have an Emissions Control Card, issued by an authorized Emissions Control Center”

The use of the Emissions Control Card is not currently enforced; instead, a specialized company is hired once a year to monitor the vehicular fleet for each project.

4.8.4 Foul Odors and Dust Emission Control Program

Air quality and consequently, worker's health may be affected during construction by dust emissions, due to cutting and filling, handling and transport of materials, or machinery, vehicle, and heavy equipment circulation.

The most relevant impacts regarding foul odors during the construction issued consist mainly on smoke discharges and foul odors that can be produced during the use of vehicles, equipment, and machinery; as well as the generation and accumulation of solid and liquid residues and organic wastes.

To mitigate the negative effects of the Project during the construction issued the following mitigation measures must be applied:

- Prepare a Dust Control Program, which contemplates activities prior and during execution. The Dust Control Program must contemplate a permanent water source for sprinkling. The project ground must be kept moist, sprinkling with water the road and areas more prone to accumulating dirt and dust, this activity must be done mainly in the road tranches within populated areas.
- If the work is subcontracted it must be ensured to comply with the Dust Control Program
- Prior to the execution to this activity, the concessionaire must present a loading procedure according to the type of equipment to avoid overloading supply lanes and material transport roads.
- Any truck that carries stone material must be covered with tarp or plastic and circulation speed must be limited.
- When executing loading operations, the transport equipment must be completely stopped with the parking brake on to avoid accidental movements.
- When vehicles circulate through the areas of indirect influence of the construction they must do so at moderate speeds to avoid producing excessive dust particles.
- The excavation areas must be kept free of solid wastes and dirt to avoid air contamination due to passing vehicles. Any construction wastes that can be easily transported by the wind have to be picked up immediately.
- There must be an adequate system for waste and organic material disposal. The concessionaire will promote the use of solid residue containers and sanitary services to avoid the dispersion of solid and organic residues.
- Open pit burning or burying of wastes in worksites is forbidden.

4.8.5 Local and Regional Suppliers Selection Program

The local and Regional Supplier Selection Program is created as a mitigation measure, in this case an Incentive Program, for the positive impact in the increase of local and regional economy to establish a list of companies that offer products or raw materials necessary for the project, that can be asked to present quotes for their products, but they must be from the area.

The concessionaire must communicate and promote the Project to small and medium companies, through flyers, ads or newspapers articles or websites, about the opportunities of providing goods and services to the projects.

For selection of local and regional suppliers, the concessionaire must verify the following requirements:

- That their products are of good quality, and area available in the required quantities,
- That the shipments are made in a timely manner,
- The Price is reasonable,
- The service offered is good, and

- The products carry a return warranty in case of defect or non-compliance

The process will also consider the companies tract record, facilities, post-sales service, technical expertise, financial level, organization and management capacities, reputation and location.

4.8.6 Traffic Management Program

The Traffic Management Program will include the following mitigation measures:

- Regulate the speed of the vehicles and machinery along the road, especially when transiting in populated areas
- Comply to the corresponding regulations of weights and dimensions, to avoid excessive loads that damage the roads
- Organize maintenance brigades for periodic maintenance to access roads, reducing further damage to the roads, and the risk of accidents.
- Inform with at least 3 days anticipation, road users, specially community leaders municipal and transit authorities, school directors, local business managers, about the constant presence of large vehicles during the construction issued and in particular of peak equipment and machinery and material movements along the affected roads. Notice must be given through written press releases, flyers, radio ads, newspaper ads, etc.
- The necessary road signals will be placed to alert drivers and pedestrians about provisional detours. Transit control elements (traffic cones, vertical posts, informative signals, plastic barriers, etc.) will be used to direct road users to ensure safety and flow of vehicles.
- Give training and build awareness in vehicles and equipment drivers and operators about the National Honduran Transit Direction (DNT) regulations, as well as the particular Project regulations and sanctions regarding road safety. (E.g. transit speeds inside and outside the project sites, installation of road signals, etc.)
- Monitor internal Project speeds and apply sanctions in case of noncompliance.
- Limit Access and work areas to minimize circulation in these zones and avoid compacting of soils due to machinery and transit.

The traffic control devices, the signals, and symbols will be made to comply with the requirements of the DNT, and comply as well with the Highway Manual, of the General Highway Direction of SOPTRAVI.

The following measures must also be considered:

It is important to highlight that the measures of preventive installation of road signals and detours must be in place before start of operations, specifically in the current road system intersections. The state of the road signals must be verified during its use to foresee timely maintenance and/or replacement.

- Specific personnel (“flagmen”) for transit control in work areas, such as entry and exit control for heavy equipment, transport of equipment that exceeds regular width dimensions, worker’s crossing etc.
- When there are partial traffic closures or during material transport activities, “flagmen” will be used to guide traffic using “flags” or signals, to maintain organized traffic in the project’s area. Before any activities that modify traffic routes there must be an information campaign through press, radio, and television. This campaign will inform the community of the date of activities that affect motor and pedestrian circulation and the corresponding alternate routes that are implemented.

4.8.7 Measures to reduce the increased risk of workplace accidents

The plan proposes a series of training-awareness sessions with the construction company's staff (for the construction stage) and the administration company's staff (during operation issued) for the Tourism Corridor: Tranche La Barca- El Progreso, that contemplates, at least, the following issues, that have to assume as company best practices:

- Basic Safety Guidelines for Environmental Control
- Max speeds in access roads
- Max speed in streets or populated areas 20 km/h.
- Ban consumption of alcoholic beverages in the construction and operation area.
- Ban the use of fire within the construction area and smoking within 50 meters from the fuel or flammable materials storages.
- Every vehicle must be equipped with a fire extinguisher.
- Respect parking areas.
- Observe maximum respect for public and private property in the whole project area.
- Obey environmental laws in the area of operations.
- Collect all wastes generated by the project and transport it to designated disposal areas.
- Keep the construction project area clean.

Consequently to these training-awareness actions, the entire project area must possess safety and warning signals to avoid contingencies; this action must continue throughout the project.

The contractor and subcontractors staff, if such were the case, must maintain the cordial relations established between the Construction Company and local population, any conflict must be reported and solved immediately.

The contingency plan must be observed to prevent bodily injuries and traffic accidents. There must also be a strict observance of driving policies for the vehicles employed by the project. The occupational health unit of the construction company must monitor this process of preventive and promotion measures.

The contractor must provide appropriate personal protection equipment to all workers (hats, goggles, masks, leather gloves, lumbar protectors, safety footwear and clothing). During the operation of equipment, the use of ear plugs is recommended to all exposed staff and ear muffs for all staff within 10 meters from areas with noise greater than 80dB.

Work Schedule to Regulate Construction Machinery and Equipment Operation Times

The objective of this program is to establish a work plan that clearly outlines working schedules, of equipment located with the temporary facilities, as well as machinery operating in the different work areas.

If due to unforeseen conditions during project execution (e.g. delays due to unfavorable weather conditions), there are times when the construction company must work out of this schedule, and the company must present a work plan for specific nighttime operations, which considers, at least, the following:

- Restricting the use of heavy equipment and machinery to the day shift (6:00 am – 6:00 pm). When activities must be done at night, with permission from the municipal authorities, the work must be limited to low-noise activities.
- Any work done outside the regular work schedule requires approval by the supervisor.
- The affected communities must be informed, in anticipation through flyers, ads in newspapers and/or use of audio equipment, of the date and time of activities executed outside of regular operation times. There must be one or several written notifications, posters or banners, along the area affected by work outside of regular operation times.

- Design a Lighting Plan according to safety measures for the executed activities.
- Monitor the levels of environmental noise during these work schedules to avoid exceeding max limits established by local regulations.

4.8.8 Soil Conservation and Protection Program

Erosion processes may occur during the execution of cleaning and removing vegetation cover activities, and during the excavation, cutting and shaping of filling, during the construction stage.

The measures for soil conservation and protection during the construction issued must be applied in sites where there is land movement or removal of consolidated material; as well as the drainage exits in the road. In order to protect unstable slopes and avoid progressive erosion, the following environmental measures are recommended:

- Comply with construction specifications in regards to providing superficial drainage elements (coronation trenches, ditches, culverts, discharge works and complementary structures); as well as the physical measures and specifications (terracing, gabions) and biological measures (revegetation, reforestation, terrain conformation etc.) proposed for stabilization.
- Execute, if possible, operations of greater movement and land disturbance, (cutting and shaping of filling, major drainage works, etc.) during low-rain periods, to avoid rain and river erosion, prioritizing the start of operations in areas with greater slope.
- Once construction works have been concluded, bare surfaces must be covered with grass or stabilizing material and sowing eroded areas as soon as possible according to the Reforestation Plan.
- The paving of ditches and gutters must be contemplated according to project design as well as implementing permanent and temporary measures (e.g. ditches, energy dissipaters, sediment traps, sediment vats, duck boarding, stone paving, natural and artificial barriers, among others). For the protection of drainage discharge in the road and nearby areas.

Slope Stabilization Measures

- Comply with adequate slope values to avoid overload of slopes and subsequent landslides.
- Round of the edges of cut slopes and embankments.
- The ditches in the Crown or higher parts of the slope, which are used to intercept and adequately drive rain water avoiding the slope must not be built too close to the slopes edge; so they cannot become the beginning and guide for a landslide. These ditches should have enough distance from tension cracks in the slopes crown.
- Provide adequate revegetation of slopes, slope crowns, cuts and embankments. The use of native or exotic species which have the capacity of colonizing and dominating forest areas must be avoided, revegetation should be done with stoloniferous growth.

Measure for Soil Compacting Control

The measures where soil Compacting Control must be controlled must increase where there is greater vehicular traffic. To minimize the impact of soil compacting during the construction stage the following mitigation measures are recommended:

1. Restrict the operation of vehicles, machinery and land movement equipment concentrating its traffic within the alignment mark.
2. Execute most construction work during the dry season, because soil compacting is much greater during the rainy season.
3. Separate the outer soil layer and store it for later repositioning in the surface of the affected areas, once construction work has finished.

During the operation stage this impact will only be generated by the traffic of vehicles through open access roads to allow maintenance and cleaning of project structures, this traffic will be very insignificant. For this issued it is recommended that vehicle circulation is concentrated strictly on the alignment of the access roads and that the number of vehicles is limited to the minimum.

4.8.9 Fauna and Flora Rescue and Relocation Plan

Even though the lane expansion work will be done on easement areas, where there is evident presence of shrubs and a few dispersed trees through the alignment, no species habitats will be destroyed by the project. Before starting work on the area the following recommendations must be considered:

- Before machinery and equipment are deployed to begin vegetation removal, there will be a (scaring off) activity that consists of people making noises with horns so a part of the mobile fauna will stray away from the site.
- If species are found upon inspection the first measure is to try to scare the animals away so they move through their own means, in the case of species with low movement, they will try to be captured and kept safe. This activity must be done by a biologist.
- There must be nets, cages, hooks and other implements for capturing animals. Captured animals shall be disposed for relocation to the sites established by the ICF and the environmental management unit of each municipality.

4.8.10 Reforestation, Arborization and Revegetation Plan

The removal of trees that will be affected during the construction stage during the activities of excavation cutting and shaping of filling and worksite preparation will generate a medium impact on the environment and as a mitigation measure the effects of this impact must comply with the following measures of mitigation, National Forest Regulations require (**Decree No. 98-2007** – Forestry Law, Areas Protected Areas and WILDLIFE; **Executive Agreement 031-2009** – Forestry Law General Regulation, Protected areas and Wildlife and **Agreement No. 011-2010** – Fund for forest reinvestment and development of plantation of the National Conservation Institute, Protected Areas and Wildlife).

The main objectives of this measure is to mitigate the negative impacts produced by the laws of vegetation cover, compensate the loss of forest species provide vegetation to cover bare soil and reduce erosion processes and the loss of soil fertility.

There must be a Reforestation, Arborization and Revegetation Plan, preferably with native species in a proportion greater than five to one, in the areas which the municipality and the ICF consider convenient meeting the needs of owners and communities, in commercial and recreational plantations, protection of water sources, fruit plantations or multiple use parcels.

The Reforestation Plan must be designed by a forestry engineer registered with the ICF. The minimum content for this plan is outlined as follows:

Minimum Contents for the Reforestation Plan

CONTENT	OBSERVATIONS
1. Introduction	
2. Project or Plan Objective:	
3. Area :	<ul style="list-style-type: none"> • Location (Municipality, Department). • Total project surface and yearly reforestation breakdown. • Legal status of the area to be reforested (possessory rights number and property inscription number). • Climate, hydrography, soils, vegetation classification (wildlife area)
4. Administrative Responsibility and Project Techniques.	
5. Reforestation Planning.	<ul style="list-style-type: none"> • Species selection: environmental requirements, plantation shift. • Plantation Establishment: terrain preparation, marking, hole-digging, planting, fertilization, replanting. • Maintenance: maintenance cleaning, fertilization. • Forestry management: seed plant removal, pruning, and thinning. • Forest protection: plague, disease and fire prevention and control. • Use of the Forest: marking, delimiting, cubing, selection, arrangement, major and minor transport. • Administration: technical support, administrative expenses, infrastructure.
6. Expected income from Thinning and Final Cut per Hectare	<ul style="list-style-type: none"> • Settling costs, management and use per hectare. • Expected income from thinning and final cut, financial analysis (VAN, RBC, and TIR).
7. Financial Aspects	
8. Physical Timetable for the Reforestation Plan/Project	
9. Input Chart	<ul style="list-style-type: none"> • Present a chart including the equipment and material needed for settling, managing, and use of a forest plantation.
10. Bibliography	
11. Annexes. The following tables must be included:	<ul style="list-style-type: none"> • Plantation characteristics and programming • Thinning and final cut programming per hectare and species. • Estimated yield and profit per species, for thinning and final cut, per hectare, and project total. • Plantation cost for the duration of the project per hectare and per project total.

Source: Own draft

General Objective

Compensate the environmental impact generated by the project on the vegetation cover and foster the development of native tree species and develop projects that contribute to environmental conservation and recovery, in compliance with the local environmental regulations.

Technical Aspects

- **Surface to be planted:** a distance of at least 3x3 or 4x4 must be observed, using the Latin square system and/or contour lines according to the topography of the area.
- **Soil Analysis:** The soils where reforestation is planned must preferably be well-drained and with a vegetation or organic cover with a minimum width of 30 cm (depending on the reforested species)
- **Planting Stock:** the project development must preferably use existing native species from the area to be reforested. The planting stock may be acquired in nearby plant nurseries, seeking to benefit local producers.

Planting Operation

- **Clearing:** the clearing of the terrain must be done manually using machetes and local hired labor, this clearing seeks to mainly eliminate herbaceous suppression, trying to eliminate competition for the planting stock, leaving trees and bushes in place must be considered. One week after initial clearing manual clearings must be done in compliance to occupational safety measures

Marking and Tracing: marked cords and rods must be used for marking and tracing the plantation, keeping a minimum distance of 3x3 or 4x4. The marking of the site where the plant stock will be planted must be marked with 50 cm stakes, to identify definitive points for each planting stock.

- **Hole Digging:** 20 cm x 30 cm holes can be dug to sow the planting stock. Organic or chemical fertilizer and lime will be added as required by the soil analysis.
- **Sowing:** once hole digging has been completed the plant stock must be transported from the nursery to the plantation area to be sowed disposing of the plastic bags. The hole is then covered with previously removed top soil placing the stock in a vertical position compacting the soil to eliminate possible air pockets that can cause rotting in the roots system. The plant stock must be leveled with the surface to avoid rainwater accumulation and resulting problems.
- **Fertilization:** the planting stock must be fertilized at the time of sowing, and for a second time after six months. During the next two years (years 2 and 3) there will be two annual fertilizations and for the following years (years 4 and 5) one fertilization per year is recommended. The fertilization process will be done according to the soil analysis.

Resowing: Planting stock must be resowed where necessary to ensure the development of all the compensated area.

- **Fire Prevention and Control Plan:** the Reforestation Plan must include a Fire Prevention and Control Plan which considers the characteristics of the chosen area.

Annual Maintenance

To ensure a successful reforestation, it is necessary that the sowed planting stock is given the necessary annual maintenance and a Forest Fire Control Program to protect them for the duration of the plantation. Clearing during maintenance years must consider the selective clearing criterion, leaving those trees established through natural regeneration.

- **First year:** The plantation will be settled during the first year and there will be an additional four clearings after the initial clearing. Fertilization will happen during sowing and after six months.
- **Second year:** Maintenance during the second year will include 4 or 6 clearings with machetes, construction and maintenance of fire barrier and semestral fertilization.
- **Third year:** During the third year the undergrowth has been debilitated and the planting stock has a fully developed root system, and therefore has enough height to partially dominate undergrowth including white straw. 4 clearings must be done. It is recommended to apply fertilizer every six months, twice during the rainy season and in those plants that have yellow coloring or slow growth. Fire barriers will be built and maintained.
- **Fourth and Fifth year:** During the last two years maintenance with machete and fire protection will be applied 3 or 4 times a year. By this time the trees should have dominated undergrowth. Annual fertilization is recommended for these years.

Recommendations

- It is important to have a biologist on-site during construction activities since it might be necessary to relocate found species. In these cases, there will be immediate notification to the ICF and the corresponding Environmental Management Units.
- Some of the species registered with the road tranche are of commercial importance. For these instances, it is recommended to calculate the timber resource, and design a reforestation and use plan and request permission from the ICF and the corresponding Environmental Management Units to use these resources.
- Trees provide shelter, perch, and sustenance to bird species; if there is thinning of the trees during the construction stage in the tranches where the road will be extended, it is recommended to install temporary bamboo or wood perches since the reforestation process may be slow, once the reforested trees reach an adequate growth the perches will become secondary.

Surveillance and Control Program

The Surveillance and Control Program will allow periodic, integrated and permanent evaluation of the environmental variables, both biophysical and socioeconomic and cultural in nature, during the project's execution. The implementation of this program must be organized in collaboration with the environmental specialist of the construction company, the project supervisor, and SOPTRAVI's Environmental Management Unit.

In this sense, the construction company will present to the SOPTRAVI Environmental Management Unit a detailed plan that includes the different activities to be executed during the construction issued. This program must be evaluated and approved by the SOPTRAVI Environmental Management Unit technicians who are able to suggest additional measures they consider convenient.

Protection Measures for the Control of Vegetation Cover Loss

This section refers to all intrusive project activities that have a negative impact on terrestrial and aquatic biological wildlife resources found in the area of influence.

The measures proposed here are based on Decree No 98-2007, established by Forestry Law, Protected Areas and Wildlife and its Regulation based on Executive Agreement No. 031-2009. In addition to these measures, the project must comply with the Highway Manual, Volume 8 Environmental Guide for Road Projects of the SOPTRAVI General Highway Direction.

These are the recommended measures:

- The limits of the total project area must be clearly marked with stakes, tape or flags.
- If it is necessary to affect an area beyond the total Project area, there must be a report describing the affected area; this report must be authorized by the environmental coordinator of the construction company and must be presented for approval to the SOPTRAVI Environmental Management Unit.
- During construction mobile equipment must be operated to cause minimum damage to vegetation and soil. To this effect operators need to be trained and informed so all the staff is qualified.
- Choose adequate sites for the final disposal of vegetable biomass pruned or logged during clearing.
- Avoid the accumulation of vegetable biomass in non-authorized sites.
- Vegetation must not be removed with controlled fire. Removed vegetation must not be burned; it should also not be retired from the site immediately. Removed vegetation must be placed in piles, no greater than 60 mts. in length and separated from non-intervened trees by a fire proof barrier at a minimum distance of 8 mts.
- Potentially useful timber can be used for other project activities once the corresponding permits have been received.
- Vegetable waste must not be placed in sites where it obstructs the flow of water and it can finally be dragged towards superficial waterways.
- Under no circumstances will removed vegetation be placed in areas where it obstructs drainage channels. However, in some cases vegetation may be used as dead barriers to control erosion.
- The debris and waste materials product of pruning or cutting, must be temporarily disposed away from standing trees (at least 10 mts.), in piles no greater than 60 mts. in length and which have fire barriers. It must be transported to an authorized site for final disposal.
- Extracting wildlife species from their natural habitat is forbidden.
- The elimination of vegetation using herbicides is not allowed. Herbicides can only be used in exceptional cases and under justified requests due to the impossibility of using mechanical means; in any case, herbicides can only be used with expressed authorization by the authorities.
- When tree pruning is necessary, it must be done by qualified personnel in such a way that:
 - ✓ The cuts must be made at a correct angle and treated with healing agents to avoid decay organisms; pruning must be done during the optimal season and with adequate equipment.
 - ✓ The cuts must be done immediately after the neck branch.
 - ✓ Large and heavy branches must be pruned with weight discharge cuts to avoid tearing the cortex and accidents.
 - ✓ Part of the biomass (logs and stakes) must be used as energy dissipaters to reduce the effects of water erosion.
- When cutting or stripping trees the following must be considered:

- ✓ Trees must be cut with chainsaws and delimbed before logging.
- ✓ Check trees for any kind of animal nest.
- ✓ Obtain necessary permits from environmental units or the ICF before cutting trees for project activities.
- ✓ If the trees are located near the roads safety cones and traffic control personnel must be deployed during the activity
- ✓ The machinery must only circulate through the construction area to avoid damaging vegetation.
- ✓ The cutting of trees must be done as the project advances since there might be last minute changes to the alignment, and at the same time the visual impact that massive vegetation cuts creates is reduced.
- ✓ Areas affected by bridge construction, borrow pits, and disposal areas and facilities must be reforested.

Protection Measures for the Control of Direct Impacts to Fauna

- Before opening the roads the environmental specialists must evaluate the area to avoid destruction of paths, nests and dens.
- In case of encountering wildlife species the project's environmental specialists must be notified for him, in turn, to notify corresponding authorities.
- Execute intrusion activities preferably during the day shift because noise is amplified during the night.
- In case of night time activities, lights must be focused towards specific work sites avoiding the illumination of wildlife habitats and minimizing the intensity of light as much as possible.
- Avoid the unnecessary noise created by whistles, horns, sirens, running engines, etc.
- Install and maintain mufflers in optimum conditions in all motor equipment (vehicles, general equipment and heavy machinery).
- Maintain all vehicles in optimum conditions and provide adequate and effective escape routes. Periodical maintenance must be given to all heavy machinery and motor equipment used during the project.
- Hunting, capture, setting traps, commercializing and voluntarily disturbing wildlife and fishing is totally prohibited.
- Keeping wildlife specimens as pets is forbidden in all campsites, working areas or living quarters.
- The acquisition of hunting and fishing products offered by the people living in the projects area of influence must have proper permissions issued by competent authorities for the use of wildlife and fishing resources. The acquisition of food products based on wildlife terrestrial or aquatic specimens is forbidden without the corresponding permits.
- If a wild animal is run over, mistreated or hurt by machinery or employees of the concessionaire or the supervising company it will be their responsibility to provide the animal with necessary medical care.

These are other measures that must be adopted within the surveillance and control program:

- Develop a Program for Civic Participation and Promotion
- Maintain a permanent Dissemination and Communication Plan regarding the advance of the Project and collateral activities.
- Maintain a high level of coordination with SERNA, SOPTRAVI (Transportation & Civil Works Secretariat) and the National Transit Direction (DNT).
- Ensure the prompt repair of any damage caused to the access roads caused by trucks, heavy machinery and equipment used in the project.
- Guarantee the installation of road signals to reduce the risk of accidents for road users and pedestrians. This measure includes the installation of permanent road signals throughout the area of influence of the project.
- Guarantee compliance to sanitation, safety, and industrial hygiene regulations for worker's conditions.

Based on this Surveillance and Control Program, the construction company will present periodic reports on the different activities during the construction and operation of camps and temporary facilities, personnel status, land movements, generation of solid and liquid residues, the use of the stone quarry, and waste material disposal, among others, as well as any collateral problems that might arise. It is recommended that these reports conform what is designated as the Environmental Project Book, which records that main project incidents on the subject.

The aforementioned activities must be verified by the environmental specialist, who must inform regarding compliance with environmental legislation and the measures proposed in the Environmental Management Plan. The environmental specialist will report to the SOPTRAVI (Transportation & Civil Works Secretariat) Environmental Management Unit regarding the evaluation's results, in order to apply corrective actions for measures that do not produce expected results, to control that activities executed during the construction stage do not cause significant unforeseen environmental alterations.

4.8.11 Technical Requirements for the Use of Dry Borrow pits

As a mitigation measure for the exploitation of dry borrow pits, the concessionaire or subcontractor must comply with the following technical requirements established by INHGEOMIN:

1. The extraction of non-metallic mining material will only be done by the company within established points in the INHGEOMIN map.
2. Before starting exploitation activities the company must have authorization to cut trees from the responsible entity
3. In case the company uses explosives:
 - The company must have the permits required by law and a Plan for Transport, handling, storage and use of explosives drafted by an expert.
 - A mining Plan must be presented.
 - Controlled explosions must be prepared in such a way to not affect private or public physical structures with a safety margin of at least 200 lineal meters between the site of the explosion and such structures.
 - The explosions must preferably be done at noon; all site neighbors must be notified about the activities to avoid speculations.
 - As a cautionary measure, qualified personnel must carry out an evaluation of the living quarters located near the stone quarry to have data regarding their conditions (structures, walls, roofs, etc.) Before starting the explosions and also monitoring their behavior during the process and the end of the activities.
 - The explosions must be permanently monitored using a seismograph.
4. All organic matter resulting from stripping must be quantified, piled and properly conserved to be used during the closure of the intervened area. Any activity that involves closure or restoration of the site must write and present a report to INHGEOMIN regarding the scope and cost of activities, the equipment to be used, and the staff and execution time table.
5. A Project supervisor who knows the terms of the agreements with the Republic of Honduras must be present in the Stone Quarry.
6. Extraction activities should not affect phreatic levels in the area.
7. No unstable slopes must remain at the end of the project.
8. Stabilization work must include engineering activities such as deviation channels, material compacting, and terraced walls that result in stable slopes.
9. During and after extraction, the transport of slope sediment or accumulated material must be prevented, building necessary structures to control sediment transport.

10. Revegetation must be done with species native to the area.
11. The extraction zone must be fenced off and permanently guarded to avoid trespassing.
12. All areas where dust occurs must be sprinkled with water, especially those located near living quarters.
13. Workers must be provided with all safety implements and to comply with the General Regulation of Preventive Accident Measures and Professional Diseases of the Labor Ministry (Republic of Honduras)
14. The whole Project area and the equipment exits must have adequate signals.
15. Any truck that transports material must be covered with a canvas tarp.
16. All activities must happen during the day shift, extraction, trituration, and transport are not allowed during the night.
17. If necessary, an area must be designated to wash the machinery.
18. The machinery must receive preventive maintenance to avoid oil spills in the area.
19. If the machinery is given maintenance in the area, there must be an adequate area for this activity.
20. If the project stores material there must be an adequate area for this purpose.
21. The company must provide georeferenced maps of the worksite and activity areas.
22. Adequate maintenance must be given to motor vehicles to reduce emissions and comply with pertinent regulation.
23. If rocks with sulfurs are found, INHGEOMIN must be notified immediately.
24. All solid waste generated by the worker's activities must be properly disposed.
25. In case of oil spills on the ground from machinery, the soil must be given appropriate treatment.
26. The company must find an adequate location to dispose of soils contaminated with oil products.
27. The company must have an Accident Prevention and Contingency Management Plan.
28. There must be a latrine (bathroom) for every 10 workers.
29. If the latrine is not connected to the Waste Water Collection System it must have a septic tank that complies with all technical specifications.
30. Under no circumstance shall the extraction activities endanger the freshwater conduction systems or the terrains adjacent to the project.
31. If the project triturates and washes extracted material, the resulting effluent must not be directly discharged to any receiving body, a structure or system (sediment capture boxes, precipitation dam, sediment transport barriers, etc.) to capture sediment must be built; the system must be kept clean by the company, and the resulting residue must be adequately disposed.
32. Maintenance must be given to the area's access roads.
33. All solid wastes generated by the worker's activities must be properly disposed.
34. On-site inspection controls must be done to verify compliance by the company to Environmental Mining Control Measures, the number of these inspections will depend on the activity timeline, recommending that an inspection is carried out every two months at cost to the executing company. If considered necessary and depending on the compliance to the norms. These inspections may increase or decrease with time.
35. As a result of the inspections, if new technical requirements are needed these will be provided by the mining authority based on field reports and must be observed by the executing company.
36. The executing company must report any abnormality immediately within the Project's area.
37. Once extraction of the material pit has ended, the company must close off and abandon the area, and notify, in writing, to the Executive Directorate.

4.8.12 Technical Requirements for the Use of Sediment Banks

As a mitigation measure for the exploitation of floodplain soils, the concessionaire or the subcontractor must comply with the following technical requirements established by INHGEOMIN:

1. The Company cannot execute humid material extraction without the respective authorization.
2. Exploitation activities may only be executed within the area inspected during the field evaluations prior to issuing the respective permit.
3. Extraction can only be done in the points established by the INHGEOMIN maps.
4. There must always be a Project Supervisor in the extraction zone; he/she must know the environmental control measures dictated by INHGEOMIN and SERNA.
5. The company must provide workers with all safety implements and to comply with the General Regulation of Preventive Accident Measures and Professional Diseases of the Labor Ministry (Republic of Honduras)
6. The entire Project area and the machinery exits must have adequate signals.
7. Any truck that transports material must be covered with a canvas tarp.
8. Adequate maintenance must be given to motor vehicles to reduce emissions and comply with pertinent regulation.
9. All solid waste generated by the worker's activities must be properly disposed. Trash bags and disposal containers must be placed in all work areas.
10. Solid residues must be transported for final disposal to a site authorized by the municipal authority of the area of influence. The corresponding authorization must be presented to the Executive Directorate.
11. In case of oil spills on the ground from machinery, the soil must be given appropriate treatment.
12. The activity execution timeline for extraction and transport of non-metallic mining material must be established in writing.
13. Bimonthly on-site inspections must take place to verify compliance with the recommended measures.
14. Extraction activities should not affect phreatic levels in the area.
15. No mounds must be left in the riverbed.
16. If the project triturates and washes extracted material, the resulting effluent must not be directly discharged to any receiving body, a structure or system (sediment capture boxes, precipitation dam, sediment transport barriers, etc.) to capture sediment must be built; the system must be kept clean by the company, and the resulting residue must be adequately disposed.
17. The extraction of sediment banks not within the riverbed must not exceed the surface level of the river, during the month of maximum discharge, considering a level of up to 1.5 meters below the current level.

18. Extraction of sand banks must be done with even and leveled cuts, preventing the formation of ditches that generate stagnant waters.
19. The machinery's engines must never come in contact with the live river channel.
20. During and after extraction, the transport of slope sediment or accumulated material must be prevented, building necessary structures to control sediment transport.
21. All activities must happen during the day shift, extraction and transport are not allowed during the night.
22. Any solid wastes generated by the worker's activities must adequately disposed of as established in guideline 12
23. The company must have an Accident Prevention and Contingency Management Plan.
24. The Company must have portable toilets for waste disposal in the locations authorized by the municipality.
25. On-site inspection controls must be done to verify compliance by the company to environmental mining control measures, the number of these inspections will depend on the activity timeline, recommending that an inspection is carried out every two months at cost to the executing company. If considered necessary and depending on the compliance to the norms. These inspections may increase or decrease with time.
26. As a result of the inspections, if new technical requirements are needed these will be provided by the mining authority based on field reports and must be observed by the executing company.
27. The Project executioner must immediately notify any irregularity in the area of influence.
29. Once extraction of the material pit has ended, the company must close off and abandon the area, and notify, in writing, to the Executive Directorate.

4.8.13 Dissemination and Communication Plan

This Dissemination and Communication Plan aims to strengthen communication channels among the relevant project participants and integrate the community to the work environment. To this end, there will be a permanent effort to concentrate actions with local authorities, community groups and civil society organizations; the project also aims to establish permanent communication channels with the general public, which will not interact directly with the construction and the nuisance it creates, despite the mitigation measures adopted in this EMP Plan, however, the public will enjoy the direct and indirect benefits the Tourism Corridor will generate. This plan also considers communication with the general population, which will not be directly impacted by the construction, but is expecting to see the finished project.

To achieve these objectives, the design strategy is divided into main themes: specific strategies according to the project's target audience, for example:

- Authorities: SOPTRAVI, as Project developer, SERNA (NATURAL RESOURCES & ENVIRONMENT SECRETARIAT), and DNT (National Transit Direction) as national regulating entities, as well as other institutions that might provide some kind of collaboration such as the Fire Department.
- Target audience or public within the area of socioeconomic influence: Citizens who will enjoy the new Tourism Corridor El Progreso-Tela.
- The General Public: Citizens who have some interest or expectation regarding the finished Project.

Strategy and actions by the concessionaire, to achieve community integration to the project's environment:

- The establishment of individualized channels for contact with this target audience or general public will allow transmitting the information they need.
- The responsibility to communicate and inform of the project activities will be the concessionaire's responsibility, for which it must present a Dissemination and Communication Plan that identifies information and communication needs, as well as the proposed means for approval and supervision by SOPTRAVI.
- The Dissemination and Communication Plan presented by the construction company must include, at least, strategies, mechanisms, and resources focused on the following areas:
 - ✓ Institutional
 - ✓ Media
 - ✓ Internet users
 - ✓ Communities within the area of Socioeconomic influence
 - ✓ La Barca - El Progreso road users
- Inform affected local businesses and communities about the activities to be executed, through media (newspaper and/or radio) and/or communication workshops (focusing on schools with the project area of influence), at least two weeks before the project starts. If the effects are minimal, distribute an information pamphlet to each business and house in the same term. The minimum information to be relayed is:
 - ✓ Owner's name.
 - ✓ Name of the Project.
 - ✓ Affected zone.
 - ✓ Name of the builder.
 - ✓ Construction terms (estimated start and end dates).
 - ✓ Project characteristics.
 - ✓ Phone number and address for community communications.
- Install a sign in front of each activity containing the minimum information relayed through newspapers, radio, workshops or pamphlets.
- In the case of expected interference with public services, communication must take place at least three days before the event and implement a Contingency Plan, to minimize nuisances.

4.8.14 Environmental Education Plan

One of the most important measures contemplated to correct or attenuate negative environmental impacts is the Environmental Education Plan, which is considered as a strategic instrument for the implementation of the Environmental Management Plan.

Environmental Education is conceived as a permanent process in which individuals and the community gain conscience of the surrounding environment and acquire knowledge, values, experiences and the will to act individually or collectively, to resolve current and future environmental problems. The Environmental Education Plan is an important mitigation measure to weaken negative environmental impacts that affect the population's life-quality due to the project's activities.

This plan is mostly directed to project staff, school teachers, community representatives and leaders from the main population centers in the project's indirect area of influence (which represent the project labor supply) because it is considered that the message will achieve a greater broadcast and multiplying effect through these leaders, increasing sensitivity and the ability to respond the environmental and natural resource deterioration situations.

The aforementioned leaders will be summoned in the neighborhoods or communities of the project's area of influence, to participate in informative sessions and interactive workshops, receiving printed material (posters, bulletins, etc.) to distribute among each citizen's co-workers (in schools, churches or community centers, in the project etc.)

The following issues are proposed as the content for informative sessions and workshops:

- Rational use of water.
- Deforestation and its influence on the water cycle.
- Soil conservation practices.
- Proper fuel manipulation and equipment and machinery maintenance.
- Environmental contamination (water, air and soil).
- Ecology and relation between water-soil-vegetation).
- Health, respect, and public area maintenance.
- Life-quality and natural resource conservation.
- Road safety
- Tourism

The staff must also be trained on the following flora and fauna protection issues:

- Types of dangerous reptiles, mammals, and insects
- Types of dangerous or stinging local plants
- Importance of natural resources
- Effects of forest fires
- Purchase of wild animals
- Bonfire prohibition

Training Records

The concessionaire must keep an updated record of the training given to project staff. This record must include the date of training and the general information of attendees (name, id number, and occupation in the project) and their signature, and the information of the trainer and his/her signature.

A similar record must be kept for the monthly informative sessions. Every worker is required to attend any training activities and achieve a clear understanding and familiarity of the different special environmental management requirements for the whole project.

It is recommended that seminars and/or workshops are given periodically and continuously (every four months), at least during the project's Selective rehabilitation and improvement Stage. The concessionaire and the project's supervision must logistically support this program, with SOPTRAVI being the development coordinator. The concessionaire must fund the program with own resources and provide continuity to the implementation process, to guarantee the adoption of concepts and values by the staff during the project duration.

As logistic program coordinator, SOPTRAVI may look for support from diverse government institutions to find willing participating panelist who wish to contribute. Given its affinity with the proposed issues, the institutions might be SERNA, Public Health Secretariat, National Transit Direction, Ministry of Labor, and the IHAH, among others.

Environmental Education Plan for Authorities and Organized Groups

The program will be developed through a Seminar-Workshop directed to interested authorities and civil society representatives from each of the municipalities affected in the area of indirect influence. SOPTRAVI will be responsible for holding these seminars.

The objectives of each seminar-workshop are the following:

- Explain the technical characteristics of the project
- Explain the impacts of the project
- Explain the mitigation and compensation measures that will be adopted
- Channel the concerns of civil society

Each community workshop will have no more than 50 people including representatives from SERNA, the Municipal Environmental Units, local authorities and civil society members.

1. Conceptual framework of the Honduras Tourism Corridor Project.
2. Project and complementary activities description.
3. Main negative and positive impacts produced by the project.
4. The role of the SOPTRAVI Environmental Management Unit.
5. Contamination prevention systems in the context of project road activities.
6. Project Road Safety System

At the end of the seminar, there must be a plenary in which the coordinator will present his/her table's conclusions. Representatives from SOPTRAVI and SERNA will gather the documents presented in the plenary session and draft a final document that must be delivered, in no more than 30 days, to authorities and organized groups that participate in the seminar-workshop for its due dissemination.

Project Disclosure

To achieve this objective, the concessionaire will distribute flyers in the affected areas with the following objectives:

- Inform the population about the project's impacts
- Inform the population about mitigation and compensation measures to be adopted
- Inform the population about the dangers associated to the presence of the project

Flyers with the required information will be made and distributed freely among the affected population.

The flyers must contain at least the following information:

- Project plan diagram
- List of human health and environmental impacts
- List of mitigation and compensation measures
- Environmental risks

All costs associated to the Environmental Education Plan including sessions, seminars, and workshops must be covered by the concessionaire; all the material used for the training sessions must be approved by SOPTRAVI. All activities must be approved by SOPTRAVI.

4.8.15 Health and Hygiene Program for the prevention of Contagious Diseases

The construction issued increases the risk of disease transmission due to the presence of workers throughout the project, and especially, during the location and installation of temporary facilities which will concentrate a great number of workers, the concessionaire must implement a Health and Hygiene Program for the prevention of Contagious Diseases STDs, HIV, and AIDS.

Contagious diseases are those that can be passed on from one person (animal) to another. There can be direct transmission from an infected person or animal to a healthy person, or there can be indirect transmission; sometimes through an intermediate animal host (mosquitoes, rat) and others through the environment (air, water, food)

The organisms that produce diseases in humans, called infectious agents, belong to different groups: bacteria, virus, fungi and can penetrate the organism through different means mechanisms, digestive, respiratory, skin, and mucous.

The chain of infection includes the following links: sick humans or animals; contaminating products (vomit, feces, urine, and blood)

1. **Source of infection:** sick humans or animals; contaminating products (vomit, feces, urine, blood)
2. **Means of disease transmission:** water, food, dust, air, insects, rodents, soil, objects
3. **Healthy humans:** the infectious agent can arrive through different ways; digestive, respiratory

Preventive measures aim to break this chain, by acting on each of the links:

1. On the source of infection: disinfection and deworming
 2. On the means of transmission: personal hygiene and work environment
- On healthy humans: vaccination and sanitary education.

Preventive Measures in work areas

- Keep work areas clean at all times
- Mosquitos are especially attracted by wastes and small puddles in work areas; for this reason, work areas must be inspected daily.
- Containers or solid wastes disposal tanks must be covered, to avoid accumulation of water.

Preventive measures for diseases spread by saliva

- The concessionaire must have a freshwater dispensing tank in all work areas. The tank must be washed and filled daily, to control this activity, a seal or tape with the date must be placed daily on the lid.
- Disposable glasses must be provided to the workers.
- Under no circumstance are workers allowed to drink water by placing their mouth directly on the tap.
- It is not recommended that workers share the same glass, as viral diseases like mononucleosis are passed on this way.

First aid measures to prevent the spread of HIV and AIDS

- Avoid contact with blood and other bodily fluids. Use gloves before providing first aid and cleaning blood or other bodily fluids. Wash or rinse gloves before removing them and discard in a plastic bag. Wash hands and other body surfaces immediately if you have been in contact with blood or bodily fluids, and after removing gloves.
- Make sure to avoid cuts when examining a wound or removing a sick patient's clothes, be careful when handling needles, scissors or other sharp instruments. If they are disposable, keep these instruments in a resistant, clearly-labeled container.
- **In case of an accident:** make the wound bleed freely, do not suck on it. Wash the area with soap and water (if eyes are affected, wash them with abundant soap and water. Do not forget to notify any accident and request appropriate medical assistance.
- If blood is spilled, wash with abundant common soap in a 1 to 10 proportion and dry with disposable towels. Use rubber gloves. If clothes become soiled, pick it up using gloves and soak in cold water before washing in the washing machine hot water cycle.
- **Mouth-to-Mouth resuscitation:** there is no evidence that mouth-to-mouth can cause HIV so there must be no hesitation to apply this procedure. If there is blood near the mouth, it will be necessary to clean before starting reanimation, which will be done using a clean handkerchief over the patient's mouth.

Preventive measures for sexually transmitted diseases

Clearly, the best preventive measure is not to engage in sexual relations with prostitutes, persons with promiscuous backgrounds, or strangers. If despite warning sexual relations occur, the use of condoms is recommended.

Condoms are currently the most effective methods to prevent most venereal diseases; however, they do not completely eliminate the risk of contagion.

Code of Conduct for workers in project areas

Besides applying the preventive measures outlined before, the most important aspect to prevent contagious diseases is the behavior of every worker in the project areas. The worker must:

- Observe good behavior and correct treatment of the community's members at all times.
- Restrict access to non-workers to the camps, facilities, and other service areas to prevent accidents, risk situations, and conflict opportunities. If this situation occurs, workers must kindly ask trespassers to leave the area for their own safety.
- There will be zero tolerance for the use of alcohol, drugs, or narcotics by the staff, especially within rest areas and other project facilities
- Respect and proper treatment of women and children of the surrounding communities must be guaranteed. In many cases, the most frequent cause of problems regarding personal conduct within project areas is improper treatment of local women.
- The labor, social, and commercial relations developed with the neighboring population as a result of company presence, must be based on mutual respect, avoiding conflicts that deteriorate the company's relationship with local communities or settlements.

- Maintain a cordial and respectful attitude with everybody, especially women, the elderly, and people with disabilities. Avoid inappropriate relations with minors- it is a crime punishable by jail.
- Use portable toilets for bodily functions. They have been installed for your comfort.

These norms of conduct and others that may be incorporated will be socialized extensively among all staff before the training and induction process regarding behavior patterns and relations with local staff.

Health issues and contagious disease prevention training

The Education Plan for the project's workers includes issues related to health, HIV, and the prevention of infectious diseases. The project will request the support of the Public Health Secretariat, through the nearest health center, to organize health fairs and vaccination campaigns for workers as necessary.

4.9 Mitigation measures execution and responsibility

The concessionaire is responsible for the execution of mitigation measures through the environmental specialist designated for the project.

The entities responsible for the supervision of compliance by the concessionaire are SERNA, the Environmental Management Unit of Soptravi and the administrators of the Environmental Units of each municipality within the area of socioeconomic influence of the Project (Santa Cruz de Yojoa, Santa Rita y El Progreso).

Table 7.2 lists the institutions responsible of monitoring each mitigation measure to be implemented in the project.

Table 6.19. Mitigation measures execution and responsibility

Medium	Impact	Mitigation Measure	Responsible for Execution	Regulating Entity * See note
Aquatic	1a. Hydrological Regime Alteration	No extraction activities should be done in the center of the riverbed, only in the sites marked by INHGEOMIN Surveillance and Control Program: delimiting the area of influence to avoid damage to other areas. Avoid the formation of pools and depositing material on the natural water runoff sources and avoid the stacking of materials higher than 2 meters	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	1b. Alteration of phreatic levels	<ul style="list-style-type: none"> Selection of water bodies with enough continuous flow to provide water to the project and not altering the aquifer recharge. 	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	1c. Quality deterioration or water contamination	Liquid and Solid Waste Management Program <ul style="list-style-type: none"> Contingency Program: Prevention and Control of contaminating substance spills (oils, fuels, paints, etc.) 	The concessionaire and the Environmental Specialist and the Security Supervisor	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
Atmospheric	2a. Quality deterioration or air contamination	Preventive vehicle and construction equipment maintenance program (adequate mechanical state is required) <ul style="list-style-type: none"> Vehicular Emissions Compliance Control Program 	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
	2b. Dust and/or foul odor generation	Program for dust emission control and foul odor prevention	The concessionaire and the Environmental Specialist	/National Transit Direction DNT Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
	2c. Increase in noise levels	.Preventive vehicle and construction equipment maintenance program (adequate mechanical state of mufflers is required for machinery) Work Schedule: Avoid, if possible, working during the night or resting periods; if necessary notify the affected population in advance. Provide auditory protection equipment to workers exposed to noise levels over 80 dBA.	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat

Medium	Impact	Mitigation Measure	Responsible for Execution	Regulating Entity * See note
Terrestrial	3a. Effects on soil due to compacting or leveling	Surveillance and Control Program: limiting of the direct area of influence to avoid damages to other areas. If necessary upon project completion, soil compacted by heavy machinery or temporary facilities must be loosened and covered with topsoil for subsequent revegetation.	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	3b. Quality deterioration or soil contamination	Contingency Program: avoid, if possible, the accidental spill of contaminating substances on the soil. Contingency Program: Prevention and Control of contaminating substance spill (oils, fuels, paints, etc.) Liquid and Solid Waste Management Program	The concessionaire and the Environmental Specialist	
	3c. Extraction or loss of soil	Surveillance And Control Program: delimiting the area of influence to avoid damage to other areas	The concessionaire and the Environmental Specialist	
	Increase in erosion processes	Erosion control and slope stability measures	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	3e. Reduction in fertility and suitability of soil	Reforestation, arborization, and revegetation plan	The concessionaire and the Environmental Specialist	ICF/Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ICF
Biotic	4a. Loss of vegetation cover	<ul style="list-style-type: none"> Surveillance and Control Program: delimiting the area of direct influence to avoid damage to other areas 	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ICF
	4b. Alteration or elimination of terrestrial and aquatic fauna	<ul style="list-style-type: none"> Surveillance and Control Program: Avoid poaching and/or species habitat disturbance. 	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ICF

Medium	Impact	Mitigation Measure	Responsible for Execution	Regulating Entity * See note
	4c. Increased risk of running over wildlife	Place animal crossing signs <ul style="list-style-type: none"> Regulate speeds in road tranches 	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT
Socioeconomic	5b. Modification to local traffic	Work Schedule: Execute planned installation of road signals in the Traffic Management Program <ul style="list-style-type: none"> Coordinate activities with the National Transit Direction Permanent disclosure campaign: Inform the communities about programmed activities 	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT
	5e. Increased risk of spreading disease	Health and Hygiene program for the prevention of contagious diseases	The concessionaire and the Environmental Specialist and the Security Supervisor	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
	5f. Increased risk of workplace accidents	Risk and Accident Prevention Program Maintaining first-aid kits and ambulance services Records of worker's training on first-aid and emergency measures	The concessionaire and the Environmental Specialist and the Security Supervisor	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat / Fire Department/ Red Cross/ COPECO/ Ministry of Labor
	5h. Increase in public sanitation problems due to the generation of solid and liquid wastes	Solid residue collection and disposal program Portable toilets must be installed for workers; the responsible company must clean the toilets at least twice a week	El The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat

Medium	Impact	Mitigation Measure	Responsible for Execution	Regulating Entity * See note
	5i. Disturbances to surrounding communities due to project activities	Work Plan: Establish a work schedule that avoids affecting daily community activities Work Schedule: Execute installation of road signals proposed in Transit Management Program Coordinate activities with the National Transit Direction DNT Dissemination and Communication Plan: maintain a permanent disclosure campaign with the affected communities	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT
	5j. Changes in the use of soil	Territorial ordinance plan review Request a change in the use of soil to the El Progreso Municipality	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	5k. Alteration of public services	Public services relocation program	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ENEE/S ANAA
Landscape related	. Alteration or changes to the landscape and environment aesthetics	Work Schedule: Execute planned installation of road signals in the Traffic Control Program • Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas.	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision

Source: The Consultant

Note:

*** Art. 28-A (added through Decree 181-2007).** - The Natural Resources and Environment Secretariat (known in Spanish as SERNA) will delegate environmental evaluation for the execution of projects, industrial facilities and any other private or public activity that is meant to be developed within and follow-up of mitigation measures for the environmental impacts subject to licensing. This evaluation process will be concurrent with the application of permits, Article 68 of this law establishes exclusions to this delegation. Municipal Corporations will assume these responsibilities by issuing a Municipality Resolution about its intention and operating capacity, and therefore, assume responsibility of actions derived from delegated functions.

Distrito Central, San Pedro Sula, Juticalpa, La Ceiba, Puerto Cortes, Roatán, Guanaja and El Progreso are able to do this immediately. The other municipalities are in the evaluation and accreditation process by SERNA, who will issue a resolution in a period no greater than sixty (60) days upon presenting the request.

5 SPECIFIC MANAGEMENT PLANS

5.1 Common Solid Residues Management Plan

The objective of residue management is to minimize any impact on the worker's health and the environment, as well as limiting risk exposure, by providing orientation regarding risk management. All aspects related to the management and administration of residues in the work site, must comply with national Honduran legislation and other international directives from the World Health Organization (WHO), the United Nations Environment Programme UNEP, and the World Bank, among others.

Plan Objectives

Residual waste management will achieve the following goals:

- Reduce risks to health and the environment (flora, fauna, water, underground water, and air)
- Identify and classify residues
- Minimize the residue generation
- Select appropriate alternatives for residue treatment
- Document all aspects of waste management and elimination

The Project Manager is responsible for residual waste management, through the field Environmental supervisor, who must be adequately trained to carry out inspection, supervision, and recording of residual waste management practices.

Common solid residues

Non-hazardous residues do not generally present immediate concerns for public health or environmental impact.

The non-hazardous residues generated during the project construction, include, but are not limited to: residues from food, paper, plastics, iron, aluminum, glass, and packaged miscellaneous items, inert construction materials (wooden planks, belts, tires, plastic and paper bags and other containers).

Table 8.1 contains a list of non-hazardous residues generated by project activities:

Table 6.20. Non-Hazardous Wastes

Material Waste Flow	Description	Main Source	Management and Disposal Options	Considerations
Domestic/ General	Non-organic: Food Food containers, plastic water bottles, paper, carton, glass (bottles, cans, windows), polystyrene, aluminum (containers)	Main workers' rest areas within the worksite and main offices	Reuse /Rec-cycle /Disposal	, Boost the initiative of diverting waste. Disposal of non-incinerable inert residues (plastic, glass, metals, polystyrene, etc.) and the flow of remaining incinerated wastes
	Organic: food leftovers	Cooking and eating areas and worksite	Disposal	Diverting organic waste from disposal can reduce leachate
Construction Debris	Concrete waste, cement additives etc.	Construction and maintenance activities	Reuse /Rec-cycle /Disposal	Wastes like additives should be reused for future or current activities as much as possible.
Scrap metal	Cortes de Tuberías, ref., cuttings, electric cabling, pipes, etc.	Construction areas	Reuse /Rec-cycle /Disposal	Donate to the community
Wood	Wood, pallets, plywood, wood chips, wood scraps, etc.	Packaging material	Reuse /Rec-cycle /Disposal	Reuse or donate to community for cooking or construction

Material Waste Flow	Description	Main Source	Management and Disposal Options	Considerations
Paper, carton	Office paper, cardboard	From offices and packaging materials	Reuse /Rec-cycle /Disposal	.Separate at the source and maximize recycling opportunities such as donations to local schools.
Polystyrene	Polystyrene	Packaging material	Recycle / Disposal	Recycling
Plastics	Plastic wrappers, PET resin bottles, HDPE, scrap, etc.	Construction Area	Recycle/ Disposal	Recycling
Tires	Worn-out, damaged tires	Construction and operations equipment	Reuse /Rec-cycle /Disposal	Tires must be used for ground stabilization, and embankments (crushed)
Welding wastes	Soldering rods or millstones	Maintenance or construction related activities	Recycling / Packaging in drums and disposal	
Non-greasy fabrics	Non-greasy fabrics (rags, gloves, clothes, etc.)	Talleres de mantenimiento oTemporary facilities and maintenance workshops	Disposal	No special requirements for disposal

Source: 504832-0000-4EPA-1007 "Residual Waste Management Plan" –JVP

Project activities during the construction issued generate different kinds of residues which must be handled accordingly, to avoid garbage accumulation which can cause diseases that affect worker's health. The concessionaire must avoid situations that threaten the health of the workers and the general population through adequate management of residual wastes resulting in minimal negative impacts to the environment.

The concessionaire must implement actions to:

1. Avoid residue generation (source prevention)
2. Separate residues at the source
3. Find alternatives uses for residues (reusing)
4. Material recovery (recycling)

It is important to consider that from a waste management perspective, source reduction and reuse are preferred options before the implementation of recycling, treatment, and elimination.

The residues generated during construction, such as: woods, pieces of metal rods, cardboard, paper, cans, plastics, among others, and the domestic waste generated by the workers, must be stored in adequate containers and on a specially designed and properly protected area within the worksite.

In order to guarantee proper management of residual solids, the concessionaire must adhere to the following principles:

1. Train workers on the established regulations for solid waste management;
2. Prohibit the burning of solid residues;
3. Appropriate segregation and labeling of solid wastes containers;
4. Minimize residue production;
5. Maximize recycling and reuse;
6. Safe transport, and

Figura 7. Adequate residue disposal.

Waste Management Training

Training for all construction workers is a key element to achieve proper solid residue management. This training must take place before the start of operations in order to achieve better results. Some of the issues to be discussed during training are: safe management practices, storage, transport, treatment, and waste elimination, according to the nature of the residues.

It is also important to consider that training must be periodically renewed; the training sessions must be recorded along with the support documentation for the offered training.

Containers for Solid Waste Collection

The containers or deposits for solid wastes will be located in the work areas and operation centers, to promote appropriate disposal; not on the ground.

A recycling program must be implemented in the temporary facilities and workshops. Simple mechanisms for temporary separation and transport of wastes must be established for the different work areas. It is proposed to separate waste in these categories for recycling: paper, glass, metals, plastics, and organics. The color coding is illustrated in Figure 8.1:

Figure 6.2. Solid Waste Containers



Source: 504832-0000-4EPA-1007 "Waste Management Plan".

Color coded containers must be provided in the worksite, this will allow separation of reusable, recyclable and fuels for elimination. The containers must be made from stiff material, resistant to tears. They must be adequately kept, clearly labeled, with lids, sheltered from the rain, and in a stable Surface. The area where they will be installed must be accesible and clearly marked. See Figure 8.2

Figure 8.2. Good practices for Environmental Management of Solid Waste



Source: The Consultant

Procedures to minimize solid waste generation

The procedures for solid waste minimization include reduction at source and reuse. The source reduction of waste includes reducing the amount of materials moved to work areas. The concessionaire must consider the following elements for source reduction:

1. Purchasing products with the least amount of wrappings (e.g. groceries and paper)
2. Use of products with greater durability and that can be repaired (e.g. durable work tools and instruments)
3. Substitute single-use disposable products for reusable alternatives (e.g. bottles for cans)
4. Increase the content of recycled materials in products (e.g. find articles easily accepted by local recycling centers). Among the waste products that can be recycled are used asphalt, used concrete, leftover paint, construction timber, vegetable material from terrain clearing such as branches and stumps, used wooden pallets, discarded metals, and other materials.

The purpose of reducing sources is to avoid handling of solid wastes just by not generating them. The concessionaire must research opportunities for local reuse of products (e.g. devices, furniture, used oils), or the possibility of donating them to the community, instead of eliminating them.

Guidelines for safe transport of Solid Wastes

During construction, solid waste will be transported from the work sites to the final disposal site. The concessionaire must guarantee that the staff assigned to this task used appropriate procedures for waste transport and have the corresponding permits and authorizations required by law. The guidelines include, at least, the following elements:

- Driver of vehicles that transport solid wastes must avoid making unauthorized or unjustified stops along the transport route.
- Vehicles that transport solid wastes must be equipped with the following characteristics:
 - ✓ Covered (e.g. tarps or nets) to prevent accidental spillover on route;
 - ✓ Ability to perform flawlessly under severe weather conditions;
 - ✓ Respect the designed vehicle capacity, without overloading; and
 - ✓ Adequate and frequent cleaning to avoid unpleasant emanations.

Final Disposal of Solid Wastes

The concessionaire must carry out all necessary procedures for final disposal of the wastes generated during construction. The concessionaire must also present the certifications required by SERNA, as proof of adequate final disposal of wastes.

Specific Procedures

The following items describe the specific procedures the concessionaire must implement for the management of its solid wastes:

- Take responsibility for the classification, collection, transport and final disposal of all wastes generated by its activities.
- Keep work sites and storage areas clean and build awareness of waste management among the staff.

- Maintain records and manifests for the type and amount of wastes and the planned elimination of all wastes generated by its activities;
- Separate wastes at the source.
- Prohibit the open burning of wastes.
- Provide training to all staff involved in the adequate management and handling of wastes and emergency response
- Ensure, as much as possible, the recycling and reuse of waste generated in the work areas.

5.2 Management Plan for Toxic and Hazardous Solid Wastes

Hazardous wastes can negatively affect human health and the environment if they are inappropriately stored, handled or eliminated.

Initially, in the construction issued, hazardous wastes may include oils and greases used in vehicle maintenance, batteries (dry and wet-cell including lead acid), used oil filters, used chemical containers, paints, biological risk wastes from first-aid stations, hydrocarbons and chemically contaminated soils, rags and absorbent pads.

Many of the products used in the project are hazardous materials. Generally, hazardous materials are classified in four kinds- petroleum derivate, explosive agents, reactive and compressed gases.

Table 8.2 presents a general list of solid hazardous wastes generated during construction activities and the proposed strategies for the management of each of these wastes:

Table 6.21. Default Hazardous Wastes

Waste Flow/ Materials	Description	Main Source	Elimination options	Consideration/ Key observations
Oily fabrics	Oily fabrics (rags), gloves, clothes, etc.	Mechanic workshops, response to spills	Off-site elimination	Treat as hazardous material. Collect in an appropriate location, off-site removal by an authorized company.
Soils contaminated by hydrocarbons	Contaminated soil	Fuel spills		Treat as hazardous material. Store in an adequate container. Elimination by an authorized company.

Waste Flow/ Materials	Description	Main Source	Elimination options	Consideration/ Key observations
Lead- containing products	Batteries, soldering, electric devices, cables	Vehicle maintenance and equipment	Off-site elimination or recycling	Treat as hazardous material. Consolidate and store to send for final disposal by an authorized company.
	Sheet accessories, brass or bronze, balanced weights	Construction activities		
Used batteries	Dry-cell batteries	Electronics, offices, and monitoring equipment	Recycling	Treat as hazardous material. Return batteries to suppliers.
	Lead acid batteries	Equipment and vehicle maintenance	Recycling	
Asbestos- containing products	Vehicle braking wedges	Vehicles	Off-site elimination	Treat as hazardous material. Consolidate and store to send for final disposal by an authorized company.

Source: The Consultant

As a recommendation, the area designated for hazardous material storage, must be identified by red codes. Hazardous wastes must be placed by workers in appropriate containers and bins before transport to the hazardous wastes deposit, and include the following specific items:

- The material content (oil filters, batteries, etc.)
- The hazardous nature of the contents (flammable, corrosive, etc.)
- The date when the waste was generated.

Hazardous wastes must be consolidated and stored in a safe way in the hazardous waste deposit. Storage must not exceed 180 days upon reception at the deposit and storage prior to its shipment for appropriate elimination/treatment.

Procedure for the Management of Specific Hazardous Substances

These are some procedures for the management of hazardous substances:

Gas Cylinders

Compressed gases are considered hazardous materials, due to the high pressure of the containing cylinders. The uncontrolled escape of compressed gases creates leaks in the equipment or its hoses; or produce chain reactions. The Material Safety Data Sheets (MSDS) must provide the specific storage requirements for each gas. Gases must be stored in closed enclosures if possible.

The cylinders must be kept in a clean and well-ventilated area, in vertical position, away from incompatible material. Heat exposure must be avoided. They must be chained to a wall, rack, or other structure to prevent tipping over.

In case of accidental release of a compressed gas cylinder, the specifications detailed on the MSDS must be followed.

Gas cylinders must be returned to the provider. However, before being returned, they must be applied a label that indicates: the material they contained or contain if they have not been emptied, the provider's information, the serial number of the cylinder, pressure, date of last hydrostatic test, and any other additional identification mark considered necessary.

Used Batteries

Alkaline or zinc-carbon batteries are considered hazardous materials, lead acid batteries (vehicles), nickel-cadmium batteries (radios and cell phones), and lithium-mercury batteries require special treatment since their toxic elements could negatively impact the environment. For this reason, they must not be discarded nor stored in inappropriate containers before neutralizing their acid content.

The storage of vehicle batteries must occur in a restricted area, on a waterproof surface protected from the rain and surface water, no less than 50 meters from water courses. Vehicle batteries must be delivered to a specialized and environmentally authorized company for treatment and final disposal.

Oil Filters

When filters are replaced they must not be discarded in the deposit site before checking they are not contaminated with hydrocarbons or other hazardous substances. Filters that can be completely drained and crushed can be disposed of in special storage sites.

Used oil must be drained from filters before deposit. The filter draining process must occur at a temperature similar to the temperature of the source equipment ("hot"). There are several acceptable procedures for this operation. For example, perforating or crushing the filter drain used oil to an appropriate container. The contaminated filters that cannot be drained must be stored until the company responsible for these wastes collects them.

Contaminated Rags

Contaminated rags and absorbent pads will be treated with the same criteria and methodology of the substance they absorbed.

Personal Protection Equipment (PPE)

Storage facilities must be equipped with proper PPE, which includes, at least, eye washing stations and firefighting equipment. The staff that enters the storage sites must be equipped with proper PPE. The PPE must include rubber boots and gloves, chemical protection goggles, respirator, rubber apron, etc., as required.

Material Safety Data Sheets (MSDS)

La Material Safety Data Sheets (MSDS) must be provided for all hazardous materials by the product supplier, and must updated as soon as new materials are added to unify criteria.

A record of the MSDS must be kept for all hazardous substances used or produced during project activities.

Final Disposal

An authorized company must be contracted for final disposal of hazardous materials. The company must have a valid Environmental License which allows the provision of this service and compliance to national regulation in this matter.

5.3 Liquid Residues Management Plan

The sanitary residues or residual waters are generated by human activity during the construction of the Tourism Corridor. The volume that is generated will depend on the number of workers and the availability of toilets in the different work areas.

Portable toilets will be contracted from a specialized company (local supplier), which will clean the contents with the required frequency in order to keep them in acceptable sanitary conditions. 1 toilet for every 10 workers must be installed.

The installation of a septic tank for the management of greywater and soapy water (and sewage in case of not having portable toilets), from temporary facilities and workshops is recommended. Final disposal of this waste requires hiring an authorized company.

Table 8.3 presents a general list of hazardous liquid residues generate during project activities and the proposed strategies for the management of each kind of residue:

Table 6.22. Hazardous Liquid Residues and Management

Material Waste Flow	Description	Main Source	Elimination Options	Considerations/ Important Observations
Used oils	Lubricants, oils, hydraulic oil, brake fluid, etc. Equipment/Vehicle refrigeration agent	Equipment and vehicle maintenance	Reuse/Recycle off-site	Treat as hazardous material. Collect at an appropriate location; remove off-site by an authorized company. Return to provider if possible.
Oily water	Water and hydrocarbons	Oil/spills	Recycle off-site	

Material Waste Flow	Description	Main Source	Elimination Options	Considerations/ Important Observations
Solvents / Degreasers	Paint, thinner, acetone	Construction activities	Recycle off-site Treatment or Elimination	Treat as hazardous material. If practical, use low impact degreaser. Elimination by an authorized company.
Paints and covers	Paint residues resin covers	Construction Areas	Reuse/Treatment Elimination Off-site	Treat as hazardous material. Consolidate and store for site maintenance purposes or send off-site for final disposal.

Source: The Consultant

Management for each type of residue will take place in the following manner and is the concessionaire's responsibility:

Used Oil

Used oil is considered a hazardous material and must be collected in oil collection tanks, with correctly labeled safety tags. The tanks must be located in protected areas within the hazardous material storage facility, which must have warning signs. For delivery to the authorized company. The mixing of used oil with antifreeze substances paint residues, degreasing solvents, synthetic lubricants, or any other liquid except water is forbidden.

Solvents

Tanks containing used solvents require rigorous management and strict content control. The following requirements must be observed: the tank must be in good conditions, be hermetically sealed, contain visibly updated labels, place barrels within protective containers, before recollection by authorized company.

Paints

Paints constitute an important source of hazardous wastes. Partially used cans must be grouped per type or eliminated. Paints and solvents of different kinds should not be mixed. Instrument like brushes, paint rollers and rods can be discarded if dry.

Storage of Hazardous Wastes

Adequate containment must be provided by levees or walls with a capacity of over 110% volume than the largest tank, and must be made of waterproof and chemically resistant materials. The containment area must have a reserve capable of containing an unusual 24 hr. storm event every 25 years, apart from having sinks equipped with the necessary pumps to collect and drain pluvial precipitation. Containment will be designed to prevent contact between incompatible materials.

For containers with lesser volumes, there must be antispill trays to avoid placing containers directly on the ground. The antispill trays must have a containment capacity of 110% the containers volume. They must be located on stable and level surfaces for storage and use.

Any bottle cylinder or hazardous material container must be labeled indicating content and hazard level.

Material Safety Data Sheets (MSDS)

Material Safety Date Sheets (MSDS) must be provided by the supplier for all hazardous material and will be updated as soon as new materials are added to unify criteria.

There must be a record of all MSDS for al hazardous substances used or produced during project activities.

FINAL DISPOSAL

An authorized company will be hired for final disposal of this type of waste. The company must have a valid Environmental License that allows providing this service and compliance to National Regulations.

5.4 Risk Prevention Plans

5.4.1 Identification of risks associated to Project Activities

In order to develop the emergency and contingency plans, it is necessary to identify the possible risks associated to the Tourism Corridor project development.

An environmental risk is the possibility of damage or catastrophe in the environment due to a natural phenomenon or human action.

During the construction of the Tourism Corridor E Progreso – Tela, some activities may represent risk situations, some activities may present risk to the environment, infrastructure and equipment.

The evaluation of inherent environmental impacts and risks during the different issueds of the project considered the activities to be executed and the associated risks; the analysis focused on the kinds of risks for which, in case of an incident, activation of Emergency and Contingency Plan is required.

Considering the nature of the project there was a general evaluation of the project activities and associated risks, whether physical, biological, or chemical. It also includes safety and hygiene measures that must be enforced at all times to prevent affecting workers health.

The identified physical risks include workplace accidents, risks associated to the use of mechanical equipment (rollovers, traffic accidents, and run overs), risk of falling, risk of fire, risk of floods, earthquakes, among others. The spill of fuels constitutes a chemical risk, while biological risks include animal/insect bites and/or stings, animal attacks or contact with poisonous and/or allergenic vegetation.

The following is a list of measures to be implemented to avoid accidents during project development:

5.4.1.1 Physical Risks

The following physical risks could affect adequate functioning of the Project:

Risk of Workplace Accidents

Many of the construction Project activities present risks for workers. In order to prevent workplace accidents, the construction company must have a Manual of Construction Safety Regulations and an Occupational Security Regulation.

It must at least contemplate the following measures:

- **Accident prevention responsibility level:** every worker is responsible of following the Safety Regulations, consequently looking out for his/her and his/her coworker's safety.
- **Safety training:** all workers must receive a safety, health and hygiene induction before start of labors; as well as routine training on executed activities and safety regulations.
- **Personal Protection Equipment:** the company must provide personal equipment protection which every worker is required to use.
- **First-aid:** the company must train the workers selected for first-aid duties.
- **Lighting:** the company must provide sufficient lighting for nighttime activities.
- **Air pollution and noise prevention and protection:** the company must provide implements for auditory protection and to avoid the threats of polluting agents and dust, such as work shoes, helmets, eye protection, auditory protection, safety belts, and respirators, among others.
- **Fires:** the company must provide necessary equipment for initial fire containment and workers must follow the corresponding preventive measures.
- **Signals:** the company must develop a policy of installing signals to indicate possible risks.

- **Security Supervisor:** the company must include in its organization an Industrial Security, Health, and Hygiene Department, previously approved by the developer in compliance with current regulations and contractual specifications.
- Observe Honduran regulations regarding Industrial Security, Health, and Hygiene.
- The concessionaire must count with ambulance services (internal or external), as well as first-aid on site.
- Train workers on good construction techniques, occupational safety guidelines and the mandatory use of safety implements.
- The concessionaire must place the procedures manual within the reach of every worker, in case of accidents. The manual must include accident management and the sanction for regulation non-compliance.

As a consequence of these training-awareness actions, the whole Project area must have safety and caution signals to avoid contingencies; this action must continue throughout the project duration.

The Contingency Plan must be followed to avoid bodily injuries and traffic accidents, and traffic accidents Vehicle driving policies for staff must be strictly enforced during project construction.

Flood Risks

Some areas within the projects are prone to flooding: Considering this risks the concessionaire must:

- Train workers on issues related to flood risks.
- Draft an Evacuation Plan per area which must be updated at least every 6 months.
- Identify areas prone to flooding and instability.
- Suspend activities when and incident occurs.
- Identify shelter areas.

Fire Risks

In order to guarantee effective protection against fire risks, the concessionaire must comply with the following measure amongst others:

- Count with the required fire extinction and prevention equipment. Guarantee access to firefighting equipment located in accessible places with clear signals.
- Provide a 20 lb ABC type fire extinguisher within a radius of 15 mts. from any site that holds more than 25 lts of flammable fluid or 3 kg. Or more of flammable gases are used in the site.
- Smoking is strictly forbidden in all areas that constitute a fire risk. Clear signs must be placed in these areas.

Electric Risks

In this type of Project this kind of accident is unlikely, however, it must be considered. The concessionaire must:

- Hire qualified staff for electric work. Use of tools in proper condition.
- Any areas where cabling is installed superficially or buried must be covered. The cabling must be isolated.
- Spatially locate the area where cabling is installed superficially or buried.

Use of Mechanical Equipment

This type of risk is focused on the different equipment used during the different stages of the project and the possibility of running over workers. This risk is extended to workers who transport supplies and materials.

These are some preventive measures for staff that operates mechanical equipment:

- Operation of machines and tools by qualified personnel only (verify certification). Use of equipment and machinery in good condition and with proper protection (if applicable).
- Any employee that operates heavy equipment must be aware of the functions and limitations of the equipment. He/she must also be aware of the equipment's regulation within the work site.
- Count with the correct extinguishers for the equipment being used.
- Establish an early warning system before mobilizing equipment and activating the alarm when reverse maneuvers are executed.
- Delimit the safety zones for vehicle and machinery circulation. Vehicles operating within the construction site must not exceed 10 kms/h.
- Dump trucks carrying material or wastes to and from the project area must not be overloaded.
- Workers must be trained on the Honduran Transit Law regulations.
- All trucks must have a radio communication system for fluid communication in case of emergency.
- Control posts must be set up in different locations to really information about material transport.
- Safety cones and flashing signs must be placed in dangerous areas.

5.4.1.2 Chemical Risks

These risks are presented when the workers manipulate chemical substances incorrectly, affecting worker's health through physical contact or inhaling hazardous fumes. These are some measures to be considered:

- The concessionaire must observe strict safety measures in the temporary facilities to avoid spilling of bituminous material, fires, as well as accidents.
- Storage areas must be kept free of undergrowth, debris, and any other flammable material that does not require storage.
- Train the staff regarding the appropriate handling of chemical substances and the personal protection equipment to be used.
- Provide the staff with the required personal protection equipment for the handling of chemicals according to the MSDS.
- The work sites must be equipped with bottles for eye-washing and water for situations requiring safety washing or rinsing.
- Maintenance activities in the work sites must be kept to a strict minimum. If maintenance activities are executed in the work sites, it must be on surfaces that have some sort of temporary waterproofing.
- Spilling lubricants, fuels, or other hydrocarbon products on the soil, surface water, and water collection systems is strictly prohibited.
- Containment vats for hydrocarbon products must be designed to hold 110% more than the volume of the largest tank.
- If maintenance is required for equipment that may drain fuels or lubricants, containers must be used to collect these fluids, these containers must be kept close to the spill containment site.
- Waters contaminated by petroleum products cannot be discharged without separating the contaminating agents, which implies the installation of oil and petroleum separators.
- Any vehicle used for transport and/or delivery of liquid fuel or other flammable substance must have at least one portable fire extinguisher, ABC type, 20 lbs minimum capacity

5.4.1.3 Biological Risk

The biological risks include snake and other animal bites, as well as insect bites. This condition carries greater risk due to the clearing of vegetation activities to be executed in the area of direct influence. There is also the risk of contact with poisonous, allergenic and or irrigative vegetation. The following preventive measures must be applied in these cases:

- Require that the staff use adequate clothing to minimize skin exposure to insects and animals.
- Prohibit staff to unnecessarily disturb local wildlife.
- Train the staff on the dangers of working in this kind of areas and the pertinent preventive measures.
- Provide staff with enough insect repellent and anti-bite gloves.
- Prohibit staff to touch or collect vegetation in the work areas.
- Provide gloves for those activities where it is inevitable to have direct contact with vegetation.

5.4.2 Security Training and Education

Training is an essential element for the success of the prevention plan, the concessionaire commits to:

1. Instruct each employee to recognize and avoid unsafe conditions and the regulations that apply to their work environment to control or eliminate any danger or exposure to diseases or injuries.
2. Instruct employees required to handle or use hazardous materials. This training must focus on safe use and handling, as well as potential dangers, hygiene and the required measures for personal protection.
3. Guarantee that employees comply with regulation concerning tight or closed spaces, instruct them on the dangers involved, the necessary precautions and the use of required protection and emergency equipment. The concessionaire must comply with any specific regulation that applies to working in dangerous or potentially dangerous areas.
4. The company must keep records on workplace accidents and diseases in the site where workers usually report for duties.
5. The file must include:
 - a) A record of bodily injuries and workplace accidents
 - b) Supplementary records for each accident or disease.
6. Records must be updated and made available to authorized government representatives or other authorities.

5.4.2.1 Personal protection equipment

Supervisors must ensure that employees have the appropriate personal protection equipment and the workers are required to use them during any operation that implies exposure to dangerous, the equipment includes:

1. Feet Protection. Employees exposed to potential risks must use safety footwear. No canvas shoes or sandals are allowed in the construction site.

2. Head Protection. Employees that work in areas where there is risk of injuries due to flying objects, electrical shocks or burns must wear protective helmets.

3. Ear protection.

- a) Whenever it is not feasible the reduce noise levels or periods of exposure, ear protection must be provided.
- b) Inner ear protection devices inserted in the ear canal must be measured or prescribed individually by competent technicians. Cotton by itself is not acceptable and a protection measure.

4. Face and eye protection.

- a) Employees must be provided with protective equipment for face and eyes, when machines or operations present a potential risk of eye or face injuries, resulting from exposure the chemical or physical agents.
- b) Employees who require the use of corrective lenses must be protected by one of the following kinds of visors
 - Visors with lenses that offer optic correction
 - Visors that can be used over corrective lenses without altering visual adjustment
 - Visors with corrective lenses mounted behind the protective glass.

5. Safety Vests

All company staff and sub-contractors must wear their respective reflective vest regardless of the job they perform.

Rules for Order and Cleanliness

The main concern of all construction works must be to focus on maintaining proper order and cleanliness in their work area to prevent environmental impacts. However, these “order and cleanliness” activities must be planned at the start of operations and be periodically verified until project completion.

1. Work areas must be free of wastes and debris of any kind for the duration of activities.
2. In workshop and storage areas, where activities and operations occur in short periods of time, debris and leftover material must be cleared from the work area as it produces fire risk.
3. The indications of the Waste Management Plan include guidelines for the management of solid, liquid, and hazardous wastes; these indications apply here as well.

5.4.2.2 Fire Prevention and Protection

The concessionaire is responsible for the development and maintenance of an effective fire protection and prevention plan in the work sites, during all issueds of construction of the Tourism Corridor: Tranche El Progreso – Tela.

Fire Protection

To guarantee effective fire protection the company must comply with the following:

1. Guarantee the availability of fire prevention and extinction equipment.
2. Keep access to firefighting equipment clear at all times.
3. Locate firefighting equipment in accessible places and signals.
4. Inspect firefighting equipment periodically and maintain it in operable conditions. Defective equipment must be replaced.
5. Train and equip a fire brigade team to assume adequate protection of portables and human lives.
6. Provide a 20 lb ABC type fire extinguisher within a radius of 15 mts. from any site that holds more than 25 lts of flammable fluid or 3 kg. or more of flammable gases are used in the site.
7. Prohibit the use of carbon tetrachloride extinguishers and other toxic volatile liquids extinguishes.

Fire Prevention

To achieve a safe management of hazardous liquids, fuels, and flammables the concessionaire must

1. Ensure that only approved containers and portable tanks are used for storage and handling flammable and combustible liquids. Metal safety containers must be used for handling and use of flammable liquids in quantities greater than a gallon. The previous exception must not be applied to flammable liquid of high viscosity which must be handled in their original containers. For less than a gallon, only the original container or metal safety cans must be used for storage and handling of flammable liquids.
2. Keep storage areas free of undergrowth, debris and other flammable materials that do not require storage.
3. Provide at least one 20 lb ABC type fire extinguisher within a distance of 5 and 20 meters from any site that holds more than 25 lts of flammable fluid or 3 kg. or more of flammable gases are used in the site.
4. Provide at least one portable fire ABC type extinguisher with capacity of 20 lbs or more for every tank truck and other vehicles used for the transport and/or delivery of fuels and other flammable liquids.
5. Prohibit smoking and the lighting of bonfires in areas used for fueling, and fuel dispensing.
6. Ensure that striking and legible signs indicate the non-smoking rule.
7. Ensure that all operators turn off their equipment's engine when fueling and not using their cell phones when fueling.

5.5 Contingency and Emergency Plan

Attention to foreseen risks should preferably be preventive; however, in case of accidents of any kind, there must be a Contingency Plan that allows responding to the described risk situations.

The main objective of the Contingency Plan is to preserve the life, health, and integrity of the project's staff and prevent or minimize soil and surface water contaminations and preserve the quality of the environment in case of emergency.

To achieve these objectives the contingency plan must include various critical elements such as major and minor accident response procedures, spill containment procedures to prevent contamination of water and soil and, in case of a spill, have the necessary measures to clean and mitigate, and attention procedures for fire outbreaks and major fires. In terms of procedure, there are routine visual inspections and planned maintenance to reduce the potential for oil and other materials spilling on the soil or water.

The following is a list of the minimum contingency measures to be adopted:

1. Work sites must have an adequate alert system, to promptly warn the staff and give first-aid to injured people;
2. There must be a safe and efficient communication system with the nearest fire department in case of emergencies out of the company's control;
3. Work sites must be equipped with a radio or phone, first-aid kits, and qualified staff; there must be a working vehicle in case of emergency at all times; there must be equipment to extinguish fires and control explosions and fuel spills.
4. In case of spills or accidents that might affect surface waters, the company must have trained staff and proper equipment and materials to take quick and effective measures.
5. All work sites must have proper equipment to remove landslides, rock movements or provide assistance in case of floods.

The Plan activities obey the following order of priorities:

- Protection of human life
- Protection of human settlements (villages)
- Prevention of contamination in bodies of water (aqueducts, rivers, streams, lakes)
- Prevention of contamination in wildlife areas

The construction company is responsible of managing its own risks, as well as prevention and response to its emergencies. In this context, the construction company will always be the main and sole responsible for the safety and health of its employees as well as the activities they develop.

Before the start of operations, the construction company must establish the necessary agreements with the Fire Department, the National Police and emergency teams that might be required in case of a contingency, with the objective of establishing mechanisms of notification and access to the corresponding sites within the work areas in case of requiring support during emergencies. Local hospitals and clinics must be informed about the properties of the hazardous wastes and materials used by the project and the type of wound or disease that may be caused by fires or explosions.

Table 8.4 presents a list of authorities that must be included in the Contingency Plan. This list includes telephone numbers in case of an emergency.

Table 6.23. Contacts for the Preparation of Contingency Plan

ENTITY	PHONE NUMBER
Transit Police	222
Preventive Police	199
Fire Department	198
Honduran Red Cross	195
Environmental Specialist	
Occupational Safety Specialist	
COPECO (Regional 1 and Regional 2)	2553-6561 / 2553-6562 2442-5820

5.5.1 Emergency Equipment

The company must prepare a list that details the type, amount and location of the equipment to be used for storage, containment, and cleaning of the work areas and construction sites. This list will include the procedures and impact minimization measures to be used when responding to a spill. The selected, measure and mitigation equipment must adjust to the characteristics of the affected terrain as well as the types and quantities of material that could potentially be spilled. The following equipment, at least, for spill containment and cleaning must be provided:

- a) Absorbents such as pads, rags, and burlap for containment and collection of spilled liquids.
- b) Commercial equipment for spills (or its functional equivalent) which are prepackaged with a wide variety of absorbents for small and large spills;
- c) Shovels and backhoes for the excavation of contaminated materials;
- d) Containers, deposits and temporary storage bags to clean and store contaminated materials

5.5.2 Equipment Maintenance and Inspection

The projects security supervisor will inspect and require maintenance of the fueling and lubricant equipment following a strict program. The company must present written documentation on the methods employed and executed activities. All containers, valves, pipes and hoses must be regularly examined to evaluate their general condition. This evaluation will identify any sign of wear that could cause a spill, as well as leakage signals (e.g. accumulated fluids). Leaks must be corrected and repaired with the utmost diligence

5.5.3 Equipment Failures

Spills may be produced as a consequence of unpredictable events like the rupture of fuel tanks, radiators and hydraulic lines. Devices with an absorption capacity of up to 20 liters can be accommodated under them operator's seat, in construction and land movement equipment.

Construction staff will be trained on the operation and maintenance of the equipment, to prevent accidental discharge or fuel, oil or lubricant spills. The staff must also be aware of laws, dispositions and regulations of environmental contamination control that apply to their jobs. Training sessions will be held with crews about the prevention of spills, these sessions must be frequent enough to guarantee learning of spill prevention measures.

Containment is the immediate priority in case of a spill; if possible, the spill must be retained in the site of occurrence.

Cleaning procedures must begin immediately upon spill containment. Under no circumstance will containment equipment be used to store contaminated material. The company must have a list of the equipment that must be used to facilitate cleaning and minimizing damages to the environment.

In case of a spill, the project must notify the emergency response team, the environmental specialist and competent authorities.

5.5.4 Action Plan

Plan The following Action Plans must be followed step by step, and in order, to respond to emergencies related to the risks identified in the Risk Prevention Plan.

5.5.4.1 General Plan

1. The employee that detects the emergency must immediately inform the Area Supervisor and the Project Supervisor.
 - a. The Project Supervisor arrives to the site of the emergency to assess the situation and coordinate pertinent actions with the assistance of the Area Supervisor
2. If the Project Supervisor considers the situation can be resolved with internal resources, he proceeds to activate the Action Plan for the specific situation.
3. If the Project Supervisor considers the situation cannot be resolved with internal resources, he proceeds to notify the Security Supervisor and/or the Environmental Specialist.
 - a. The Security Supervisor and/or the Environmental Specialist coordinate activities with competent authorities and other external resources to determine the actions needed to resolve the emergency.
 - b. The Security Supervisor and/or the Environmental Specialist proceed to apply provisional measures until the arrival of external help (as long as the safety of the staff is not compromised).
 - c. The Security Supervisor and/or the Environmental Specialist, if necessary proceed to evacuate the facilities.
 - d. The Security Supervisor and/or the Environmental Specialist, upon the arrival of external help, provide the necessary information to resolve the emergency.

5.5.4.2 Fuel or Lubricant Spill

1. The employee that detects the emergency must immediately inform the Area Supervisor and the Project Supervisor.
2. The Project Supervisor arrives to the site of the emergency to assess the situation and coordinate pertinent actions with the assistance of the Area Supervisor
3. If the Project Supervisor considers the spill can be resolved with internal resources he proceeds to act in accordance to the subsequent items, if this is not the case he must then precede to point 4 of the General Plan.
4. The source of the spill must be immediately stopped or cut.
5. A fire extinguisher must be transferred to the site of the spill.
6. The project supervisor notifies the Security Supervisor and/or the Environmental Specialist of the incident and provides preliminary information about its magnitude.
 - a. The Security Supervisor and/or the Environmental Specialist, evaluates the need to coordinate actions with external resources and proceeds to it.
 - b. The Security Supervisor and/or the Environmental Specialist, depending on the incidence magnitude, evaluate the need of transferring to the site to provide support, to the Plan's activities.
 - c. The Project Supervisor coordinates spill containment using, depending on the magnitude, of containment barriers in ditches and drainages and the use of absorbent materials.

The Supervisor and/or the Environmental Specialist coordinate the tasks of cleaning up the spill.

7. The Security Supervisor and/or the Environmental Specialist draft the corresponding report and submit it to the developer or Project Manager.
8. The Security Supervisor and/or the Environmental Specialist make sure that the equipment and material used for spill containment that are restituted to their storage.
9. In the case of spills greater than 50 gallons, the project manager proceeds to inform competent authorities about the situation and executed actions within a 24 hour period after the incident.

5.5.4.3 Fire Outbreak

1. The Security Supervisor and/or the Environmental Specialist ensure that the equipment use for extinction is restituted in its storage place. The employee that detects the emergency must immediately notify the Area Supervisor and the Project Supervisor who must go to the site of the incident.
2. The employee that's detects the emergency takes the nearest extinguisher, foam tank or hose and proceeds to extinguish the fire outbreak; if he/she does not know how to operate the extinction system he/she must request help from other onsite staff.
3. Once the fire outbreak has been controlled, the project supervisor notifies the Security Supervisor and/or the Environmental Specialist about the incident.
4. The Security Supervisor and/or the Environmental Specialist drafts the corresponding report and submits it to the developer or Project Manager.
5. The Security Supervisor and/or the Environmental Specialist makes sure that the equipment and material used for extinction are restituted to their storage.

5.5.4.4 Fire

1. The employee that detects the emergency must immediately inform the Area Supervisor and the Project Supervisor.
2. The project supervisor notifies the Security Supervisor and/or the Environmental Specialist of the incident and provides preliminary information about its magnitude.
 - a. The Security Supervisor and/or the Environmental Specialist proceeds to coordinate assistance with the nearest Fire Department and goes to the site.

The Security Supervisor and/or the Environmental Specialist proceeds to notify the Developer or the Company Manager about the incident.
3. The Project Supervisor considering the safety of the staff, proceeds if possible, to organize extinction activities while the Fire Department Arrives
4. Depending on the magnitude of the incident the Security Supervisor and/or the Environmental Specialist will assess the need of site evacuation and await the arrival of the fire department.
5. Once the emergency has been contained the Security Supervisor and/or the Environmental Specialist drafts the corresponding report and submits it to the Developer or Project Manager.
6. The Security Supervisor and/or the Environmental Specialist ensure that the equipment used for extinction is restituted to their storage location.
7. The Project Manager proceeds to inform the proper authorities of the situation and the applied containment measures, within 24 hours of the incident.

5.5.4.5 Minor Workplace Accidents (concussions and lacerations)

1. The employee that detects the emergency must immediately notify the Area Supervisor or the Project Supervisor and the First Aid Coordinator.
2. The employee that detects the emergency retrieves the first aid kit and provides the care that the injured worker requires.
3. The First Aid Coordinator goes to where the injured worker is located, assesses provided care and determines the need or not of sending the injured worker to a clinic for specialized attention.
4. If the need for specialized attention is acknowledged, the First Aid Coordinator coordinates the Security Supervisor and/or the Environmental Specialist the transfer of the affected person.
5. Once the emergency has been contained the Security Supervisor and/or the Environmental Specialist, in collaboration with First Aid Coordinator drafts the corresponding report and submits it to the Developer or Project Manager.
6. The Security Supervisor and/or the Environmental Specialist ensure that the materials from the First Aid Kit are restituted.

5.5.4.6 Minor Workplace Accidents Related to the Manipulation of Hazardous Substances

1. The employee that detects the emergency must immediately inform the Area Supervisor and the Project Supervisor and the First Aid Coordinator.
 2. The employee that detects the emergency retrieves the First Aid Kit and the safety sheet (MSDS), of the chemical substance involved in the accident.
 3. The employee that detects the emergency proceeds to administer first aid according to the instructions defined in the safety sheet of the chemical substance.
 4. The First Aid Coordinator (who reports to the Security Supervisor), goes to where the injured worker is located, assesses provided care and determines the need or not of sending the injured worker to a clinic for specialized attention.
-

5. If the need for specialized attention is acknowledged, the First Aid Coordinator coordinates the Security Supervisor and/or the Environmental Specialist the transfer of the affected person. The safety sheet (MSDS), of the chemical substance involved in the accident, must be brought and given at the hospital.
6. Once the emergency has been contained the Security Supervisor and/or the Environmental Specialist, in collaboration with First Aid Coordinator drafts the corresponding report and submits it to the Developer or Project Manager.
7. The Security Supervisor and/or the Environmental Specialist ensure that the materials from the First Aid Kit are restituted.

5.5.5 Equipment and Material for Emergency Attention

The following is a list of equipment and material that must be available in the worksite during the implementation of the various Action Plans.

Once the work areas have been defined, during construction the concessionaire must prepare diagrams of the site that show the location of equipment and material for emergency control, as well as the minimum quantities that must be kept in stock.

During the construction issueds of the highway the following equipment and materials must be kept on site:

- Portable Extinguishers
- Foam Fire Extinguishers
- Barriers for containment of major spills
- Barriers for containment of minor spills and absorbent pads
- Cleaning products for small fuel spills
- First Aid Kit
- Communications equipment
- Personal protection equipment for cleaning activities, including rubber and leather gloves, protective lenses, protective clothing.
- Shovels, machetes and picks.

Large plastic bags

- Flashlights

The inventory of these equipment and materials must be verified monthly.

5.6 Citizen Participation Plan

Stage I: Principle 10 of the United Nations Declaration on Environment and Development, establishes that environmental issues “are managed in a better way”, with the participation of all interested citizens.

The Citizen Participation Plan has the following objectives:

1. Explain the project’s characteristics to the population in the project’s area of influence.
2. Establish dialogue and communication messages with the community benefitted by the Project.
3. Listen to the communities’ opinions and perceptions regarding the project’s potential impacts.
4. Learn the opinion of institutions and other key stakeholders through interviews.

The designed Citizen Participation plan is divided into two stages:

- **STAGE I:** Citizen Participation during the drafting of the Environmental Impact Study.
- **STAGE II:** Citizen Participation during the construction issued.

These stages respond to the fact that the communities’ expectations vary throughout the Project, and to the need of incorporating local labor in each of the activities to be executed.

5.6.1 STAGE I: Citizen Participation during the Drafting of the Technical Environmental Documents for Tranche La Barca – El Progreso

The communities considered for the development of the Citizen Participation Plan during this stage, are concentrated in the cities of Santa Rita and El Progreso

The main activities developed as part of the Citizen Participation Plan consisted of:

1. **Interviews with Key Stakeholders:** These interviews were conducted before requesting an Environmental License from SERNA (Natural Resources & Environment Secretariat). The interviews were conducted with the objective of gauging the perception and opinion of the mayors and key stakeholders in the municipalities within the area of socioeconomic influence of the project.
2. **Presentation of the Project and Environmental Impacts:** Technical presentations of the project and its environmental studies were given to the municipalities, to ensure that everybody involved in the project becomes a project auditor, including municipal engineers, environmental unit directors and other interested parties.

First Stage Results

Socialization Meeting in the Santa Rita Municipality

This meeting took place on June 27th 2013 in the meeting hall of the Santa Rita Municipality. The following municipal staff (See attendance list-Annex 4) participated in the meeting:

- Santa Rita Mayor: Wilmer Noé Mejía
- Santa Rita Council Members: Hector Amaya, Fany Arlet, María Marlenis Yanez, José Santos Rodríguez, Suli Mejía
- Municipal Aid: Jenny Chávez
- Municipal Environmental Unit Coordinator: Maximino Guevara Meza

Apart from the municipal staff the meeting also included Engineer Carlos Rivas Autopistas del Atlántico representative (concessionaire); representatives from Ingeniería y Ambiente de Sula and from The Louis Berger Group (environmental consultants).

In this meeting a video for the Honduras Tourism Corridor Project was presented, the video included all the tranches in the concession there was also a technical presentation about the project that included construction and operation-maintenance of the tranches.



After the presentations, individual interviews were conducted in which each participant shared their opinions on the project, considering the activities, benefits and positive and negative impacts that the project might generate.

The following is a summary of expressed opinions:

- 100% of interviewees are in favor of the Project and consider it positive.
- The surveys identified the following impacts, already considered in the evaluation of environmental impacts:
 - **Positive Impacts:** most interviewees concluded the Project will bring development in the construction by hiring staff and purchasing goods and services associated to the construction.
 - **Biological Impacts:** the interviews mentioned that no impacts are foreseen since the four lanes will be built on the existing road.
- Most of the interviewees consider that the safety aspects and the improvement in road conditions as a benefit of the Project.



Finally, the Project developer highlights the following from the observations and suggestions:

▪

- Socialize and present the Project to the media, the interviewees feel that there might be an impact to local society, due to the uncertainty of where the toll booths are located. It is important to mention that the determination of this fee is not part of this environmental study.

Annexed to this Environmental Management Plan, are the interviews with the participants at the Santa Rita Municipality. Annex 5

Socialization meeting held in the El Progreso Municipality

This meeting took place on June 27th 2013, in the El Progreso Municipality meeting room. Municipal representatives participated in the meeting. (See attendance list- Annex 6)

- Regidor Municipal de El Progreso: Oscar Armando Rubí
- Jefe de Obras Públicas: Rommel Cano
- Jefe del Departamento Municipal Ambiental: Ana Zulay Rivas
- Estudiante de pasantía: Alejandra Gallo
- Asesor Legal: Maynor López
- Jefe de Planificación Urbana: Gloria Edith Medina



Besides municipal staff the following representatives attended the meeting: Carlos Rivas, Autopistas del Atlantico Coordinator (Concessionaire), representatives from Ingenieria y Ambiente de Sula and representatives from the Louis Berger Group (Consultants).

In this meeting a video for the Honduras Tourism Corridor Project was presented, the video included all the tranches in the concession there was also a technical presentation about the project that included construction and operation-maintenance of the tranches.

After the presentations individual interviews were conducted, each participant was asked to express his/her opinions about the project,

considering activities, benefits and positive and negative impacts they considered the Project might generate.

Un resumen de las opiniones emitidas se presenta a continuación:

The interviewees (6), all stated to have Heard about the Tourism Corridor Project before and said they agreed to its development

- The positive impacts that the interviewees perceived include savings in time and fuel, the increase in land improvement added value, temporary employment generation and the increase in internal tourism.
- Como impactos negativos se mencionaron: la posible importación de mano de obra, incremento en el tráfico vehicular, aumento de ruido por el tráfico, aumento de las emisiones atmosféricas y la tala de árboles.
- Among the recommendations the interviewees considered must be made to the program developer, in this case SOPTRAVI the following were mentioned: socialization of the project in the communities located along the road, comply with all mitigation and compensation measures to minimize effects on natural resources, maintain constant communication with the Environmental Department of the El Progreso Municipality and consider the Zoning Plan made for El Progreso, so the developed activities agree with the stipulations of the Zoning Plan.



Annexed to this Environmental Management Plan, are the interviews with the participants at the El Progreso Municipality. Annex 7.

5.6.2 Issued II: Citizen Participation during Construction Stage

During the construction stage of the Project the following hierarchical order must be considered to establish effective communication between the communities within the area of socioeconomic influence (municipalities of El Progreso and Santa Rita), the developer SOPTRAVI, SERNA, environmental management units and the concessionaire (project executive).

- SERNA and/or Environmental Management Units → The Concessionaire → SOPTRAVI, the Environmental Management Unit of SOPTRAVI, through the unit chief who will serve as liaison.
- Community → The Concessionaire → SOPTRAVI, through the proper authorities only with strictly administrative problems.
- Community → The Concessionaire → SOPTRAVI, through the SOPTRAVI Environmental Management Units, when dealing with environmental issues or social complaints. The Environmental Management Unit will notify SERNA (Natural Resources & Environment Secretariat) about the object of the quarry or the existing problem.
- The Concessionaire will notify SERNA (Natural Resources & Environment Secretariat) and/or Environmental Management Units, about events related to the units as construction advances and coordinates follow-up inspections to the Project.

In all of these cases communication must be in writing and delivered directly to the corresponding offices. In this sense, the concessionaire should establish an office of citizen participation or community relations, which must be located in an area close to the project but accessible, or within the field offices, this office must have qualified personnel (social workers or sociologists) who will be responsible to respond and receive any doubt, complaint or information request from nearby or neighboring communities.

The concessionaire must establish a mechanism to receive complaints, through a single window or a toll free telephone number, which must be answered by the same qualified staff in charge of the previously mentioned citizen participation office.

5.6.2.1 Labor Hiring Program

Considering that the new program will require skill and unskilled labor, it is recommended that the concessionaire, through its human resources office, organize a job fair according to the projects labor needs. This job fair must be promoted through massive media three months before the start of project operations.

The concessionaire's human resources office must receive resumes of possible candidates through a single window functioning during the projects execution, in order to involve or incorporate people from communities from within the area of socioeconomic influence to labor for which they are qualified or they can join new workers training programs, in collaboration with educational institutions, the Ministry of Labor and Social Security and the Honduran National Employment Service.

Finally, candidates who are duly selected and have enough qualifications to execute the required labor will be formally linked to the project with the requirements demanded by law and protected by the National Labor Regulations.

5.6.2.2 Institutional Strengthening

Considering that within the Environmental Management Program there will be an Environmental Surveillance and Control Program that implies the development of a system of environmental quality monitoring, the concessionaire in collaboration with SOPTRAVI, will hold project advanced meeting with involved institutions to familiarize them with project execution issues and facilitate their job of monitoring and follow-up.

5.6.2.3 Elements to consider in the Citizen Participation Plan

Table 8.5, presents the elements and measures to be contemplated for the development of the Citizen Participation Plan:

Table 6.24. Citizen Participation Plan Evaluation Elements

No	ElementoElement	MedidasMeasures
1	Maintain a citizen participation office managed by qualified staff to receive any doubt, complaint, or information request from the communities with the area of socioeconomic influence through a single window or a toll-free telephone line.	Record of visits, complaints, and/or requests received
2	Hold a job fair to incorporate community members from the area of socioeconomic influence to the project activities and maintain a single window to receive candidate applications during the project execution.	Number of person to be hired, by gender and age
3	Establish an agreement (with education institutions), or professionals for training on different issues.	Signing and execution of an agreement between the concessionaire and the educational institution or the professional trainers and SOPTRAVI, for an estimated period of time.
4	Incorporate local schools identified in the area of influence to an environmental education Project.	Preparation of an environmental education program

Source: The Consultant

5.7 Environmental Recovery and Closure

Environmental recovery will take place once construction activities have ended (e.g. installation and operation of temporary facilities, extraction of material from stone quarries, use of water sources, etc.) in those sites that require it and will not be used again. In this sense, the Environmental Recovery Plan must be presented in issues, as project stages end, with a corresponding Closure Plan.

The objective of environmental recovery is the restoration of adequate conditions for the restoration of natural biological communities in the work sites (natural recovery or natural revegetation). Environmental Recovery includes the following tasks:

- Reshaping of the pre-construction terrain profile
- Erosion control
- Revegetation
- Reforestation, if necessary

The Environmental Recovery Plan must be applied to all areas not occupied with project activities and which can be recovered such as temporary facilities, borrow pits, warehouses, storage sites, parking spaces, among others. The removal of temporary facilities and machinery requires removing all surface and underground infrastructure (e.g. aqueduct pipes, sewage or drainage systems, viaducts, cabling, etc.). Once all infrastructure has been removed environmental recovery or restoration must proceed, which must include only native species for reforestation and revegetation.

Recovery activities must be monitored constantly to ensure achieving the objective without leaving behind environmental liabilities. The concessionaire is responsible for the environmental recovery plan. To this effect, the concessionaire must present its Closure Plan to the SOPTRAVI Environmental Management Unit at least six (6) months before removing any project segment. The plan must detail demobilization, cleaning, and restoration activities according to initial conditions.

5.8 Monitoring and internal evaluation of the Environmental Management Plan and Individual Management Plans

5.8.1 Objective

The objective of the Environmental Management Plan is to document the degree in which preventive and mitigation actions outlined in the Environmental Management Plan achieve their objective of minimizing negative impacts associated with the project's construction.

In order to document and prove achieved objectives, it is necessary to collect and report key information that show how environmental variables have behaved, when corrective were executed and their degree of affectivity to prevent, mitigate, and compensate identified environmental effects.

5.8.2 Special Monitoring Aspects

This section summarizes the main environmental variables that will be monitored during the project's construction, in order to gather enough information to evaluate environmental effects due to its development. This monitoring is independent from the environmental inspection required to guarantee compliance of each of the mitigation measures proposed in this plan.

A summary of monitoring activities is included in table 8.6 to facilitate reading and approval by the environmental specialist and the pertinent authorities.

Table 8.6 Project Monitoring Plan

Nº	Impact	Medium	Mitigation Measures	Monitoring Activities	Periodicity	Regulation	Responsible
1	Contamination of Surface water during the construction of bridges, accidental fuel spills or sedimentation due to excavation. Effects on aquatic fauna	Ac and Bio	<ul style="list-style-type: none"> Management Program for Liquid and Solid Wastes Contingency program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.) 	<ul style="list-style-type: none"> Surface water quality monitoring in main waterways during the construction of every bridge upstream and downstream of the worksite. Monitoring will take place through direct field measurements and lab analysis of sediment and water samples. The water analysis includes parameters for pH[°], biochemical oxygen demand, dissolved oxygen, suspended solids, fecal matter, greases and oils and hydrocarbons. 	Surface water analysis will take place in main waterways during the construction of bridges or every three months if determined by SERNA or the Environmental Management Units	<p>Water Quality⁴</p> <ul style="list-style-type: none"> Primary regulation for Environmental Quality and quality levels for continental waters for recreational use with and without direct contact. DE. 75 de 2008. Panamá. <ul style="list-style-type: none"> Medium Risk: Fir for recreation with and without direct contact. Continental waters that allow recreational activities that do not imply prolonged exposure with the liquid nor complete skin and mucous membranes immersion. It involves only recreational activities where limbs are moistened such as sailing and fishing. Project draft that dictates environmental quality regulations for natural waters. <ul style="list-style-type: none"> 2 C Class Waters: Waters for: <ol style="list-style-type: none"> Human consumption with conventional treatment (coagulation, flocculation, sedimentation, filtering and disinfection) Risk of contamination of vegetables consumed by humans after processing or parks, gardens and fields and sports when there is direct contact. Artisan fishing Risk recreation according to norms. Cattle watering. World Bank recommended standards 	The Concessionaire Environmental specialist Tourism Corridor Supervision

PARAMETER	Limit Values for Natural Water		
	D.E 75 DE 2008 Mean Risk	Class 2 C	Limit BM - IFC
PH	6.5-8.5	6.0 – 9.0	-
Suspended Solids (mg/L)	<50	-	50
Turbidity (NTU)	50-100	<100	-
Dissolved oxygen (mg/L)	6-7	>5	-
Biochemical oxygen demand (mg/L)	3-5	<5	<50
Greases and oils (mg/L)	<10	<10	10
Hydrocarbons(mg/L)	0.05-2.0	<50 µg/L	-
Fecal matters (UFC1/100 mL)	251-450	<1000	-

⁴ Since there is no Honduran Regulation, it is proposed to use World Bank and Panama City regulations which include: Primary regulation for Environmental Quality and quality levels for continental waters for recreation and no direct contact use. DE. 75 de 2008 y the Regulation Project to dictate the environmental quality for Natural Water.

2	Deterioration of quality or air contamination Foul odor and dust generation	At	<ul style="list-style-type: none"> Preventive vehicle and construction equipment maintenance program (adequate mechanical state is required) Vehicular Emissions Compliance Control Program Dust and Foul Odor Emission control Program 	<ul style="list-style-type: none"> Air quality monitoring must be done every six months in 4 control points located in the tranche (sensitive receivers) Site selection must consider the location of the most sensitive receivers, the activities of most impact on air quality; climatic variables that might influence the effects of dispersion and possible barriers or natural area conditions. Adequate maintenance of heavy equipment Maintenance Record 	<p>Every six months or according to the pertinent authority.</p> <p>In 4 sites or according to the pertinent authorities as established in regulations</p>	<p><u>Air:</u> Since there is no local regulation for air quality control, it is suggested to use the World Bank and EPA guidelines.</p> <p>World Bank parameter guidelines NO₂, SO₂ y PM₁₀, y EPA 2003 para CO</p> <table border="1"> <thead> <tr> <th>PARAMETER</th> <th>PERIOD</th> <th>MAX LIMIT</th> </tr> </thead> <tbody> <tr> <td rowspan="2">NO₂ – World Bank 2007.</td> <td>Annual</td> <td>40 µg/m³</td> </tr> <tr> <td>1 hour</td> <td>200 µg/m³</td> </tr> <tr> <td rowspan="2">SO₂ – World Bankl 2007.</td> <td>24 hours (guide value)</td> <td>20 µg/m³</td> </tr> <tr> <td>10 minutes⁵</td> <td>500 µg/m³</td> </tr> <tr> <td rowspan="2">CO - EPA 2003. National Ambient Air Quality Standards.</td> <td rowspan="2">1 hour</td> <td>9 ppm</td> </tr> <tr> <td>10 mg/m³</td> </tr> <tr> <td>PM 10 – World Bank 2007.</td> <td>24 hours</td> <td>50 µg/m³</td> </tr> </tbody> </table> <p>Regulation for Control of Contaminating Gases and Smoke Emissions from motor vehicles</p>	PARAMETER	PERIOD	MAX LIMIT	NO ₂ – World Bank 2007.	Annual	40 µg/m ³	1 hour	200 µg/m ³	SO ₂ – World Bankl 2007.	24 hours (guide value)	20 µg/m ³	10 minutes ⁵	500 µg/m ³	CO - EPA 2003. National Ambient Air Quality Standards.	1 hour	9 ppm	10 mg/m ³	PM 10 – World Bank 2007.	24 hours	50 µg/m ³	The Concessionaire Environmental specialist Tourism Corridor Supervision
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		10 mg/m ³																									
PM 10 – World Bank 2007.	24 hours	50 µg/m ³																									
3	Impact to worker's health	SE	<ul style="list-style-type: none"> Dust and Foul Odor Emission control Program 	<ul style="list-style-type: none"> Monitoring of breathable particles 	Depending on the number of workers and exposure Every six months	<p>Total Breathable Particles Occupational Safety and Health Administration" (OSHA/ USA, max value is 5 mg/m³)</p>	The Concessionaire Environmental specialist Tourism Corridor Supervision)																				

⁵ Según estudio de la OMS, se recomienda que no se supere una concentración de SO₂ de 500 µg/m³ durante periodos con una duración media de 10 minutos.

4	Increase in noise levels	At	<ul style="list-style-type: none"> Preventive vehicle and construction equipment maintenance program <p>Work Schedule: avoid as much as possible work during night hours or rest periods; if unavoidable notify affected populations in advance</p>	<ul style="list-style-type: none"> Field supervision of applied measures Records of Personal Protective equipment Photographic record of staff wearing protective equipment <ul style="list-style-type: none"> Noise monitoring plan in 4 control points where the most sensitive receivers are located in the tranche. 	Noise monitoring in the in 4 points during the Selective Rehabilitation and improvement Stage and then every six months	<p><u>Environmental Noise</u></p> <p>The impacts of noise cannot exceed the levels established in the following table, nor can the derive in a maximum increase of background noise levels 3 db in the nearest receiver.</p> <table border="1"> <thead> <tr> <th colspan="3">NOISE LEVELS GUIDE 1</th> </tr> <tr> <th colspan="3">ONE HOUR L_{AQ} (DBA)</th> </tr> <tr> <th>RECEIVER</th> <th>Daytime 07:00 – 22:00</th> <th>Nighttime 2:00 – 07:00</th> </tr> </thead> <tbody> <tr> <td>Residential, Institutional, educational²</td> <td>55</td> <td>45</td> </tr> <tr> <td>Industrial, Commercial</td> <td>70</td> <td>70</td> </tr> </tbody> </table>	NOISE LEVELS GUIDE 1			ONE HOUR L _{AQ} (DBA)			RECEIVER	Daytime 07:00 – 22:00	Nighttime 2:00 – 07:00	Residential, Institutional, educational ²	55	45	Industrial, Commercial	70	70	The Concessionaire Environmental specialist Tourism Corridor Supervision
NOISE LEVELS GUIDE 1																						
ONE HOUR L _{AQ} (DBA)																						
RECEIVER	Daytime 07:00 – 22:00	Nighttime 2:00 – 07:00																				
Residential, Institutional, educational ²	55	45																				
Industrial, Commercial	70	70																				
5	Impact to worker's health	SE	<ul style="list-style-type: none"> Provide auditory protection equipment for workers exposed to levels higher than 80 dBA. 	Occupational Monitoring <ul style="list-style-type: none"> Noise and control measuring 	Monitoring every six months and then every six months according to exposure conditions	<p><u>Workplace Noise</u></p> <p>General Regulation of Preventive Measures for Accidents and Professional Diseases</p> <p>Maximum Level: 85dB maximum exposure</p>	The Concessionaire Environmental specialist Tourism Corridor Supervision															
6	Soil contamination due to the spill of fuels, oils, greases, and/or lubricants.	T/S	<ul style="list-style-type: none"> Liquid and Solid Waste Management Program Contingency Program 	<ul style="list-style-type: none"> Draft of the report Photographic record of spills and cleanup activities See Section 8.5.4.2. Application of vehicle and oils and grease best practices established by law 	Permanent during Selective Rehabilitation and improvement Construction Operation	Regulation for the installation and operation of Service Stations, Fuel Deposits and Alternative or Substitute Products. (Agreement No. 1011, La Gaceta 18/04/2009).	The Concessionaire Environmental specialist Tourism Corridor Supervision															
7	Increase in public sanitation issues due to the generation of solid and liquid wastes	SE	<ul style="list-style-type: none"> Liquid and Solid Waste Management Program 	<ul style="list-style-type: none"> Record of monthly disposal payments to the municipality Record of waste disposal activities and amount of disposed material Record of toilet cleaning 	Permanent during Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Health Code – Decree N°65 – 1991 Environmental Health Regulation – Agreement N° 0094-1997 Agreement for Solid Waste Management – Agreement N°378-2001 	The Concessionaire Environmental specialist Tourism Corridor Supervision															

5.9 Implementation and Evaluation Timeline

Dates must be assigned for the mitigation measures that must be executed during each project issued. Some of these measures have specific dates and others continue throughout all project issueds. The implementation timetable can be visualized in Table 8.7:

Table 6.25. Timetable for the Execution of Mitigation Measures

Medium	Impact	Mitigation Measure	Responsible Entity	Frequency	Stage	Regulating Entity
Aquatic	1a. Hydrological regime alteration	<ul style="list-style-type: none"> Under no circumstance shall the extraction activities endanger the freshwater conduction systems or the terrains adjacent to the project. Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas. Avoid the formation of pools and depositing material on the natural water runoff sources and avoid the stacking of materials higher than 2 meters 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Municipal Environmental Units SOPTRAVI Environmental Management Units SERNA Health Secretariat
	1b. Phreatic Level alteration	<ul style="list-style-type: none"> Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas. Follow the technical guidelines of INHGEO MIN for floodplain soils. 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Municipal Environmental Units SOPTRAVI Environmental Management Units SERNA Health Secretariat
	1c. Deterioration of quality or air contamination	<ul style="list-style-type: none"> Liquid and Solid Wastes Management Program Contingency Program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.) 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Municipal Environmental Units SOPTRAVI Environmental Management Units SERNA Health Secretariat
Atmospheric	2a. Deterioration of quality or air contamination	<ul style="list-style-type: none"> Construction Equipment and Vehicles Preventive Maintenance Plan Vehicular Emissions Compliance Program 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA DNT
		<ul style="list-style-type: none"> Air quality monitoring plan in 4 control points where the most sensitive receivers are located in the tranche. 	The Concessionaire Environmental specialist	Every six months	Selective Rehabilitation and improvement Construction Operation	
	2b. Dust and foul odor generation	<ul style="list-style-type: none"> Dust and Foul Odor Emission control Program 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	
	2c. Increase in noise levels	<ul style="list-style-type: none"> Construction Equipment and Vehicles Preventive Maintenance Plan Work Schedule: Avoid nighttime or rest period operations or notify affected communities in advance E Provide auditory protection equipment to workers exposed to noise levels over 80 dBA. 	The Concessionaire Environmental specialist Security supervisor	Permanent	Selective Rehabilitation and improvement Construction Operation	

Medium	Impact	Mitigation Measure	Responsible Entity	Frequency	Stage	Regulating Entity
		<ul style="list-style-type: none"> Noise Monitoring Program 	The Concessionaire Environmental specialist Security supervisor	Every six months	Selective Rehabilitation and improvement Construction Operation	
		<ul style="list-style-type: none"> Labor vibrations monitoring plan 	The Concessionaire Environmental specialist Security supervisor	Every six months	Selective Rehabilitation and improvement Construction Operation	
Terrestrial	3a. Effects on soil due to compacting or leveling	Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas.	The Concessionaire Environmental specialist	Permanent	Construction	<ul style="list-style-type: none"> Municipal Environmental Units Environmental Management Units SOPTRAVI SERNA
	3b. Quality deterioration or soil contamination	<ul style="list-style-type: none"> Contingency Program: avoid, if possible, the accidental spill of contaminating substances on the soil. Prevention and Control of contaminating substance spills (oils, fuels, paints, etc.) Liquid and Solid Waste Management Program 	The Concessionaire Environmental specialist Security supervisor	Permanent	Selective Rehabilitation and improvement Construction Operation	
	3c. Extraction or loss of soil	<ul style="list-style-type: none"> Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas. 	The Concessionaire Environmental specialist	Permanent	Construction	
	3d. Increased soil erosion processes	<ul style="list-style-type: none"> Erosion control and slope stability measures 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA
	3e. Reduction in fertility and use of soil	<ul style="list-style-type: none"> Reforestation, Arborization and Revegetation Plan 	The Concessionaire Environmental specialist		Construction	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA
Biotic	4a. Loss of vegetation cover	<ul style="list-style-type: none"> Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas. 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Municipal Environmental Units SOPTRAVI Environmental Management Units SERNA ICF

Medium	Impact	Mitigation Measure	Responsible Entity	Frequency	Stage	Regulating Entity
	4b. Alteration or elimination of terrestrial and aquatic fauna	<ul style="list-style-type: none"> Surveillance And Control Program: Avoid predation and the alteration of species habitats 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Municipal Environmental Units SOPTRAVI Environmental Management Units SERNA ICF
	4c. Increased risk of running over local fauna	<ul style="list-style-type: none"> Place animal crossing signs; Speed regulation 	The Concessionaire Environmental specialist	Once	Operation	<ul style="list-style-type: none"> Municipal Environmental Units SOPTRAVI Environmental Management Units SERNA
Socioeconomic	5b. Modification to local traffic	<ul style="list-style-type: none"> Work Schedule: Execute installation of road signals proposed in Transit Management Program Coordination between DNT and Dissemination And Communication Plan: Maintain a permanent campaign for communication of affected areas 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA DNT
	5e. Increased risk of contagious diseases	<ul style="list-style-type: none"> Health and Hygiene Program 	The Concessionaire Environmental specialist Security supervisor	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA DNT
	5f. Increase in the risk of workplace accidents	<ul style="list-style-type: none"> Risk and Accident Prevention Program Maintain first-aid kits and ambulance services Record of worker's training on first aid measures 	The Concessionaire Environmental Specialist Security supervisor	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA Health Secretariat Ministry of Labor
	5h. Increase in public sanitation issues and the generation of soils and liquid wastes	<ul style="list-style-type: none"> Collection and Disposal of Solid Wastes Program Portable Toilets for Company workers cleaned at least twice a week. 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA Health secretariat
	5i. Disturbances to surrounding communities	<ul style="list-style-type: none"> Work plan: Establish a work Schedule that avoids affecting daily community activities Work Schedule: Execute installation of road signals proposed in Transit Management Program Coordination between DNT and Dissemination And Communication Plan: Maintain a permanent campaign for communication of affected areas 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA Health secretariat
	5j. Changes in the use of soil	<ul style="list-style-type: none"> Agreement selection in the El progreso Municipal Zoning Plan Request change in the use of soil by the unicity 	The Concessionaire Environmental specialist	Permanent	Planning	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA Health secretariat

Medium	Impact	Mitigation Measure	Responsible Entity	Frequency	Stage	Regulating Entity
Landscape related	7a. Alteration or changes to the landscape and environment aesthetics	<ul style="list-style-type: none"> Execute planned installation of road signals in the Traffic Management Program. Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas. 	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> Environmental Management Units SOPTRAVI SERNA Health secretariat

Source: The consultant

6 ENVIRONMENTAL MANAGEMENT PLAN UPDATES

It is recommended to draft Environmental Measures Compliance Reports (Known As Icma) every six months, these reports gather the results obtained from program execution and the plans defined in the Environmental Management Product, as well as the analysis of the results obtained from the implementation of each measure.

The Environmental Management Plan must be continually revised during the Selective rehabilitation and improvement stage, for an estimated period of 10 months, and 12 months for the construction issued and 6 months after the execution of programmed measures. This period can be extended if, in light of the obtained results, environmental authorities consider it necessary. The Environmental Management Plan can be adapted to the activities executed during the operation and maintenance stage.

Modifications must be approved by the concessionaire, who will proceed to notify SERNA (Natural Resources & Environment Secretariat) for final approval.

7 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION COST

Table 10.1 presents the detail and flow of the costs for the Environmental Management Plan. These costs generally present costs for, planning, administration, execution of programs; however, there will be material and equipment costs for the programs which must be covered by the concessionaire through other budget lines (construction costs, materials, and construction equipment)

Table 6.26. ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION COST

No.	EMP PROGRAM	Entity Responsible for Execution	Frequency	Stage	Total Cost [US\$]	Execution		Operation and Maintenance								
						Years										
						2014	2015	2016	2017	2018	2019	2020	2021	2022	2044	
1	Affected Public Services Relocation Program	CONCESSIONAIRE	Once	Planni ng	S/C *											
2	Compensation or Resettling of affected houses plan	DEVELOPER	Once	Planni ng	S/C *											
3	Municipal payment for per tree fee	CONCESSIONAIRE	Once	Planni ng	\$ 43,399		B/. 43,399									
4	Program for Management of Temporary Camps and Facilities	CONCESSIONAIRE	Permanent	Execut ion	\$ 152,359	\$ 76,179	\$ 76,179									
5	Preventive Vehicle and Construction Equipment Program	CONCESSIONAIRE	Permanent	Execut ion	\$ 60,943	\$ 30,472	\$ 30,472									
6	Program for Compliance with Vehicular Emissions Regulation	CONCESSIONAIRE	Permanent	Execut ion	\$ 181,307	\$ 26,663	\$ 26,663	\$ 13,331	\$ 6,666	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999
7	Waste Management Program	CONCESSIONAIRE	Permanent	Execut ion	\$ 362,613	\$ 53,325	\$ 53,325	\$ 26,663	\$ 13,331	\$ 7,999	\$ 7,999	\$ 7,999	\$ 7,999	\$ 7,999	\$ 7,999	\$ 7,999
8	Risk Prevention Plan	CONCESSIONAIRE	Permanent	Execut ion	\$ 466,217	\$ 68,561	\$ 68,561	\$ 34,281	\$ 17,140	\$ 10,284	\$ 10,284	\$ 10,284	\$ 10,284	\$ 10,284	\$ 10,284	\$ 10,284
9	Arborization, Reforestation, and Revegetation Plan	CONCESSIONAIRE	Once	Execut ion	\$ 114,269	\$ 57,134	\$ 57,134									
10	Dissemination And Communication Plan	CONCESSIONAIRE	Permanent	Execut ion	\$ 181,307	\$ 26,663	\$ 26,663	\$ 13,331	\$ 6,666	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999	\$ 3,999
11	Dust and Foul Odor Emissions Control Program	CONCESSIONARIO (CONCESSIONAIRE)	Permanent	Execut ion	\$ 76,179	\$ 38,090	\$ 38,090									
12	Health and Hygiene Program for the Prevention of Contagious Diseases	CONCESSIONAIRE)	Permanent	Execut ion	\$ 99,033	\$ 49,517	\$ 49,517									
13	Traffic Management Program	CONCESSIONAIRE	Permanent	Execut ion	\$ 83,797	\$ 41,899	\$ 41,899									
14	Surveillance and Control Program	CONCESSIONAIRE	Permanent	Execut ion	\$ 310,811	\$ 45,708	\$ 45,708	\$ 22,854	\$ 11,427	\$ 6,856	\$ 6,856	\$ 6,856	\$ 6,856	\$ 6,856	\$ 6,856	\$ 6,856
15	Flora and Fauna Rescue and Relocation Program	CONCESSIONAIRE	Permanent	Execut ion	\$ 137,123	\$ 68,561	\$ 68,561									
16	Environmental Monitoring Plan: Surface Water Quality Monitoring	CONCESSIONAIRE	Every two months ⁽¹⁾	Execut ion	\$ 31,995	\$ 15,998	\$ 15,998									
			Annual	O/M	\$ -											
17	Environmental Monitoring Plan: Air Quality Monitoring (environmental and labor related)	CONCESSIONAIRE	Semestral ⁽²⁾	Execut ion	\$ 21,330	\$ 10,665	\$ 10,665									
			Annual	O/M	\$ 73,589			\$ 10,665	\$ 10,665	\$ 5,333	\$ 5,333	\$ 2,666	\$ 2,133	\$ 1,600	\$ 1,600	
18	Environmental Monitoring Plan: - Noise monitoring	CONCESSIONAIRE	Semestral ⁽²⁾	Execut ion	\$ 21,330	\$ 10,665	\$ 10,665									
			Annual	O/M	\$ 73,589			\$ 10,665	\$ 10,665	\$ 5,333	\$ 5,333	\$ 2,666	\$ 2,133	\$ 1,600	\$ 1,600	
19	Environmental Monitoring Plan: - Vibration monitoring	CONCESSIONAIRE	Semestral ⁽²⁾	Execut ion	\$ 15,998	\$ 7,999	\$ 7,999									
			Biannual	O/M	\$ -											
20	Environmental Monitoring Plan: - Soil	CONCESSIONAIRE	Trimestral	Execut	\$ 15,998	\$ 7,999	\$ 7,999									

	Contamination Monitoring		(3)	ion												
			Biannual	O/M	\$	-										
21	Local and regional providers selection	CONCESSIONAIRE	Monthly	Execut ion	\$	22,854	\$ 11,427	\$ 11,427								
22	Environmental education Plan	CONCESSIONAIRE	Permanent	Execut ion	\$	259,010	\$ 38,090	\$ 38,090	\$ 19,045	\$ 9,522	\$ 5,713	\$ 5,713	\$ 5,713	\$ 5,713	\$ 5,713	\$ 5,713
23	Contingency and Emergency Plan	CONCESSIONAIRE	Permanent	Execut ion	\$	259,010	\$ 38,090	\$ 38,090	\$ 19,045	\$ 9,522	\$ 5,713	\$ 5,713	\$ 5,713	\$ 5,713	\$ 5,713	\$ 5,713
24	Citizen Participation Plan	CONCESSIONAIRE	Permanent	Execut ion	\$	53,325	\$ 26,663	\$ 26,663								
25	Environmental Recovery and Abandon Plan	CONCESSIONAIRE	Permanent	Execut ion	\$	45,708	\$ 22,854	\$ 22,854								
26	Environmental Auditing Plan	CONCESSIONAIRE	Semestral (2)	Execut ion	\$	83,797	\$ 41,899	\$ 41,899								
					\$	3,246,890	\$ 815,118	\$ 858,517	\$ 169,880	\$ 95,605	\$ 55,230	\$ 55,230	\$ 49,897	\$ 48,831	\$ 47,764	\$ 47,764

Note: S/C * = Without cost to the PGA since it is included in actions that must be funded by the concessionaire

(1): The analysis of Surface water quality will be done in the main waterways during the construction of every bridge or every three months for every bridge if determined by SERNA

(2): The analysis of air, noise, and vibrations will be done every six months or according to SERNA

(3) The analysis of soil contamination must only be done if there is a spill of over 25 gallons during construction or every three months if determined by SERNA or Environmental Management Units: .

ANNEXES

Anexo 1. Consultant's Affidavit

Anexo 2. Original or Notarized Copy of Consultant's License Certificate

Anexo 3. Notarized Copy of Consultant's Registry

Anexo 4. Assistance List to the Meeting in the Municipality of Santa Rita

Anexo 5. Interviews in the Municipality of Santa Rita

Anexo 6. Assistance List to the Meeting in the Municipality of Santa Rita

Interviews in the Municipality of El Progreso

a. Document of Society Constitution, individual service provider or legal status (N/A)

Property or lease deed for the location where the Project will be developed, duly stamped and registered (N/A)

Certificate issued by the Municipal Environmental Unit (known in spanish as UMA) which certifies the condition of the Project (N/A)

F- Publication (in a renowned newspaper) notification of receipt by this Secretariat, five days before the presentation of this form and other requirements

**(Insert the newspaper
publication here)**

Breakdown of the global investment amount for the activity, work or project

The capital costs for the project are estimated as follows:

Section	Length (Km)	Basic (US\$)			Optional (US\$)	
		Construction costs	Tuning	Bridges	Construction costs	Tuning
El Progreso - Camalote	6	8 831 457,25			9 615 255,66	
Camalote - Chindongo	6	5 951 217,09	691 324,09			
Chindongo - El Aguacate	18,1	20 938 870,12	2 160 339,25			
El Aguacate - La Mulera	21,6	24 497 796,57	2 002 394,23			
La Mulera - Tela	16,9		1 490 618,26		16 334 406,80	
Santa Rita - El Progreso	26		5 148 198,42	5 500 732,63	29 467 495,33	
La Barca - Santa Rita	11				10 421 908,86	
San Pedro - El Progreso	17,5		3 044 748,76	2 988 500,00		
Tela - La Ceiba	95					5 677 334,73
		3 010 967	726 881	424 462		
Implementing Environmental Management Plan		1 000 000,00	-			
Transfer Utility Networks		1 000 000,00	1 000 000,00			
Join And/Or Transfer Of Fiber Optic Networks		1 000 000,00	-			
Studies And Designs		886 000,00	-		110 000,00	475 000,00
Weighing Stations And Tolls		3 000 000,00				
Total (Usd 2012)		70 116 308,03	16 264 504,01	8 913 694,63	65 949 066,65	6 152 334,73

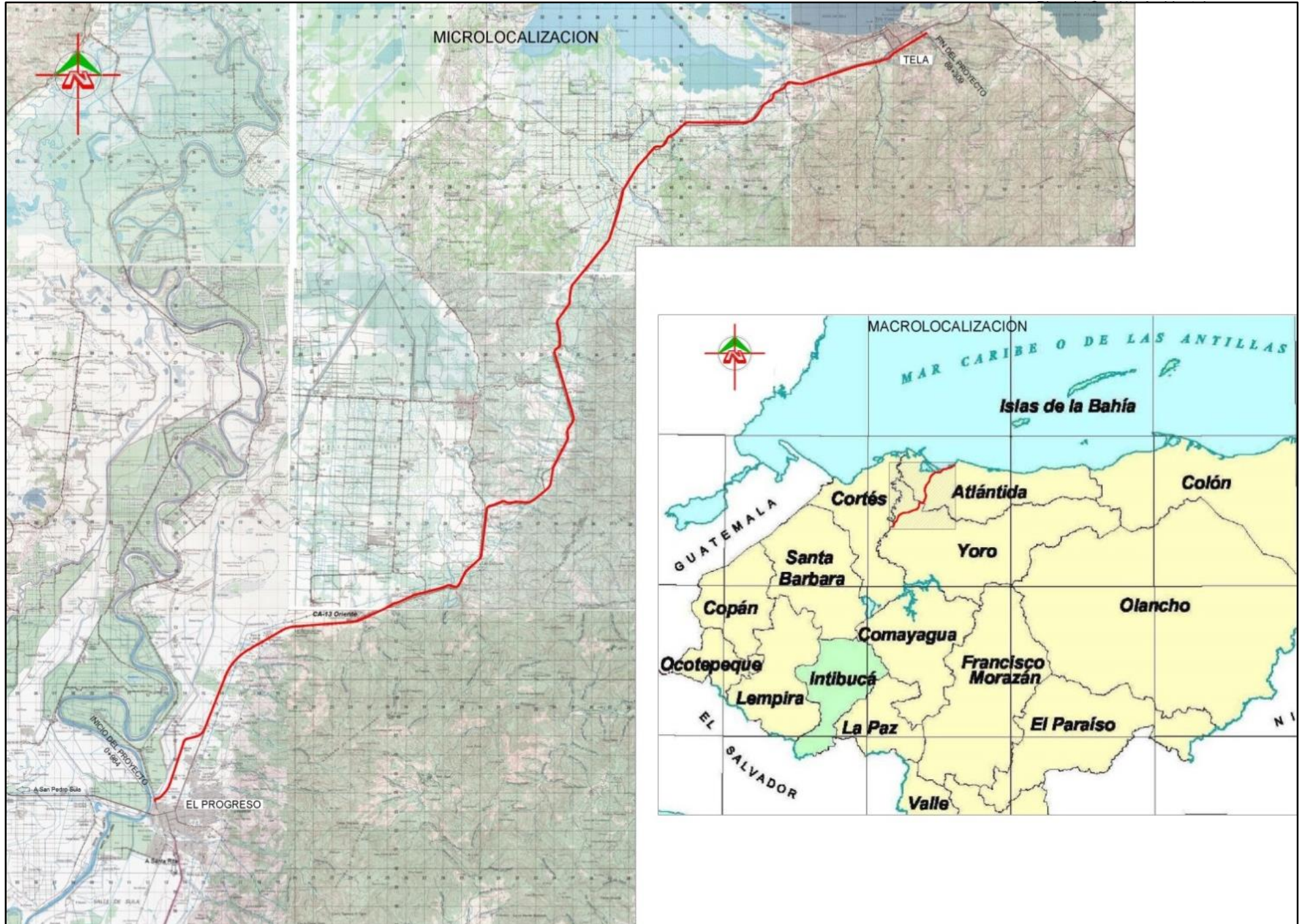
Source: Client

The basic design of the site, is based on a general plan for the activity, work or project to be developed (N/A)

Copy of the map sheet in which the AP is located

Proyecto Categoría 3: Corredor Turístico de Honduras

Tramo: La Barca – El Progreso



**Certificate issued by the
consultant responsible for the
Geotechnical and Civil Engineer
Situation of the Terrain (N/A)**

((Include the Geotechnical Report here))

**Certificate issued by the consultant - regarding the
Geological, Geomorphological, Hydrogeological
and Natural Threats**

((Include Hydrology Report here))

**Certificate issued by the consultant
responsible for the archeological situation
of the terrain where the project is located**

CERTIFICATION

The General Secretary of the Honduran College of Civil Engineers of Honduras (CICH) hereby certifies that the company Ingeniería y Ambiente de Sula is duly registered in this College and according to our records is allowed to execute Consulting Activities, being represented by Engineer Carol Yisel Perdomo CICH No. 02293, with both parties being up-to-date with the corresponding obligations.

As a consequence, the company Ingeniería y Ambiente de Sula S. de R.L. de CV is allowed to participate.

This college declares that any other firm associated with Ingeniería y Ambiente de Sula is not allowed to intervene separately in any bidding process unless participating jointly.

Honduran Institute of Anthropology and History
TECHNICAL OPINION No. 055-SGP-2013

The Deputy Manager of the Heritage Office of the IHAH certifies that it received Technical Inspection Report No. 30-RN, on July 10th of 2013, as presented by the Northern Regional IHAH - representative Aldo Zelaya, and his archaeologist assistant, Melvin Evenor Fuentes, as requested by Carol Perdomo from Ingeniería y Ambiente de Sula for the project Tourism Corridor coordinated by the Transportation and Civil Works Secretariat (SOPTRAVI).

The inspection was done in the following road tranches where the highway will be expanded to have four lanes: La Barca-El Progreso with an extension of 36.5 kms

El Progreso-Tela with an extension of 68.8kms

These tranches can be found in the following map sheets:

2661 III Rio Lindo

2662 VI Villanueva

2662 III El Progreso

2662 II Ocote Paulino

In the tranches of San Pedro Sula-Progreso (17,5 kms) and Tela-La Ceiba (97 kms) there was no inspection because the dirt road will not be expanded and no crevasses will be built, there will only be repair of pot holes, general maintenance and cleaning over a terrain that has been asphalted or paved.

According to the report, since the inspection took place on an existing road “there was an ocular inspection of the tranche and camp areas that were previously used for maintenance and parking of machinery”, there was also “a review of archaeological records in the Northern Regional project laboratory for site identification”.

Having reviewed the records of previous archaeological projects no damage to infrastructure was found in these tranches and the inspection did not show “any archaeological site in danger of being damaged or destroyed in the expansion of the road from La Barca to La Ceiba”, as per the quoted report.

In tenor of articles 1,2,3,9,19 and 22 of the Law for the protection of Cultural Patrimony of the Nation, Decree 200-97, the Deputy Direction of Patrimony finds:

1. There is no presence of archaeological sites or remains in danger of being damaged or destroyed in the areas for maintenance and expansion of the Tourism Corridor, tranches San Pedro Sula-Progreso, La Barca- El Progreso, El Progreso-Tela, and Tela-La Ceiba.
2. The responsible for the Tourism Corridor Project are required to notify the IHAH in case of any archaeological or paleontological finding in the area.
3. This formal opinion is subject to change if an archeological or paleontological site or remains are found.

Signed in the City of Tegucigalpa, Municipality of the Central District, on the 30th of July of 2013.

[SIGNATURE AND SEAL – ROLANDO CANIZALES VIJI

Geometric Design Technical Memory



Republic of Honduras

PROJECT

TOURISM CORRIDOR OF HONDURAS TRANCHE: LA BARCA - EL PROGRESO DEPARTMENTS OF CORTÉS AND YORO

TECHNICAL REPORT GEOMETRIC DESIGN

c@aliansz

Preparado por: Ing. A.
Domínguez

Revisado por: Ing. J.
Vanegas

Aprobado por: Ing. César
Colejal

Aprobado por:

Compañía: **TLBG**
Ingeniera de Proyectos

Compañía: **TLBG**
Director Técnico del Proyecto

Compañía: **GRODCO S.A.** Director
General del Proyecto

Compañía: **SOPTRAVI**

Fecha y Firma:
07/08/2013

Fecha y Firma:

Fecha y Firma:

Fecha y Firma:

Proyecto	Tipo de Producto	Grupo de Documentos	Especialidad	Numeración	Revisión	Fecha
AFQ448	DO	02	VI	001	01	2013-08-07



MEMORIA TÉCNICA DISEÑO GEOMÉTRICO	Proyecto: Corredor Turístico de Honduras Numeración: 001
Identificación de Documento AFQ448-DO-02-VI-001 -01	Revisión: 01 Fecha: 15/05/2018

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1 INTRODUCTION

This technical report describes the background, current status, guidelines and geometric design parameters considered during the first stage of the presentation of the studies related to the expansion of existing tranche of road between the municipalities of La Barca and El Progreso, Departments of Cortes and Yoro, in the Republic of Honduras.

The road tranche object of this widening is characterized by an asphalt concrete roadway with two lanes, one in each direction, with successive accsses and several urban areas of varying density, present along the stretch.

The expansion project includes the work needed to convert the road tranche in a main dual roadway, physically separated by a strict median, with four lanes, two in each direction. Treatment of the different areas are included along the way, with the primary objective of providing a safe route, both for traffic and for the inhabitants of the surrounding villages to the project.

2 BACKGROUND

The Honduran State, through the National Alliance for Public - Private (COALIANZA), and the Secretariat of State in the Ministry of Public Works Transport and Housing (SOPTRAVI) under the framework of the Law on Promotion of the Public Private Partnership, conceived and granted through the International Private Public Bidding, the Construction and Operation of the Honduras Tourism Corridor.

The successful tenderer is Consorcio Autopistas del Atlántico S.A. de C.V., formed by companies Grodco S.A. of Colombia, and PRODECON S.A. de C.V, of Honduras.

The Louis Berger Group, INC, from here on TLBG, consulting firm with regional headquarters in Panama, was hired by the contractor to carry out the design of the different



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components of the road project for the expansion of the road between La Barca and El Progreso and El Progreso (from the intersection bypass) with Tela.

TLBG is the author of this report.

3 GENERAL INFORMATION

Discussed below are the main features intrinsic to the project, which are the product of research and survey area.

3.1 ROAD IDENTIFICATION

According to the coding system of roads of SOPTRAVI 2013, the road identified as Route 21, which is subject of this study, includes the following sections:

Tabla 1 Identificación Vial del Tramo La Barca - El Progreso

With this, the total length of the action amounts to 36.48 km, according to data from the SOPTRAVI , since the expansion project reaches the entrance of the bridge over the Pelo River. However the survey conducted for design purposes has a total length of 36.6 km.



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3.2 PROJECT LOCATION

The planned extension of Route 21 in the Republic of Honduras, begins in the municipality of La Barca, Municipality of Santra Cruz de Yojoa, Department of Cortés, where the station is located at 0 +000, and extends towards the municipal capital of El Progreso, in the Department of Yoro, which ends at station 36 +624.48.

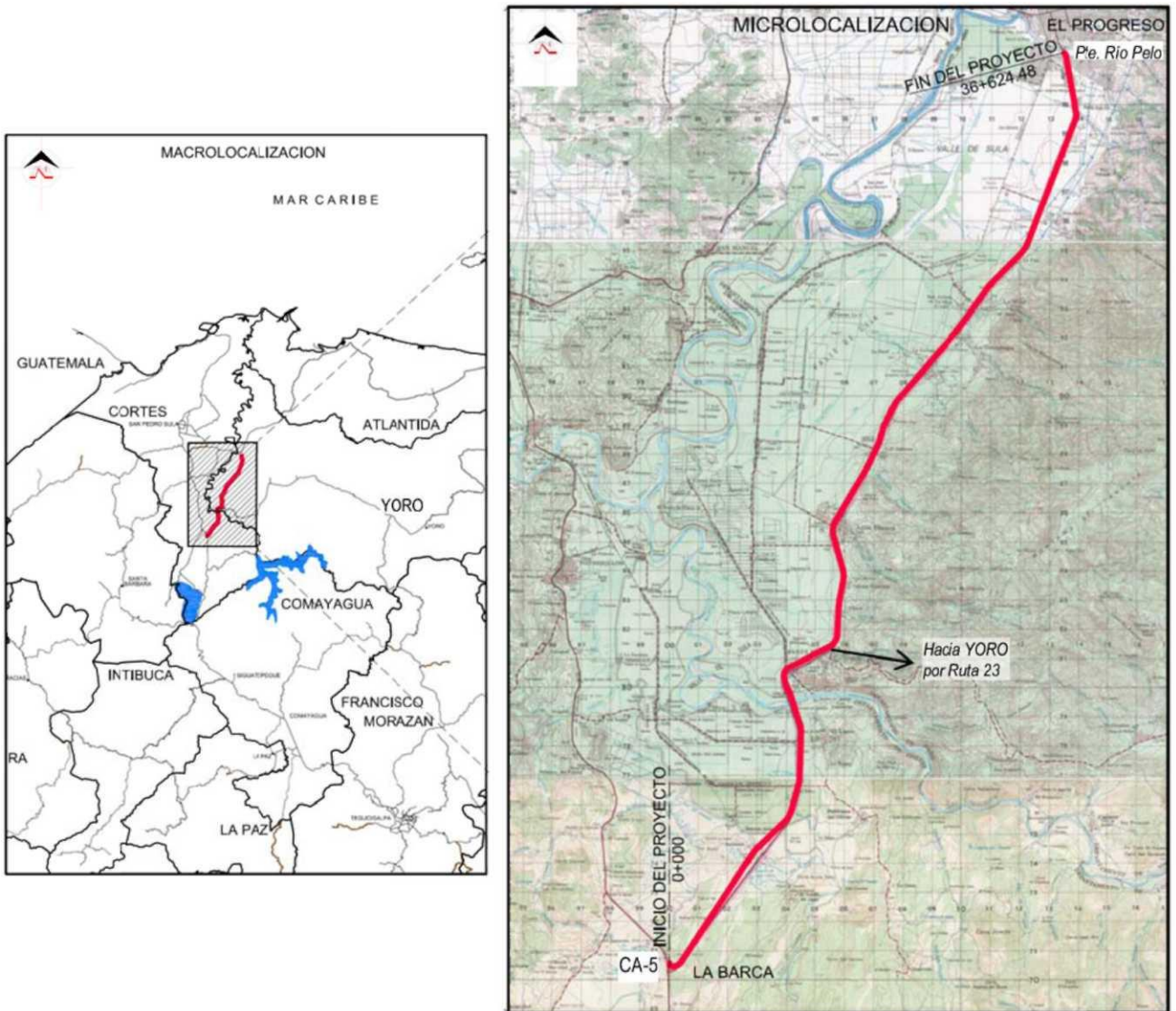


Figura 1 Localización del Proyecto La Barca - El Progreso



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Its starting point coincides with the main road CA-5, listed as 05P00555 tranche where the detour to El Progreso is located. Approximately at Km10 +750 from its inception in Cortés, lies the departamental border with Yoro. Moving northwest at km13 +440 and on the right side of the road we find the turnoff to the town of Yoro on Route 23.

Continuing northwest to the end of the project an access is seen right on Pelo River in the city of El Progreso.

The Figure 1 shows the regional and general location of the project outline .

3.3 CURRENT STATUS

Repeated visits, along with the mapping information, and compilations of data inherent to the recognition of the area, have established the basis for the preliminary design of the road tranche. The following summarizes some of the features that characterize the environment.

3.3.1 urban Zones

The presence of human settlements is evident along the trace, some consolidated, and others dispersed on the side of the road, or scattered at some distance from their sides, with varying population density. There are no transition zones on the road to alert drivers about the approach to the villages, and internally lack of sidewalks and appropriate spaces for intersections and pedestrians.

Figure 2 shows a diagram with the population distribution along the tranche, and allows to evaluate the presence of paths in which special treatments shall be projected to improve pedestrian safety.



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As we advance forward in direction of the stations, the following villages, colonies and / or small communities belonging to different municipalities, were detected with an approximate population which has been consulted in the respective municipal land use plans:

--

population centers in the direction of circulation of El Progreso to La Barca.

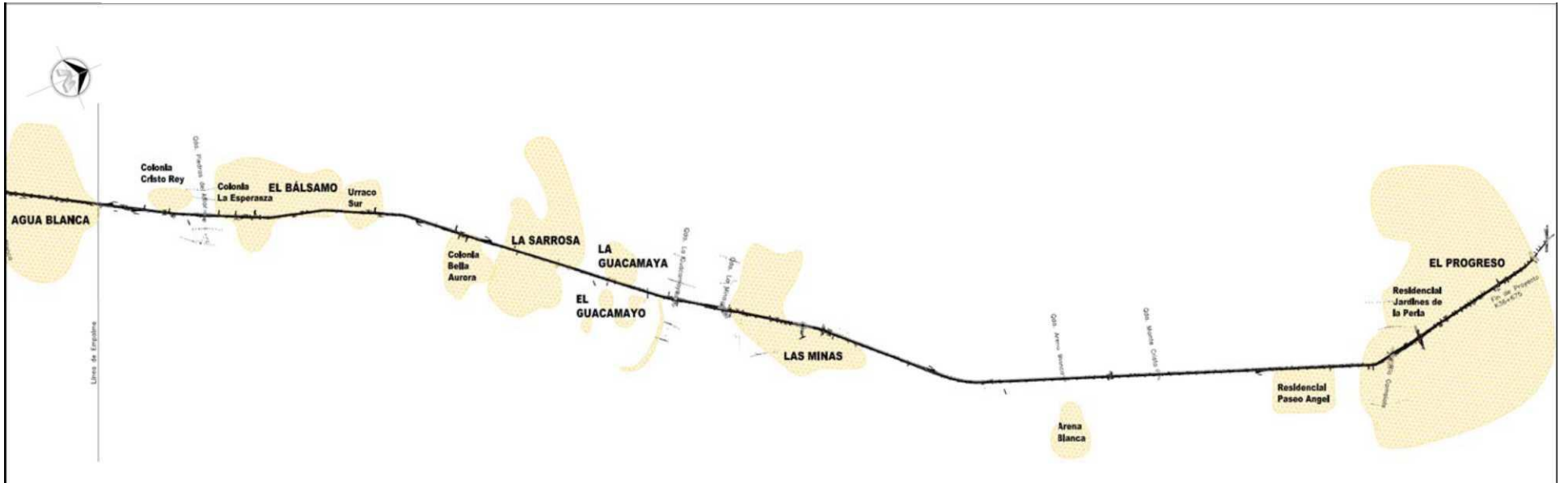
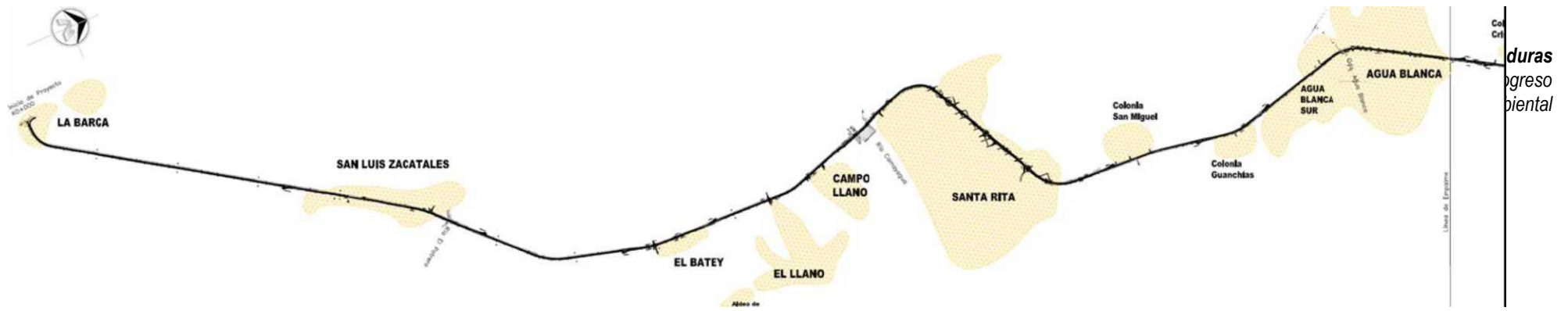


Figura 2 Esquema Poblacional Tramo La Barca - El Progreso



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Foto 1. El Progreso



Foto 2. Las Minas

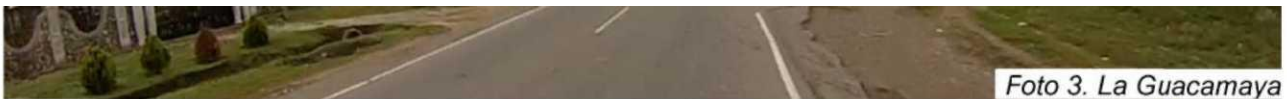


Foto 3. La Guacamaya



Foto 4. La Sarrosa



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Foto 5. El Bálsamo



Foto 6. Agua Blanca Sur



Foto 7. Santa Rita



Foto 8. San Luis Zacatales



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3.3.2 Components of the Special Transit

- The sugar cane crops are present in the areas of influence of the road, so the passage of "cane transporting" trucks, articulated and of imposing lengths, must be brought into consideration in the geometric design phase, and in the election of measures to improve road safety of the tranche.

The presence of sugarcane crops in Agua Blanca Sur, with access via a road located in the left side of the road, adjacent to the cemetery, roughly on Km17 +400

In Additionto this , the Ingenio Azúcares del Norte S.A. (AZUNOSA) is located on the left side of the road, With An access road south of the Sarrosa, approximately on Km23 +340.

- On the other hand, one of the existing means of transport in the area are represented by the so called mototaxis, whose routes should be limited within the villages, but their presence is visible in some sections of the road. They are seen by the circular shoulder or verge, and sometimes by the roadways.

- The flat trend of the topography and climate of the region, promote the use of bicycles as transportation, so it is also common to see people of different villages, traveling intermediate distances from their places of work or study and their homes. Normally the shoulder or verge of the road is used for these displacements.

- Added to the road users we have, intercity passenger transportation in its various forms, school buses, light vehicles, trucks and trailers.



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3.3.3 References of Traffic Accidents in Honduras

According to statistics of traffic accidents issued by the National Transit Authority of Honduras, reported nationwide during the last five years may be appreciated in Table 2.

These figures show that traffic accidents bring the second number of violent deaths in Honduras, according to the Violence Observatory UNAH (National Autonomous University of Honduras).

AÑO	ACCIDENTES DE TRÁNSITO REGISTRADOS				TOTAL	CONSECUENCIAS	
	COLISIONES	CHOQUES	VOLCAMIENTOS	*OTROS	ACCIDENTES	MUERTOS	LESIONADOS
2008	15281	113	292	746	16432	1047	2834
2009	15097	92	219	638	16046	948	2498
2010	14577	87	164	645	15473	937	2173
2011	12444	96	165	588	13293	878	2067
2012	12834	95	218	667	13814	961	2456

* Otras causas, como caídas, despistes, aplastamientos y atropellos.

Tabla 2 Resumen de Estadística de Accidentes por Año en Honduras
(Fuente: <http://direccionnacionaldetransito.gob.hn>)

While the data shown in the table reflect national data, it is expected that accident figures provided by the departments that make up the Valle de Sula, are significant, given its importance to economic and tourism level after Tegucigalpa. Only in the Municipality of San Pedro Sula, Cortés in 2012 recorded 167 victims in events of vehicular traffic, where 53.3% represents the runovers, followed by 29.9% for collisions and 10.8% by fender benders, the rest are rollovers, falls, crushings and runoffs.

Therefore, from the point of view of road safety, it is considered appropriate to conduct a survey on the actual causes of such accidents, with the aim of providing reliable technical solutions to minimize risks on the road tranches to be projected.



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Due to lack of official data, Table 3 makes reference to some articles in the local press, regarding both events that happened on the road object of this report, as nearby roads with similar characteristics.

Additionally, the Santa Rita website (<http://santaritayoro.org>) mentions the chronological order of accident data is in road from Santa Rita Road to El Progreso, of which the following stand out:

- November 7, 2006: General Cemetery Agua Blanca Sur Sector . Collision between a passenger car and a bus, due to high speed. 2 killed and 3 wounded.
- July 19, 2008: Guanchías colony Sector . Collision between a truck and a intercity bus. 3 dead and 11 wounded .
- March 20, 2010: Bridge gave away on Humuya River. Fall to the River of a tour bus for lack of signaling of bridge disused. 5 killed and 40 wounded.
- - October 27, 2010: Guanchías Sector . Collision between a passenger car driven by a drunk person and a bus. 2 dead.

Graphic reference

General Description



June 22, 2012

Taulabé caverns, CA-5.




13 collisioned vehicles . two death victims.

A trailer lost control over a pronounced curve and took the roadway from the vehicle coming in the opposite direction, which caused the crash.



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REFERENCIA GRÁFICA	General Description
	<p>August 5, 2012</p> <p>La Pirámide sector, between Tegucigalpa and Comayagua.</p> <p>Trailer lost control due to road humidity.</p> <p>The road blockage prolonged during 4 hours due to the invasion of both roadways.</p>
	<p>November 27, 2012</p> <p>Carrizal Colony, in northern Honduras.</p> <p>Impact on the curb of the street that led to the overturning of the vehicle. One fatality and two serious injuries.</p>
	<p>January 9, 2013</p> <p>Santa Rita Yoro to La Barca road.</p> <p>Two dead and five wounded.</p>



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GRAPHIC REFERENCE

GENERAL DESCRIPTION



March 11, 2013
El Progreso - Santa Rita Road.
One fatality. Run over a cyclist trying to cross the road.



July 16, 2013
Santa Rita - Yoro Three
Speeding motorcycle taxi causes collision with a truck parked in the area of the road.

Table 3 References Transit Accident in the Project Area (Source: Local newspaper)

3.3.4 Step Structures

Currently we can identify seven (7) vehicular step structures that give passage to natural watercourses, whose location and geometric characteristics are shown in Table 4.

An eighth bridge in Santa Rita Yoro (*), which collapsed on June 28, 2009, one month after the earthquake that caused a serious accident, and is now replaced by a parallel interim step is added to list.



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Table 4 List of existing structures of passage (high drain)

Additionally, 5 boxes of concrete, and lesser drainage structures like concrete sewers and pipelines of various diameters are located. Such structures become definite geometric layout, and are subject to expansion and / or replication to meet the objectives of road project.

3.4 TOPOGRAFIA

The topography that characterizes the corridor varies between hilly and flat, and is closely linked to the hydrographic conditions in the region.

A first tranche between La Barca and the passage by El Potrero River (Zacatales bridge) is presented as hilly, with elevations ranging from 50 to 80 m. Followed by a flat tranche with low levels between 48 and 50 m extending over to Humuya or Comayagua river. Bypassing such river flow, the relief tends to be wavy again, with levels between 50 and 70 m until arriving El Progreso, final destination of the road tranche

Much of the project is found in the Valle de Sula, the largest alluvial valley of Honduras, which is located between the basin of the Ulua, Chamelecón and Humuya river area



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rich in groundwater and subject to frequent flooding, especially in the rainy season.

Figure 3 illustrates the project area within the relief that characterizes the Sula Valley, an extract of the map of the Region of Sula Valley Development, published by the SEPLAN (Technical Secretariat of Planning and External Cooperation, Government of the Republic of Honduras) on its website.

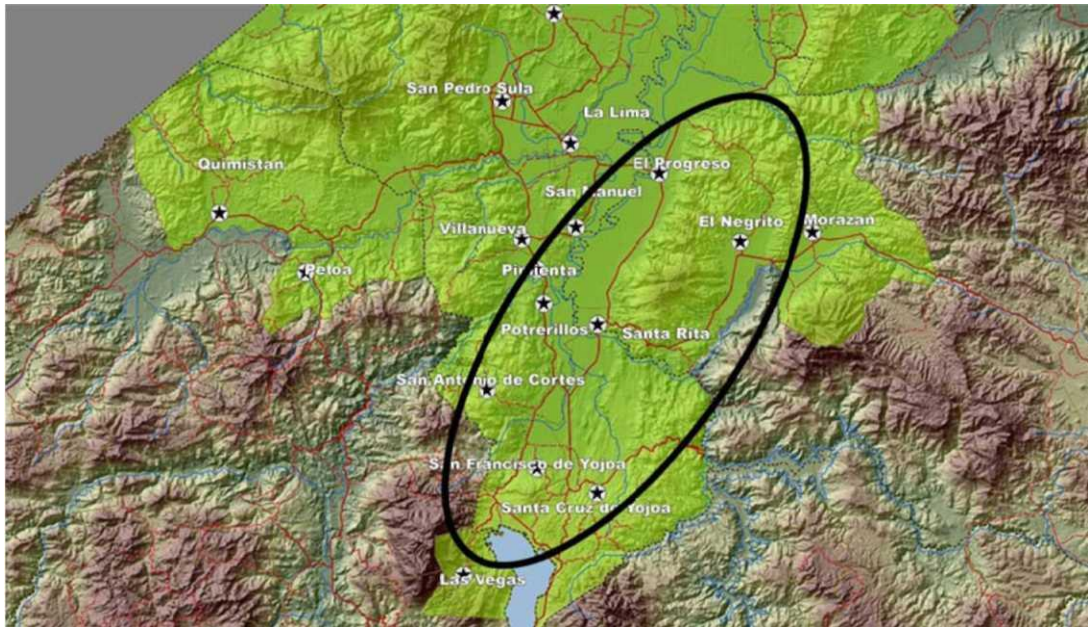


Figure 3 Relief of the Project Area (Source: website SEPLAN)

To initiate the first phase of geometric design, the contractor handed TLBG a topographic survey of the existing road axis between La Barca and El Progreso, with a transverse width limited by fences that demarcate the land and right of way currently free of physical obstacles currently, which is presented as variable due to invasions into the space that can be seen along the way.



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The detailed topography is reserved for the next phase of readjustment of the geometric design, and according to the needs required by different specialists involved in the definition of the respective components.

4 ROAD SAFETY

A comprehensive analysis of the events shown in Section 3.3.3, reveal the need to act decisively on the safety of the road project, highlighting the following actions as:

- Provide physical separation of driveways in the opposite direction for medians of reduced to width. They help to redirect vehicles that have lost control and prevent blocking the entire road before an accident.
- Provide free obstacle zones along roads and protect drivers against inevitable physical hazards such as poles, culverts, trees, signs, etc. ..
- Designing intersections at nodes that will become conflicting when driveways are separated, giving solution to the various turns and pedestrians.
- Find a consistent geometric design.
- Provide adequate and sufficient signage along the route, to enable road users timely decision-making and safety.
- Availability of booms on sections that require them.
- Designing transition zones before and after the passage of population centers, where the variation of the operating speed is significant.
- Provide safe crossings for urban dwellers populations.



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5 GEOMETRIC DESIGN

The human factor, traffic composition, the topography of the area, land use, and definite the points of obliged passage, make up the main aspects that govern the geometric design of the project to widen the road between La Barca and El Progreso.

Therefore, both the horizontal and vertical alignment, with different design features, respond to the harmonization of these factors, in search of a safe road project that meets the needs of different users.

5.1 DESIGN CRITERIA AND MINIMUM PARAMETERS

5.1.1 Regulations and Recommendations

For geometric design, we attended the following regulations and recommendations:

- Road guide book. Volume 3. SOPTRAVI 1996
- Central American Regulations for Geometric Design for Regional Roads Guide Book. 2da. Edition. Convention No. 596-0184.20, PROALCA II, SIECA. March 2004.
- A Policy On Design Of Highways and Streets (AASHTO 2004 y 2011)

5.1.2 Project Type

The road project is listed as the widening of an existing road (Route 21), essentially retaining its alignment, in order to increase capacity, improve road safety, order and improve transit access. Categorization according to the Highway Guide Book of SOPTRAVI. The final design consists of two roadways separated by a narrow median, with two lanes in each direction.



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According to the SIECA guide book, the route could be classified as a Rural Road, where a year of design, traffic volumes could reach 20,000 vehicles per average day, with significantly inferior limits lower than 500 vpd.

In this type of roads, bus stops along its path, crosswalks delineated on the pavement, located at sites of abundance of pedestrians are recommended. Intersections shall be provided with traffic lights with fixed time and / or channeled, where the movement of vehicles and pedestrians require it, and in other cases of lesser intensity of motion, shall be provided with signage right of way and STOP signs for transit of secondary branches.

5.1.3 Speed

For flat and undulating topography between the Sula Valley, where the road section, and average daily volume (AADT) traffic forseen over twenty years of between 10,000 and 20,000, the recomended speed adopted and recommended is of 80 km / h.

However, it is stressed that the speed limit along the path will vary, depending on its passage through the different populations, where through the transition zones ad measures to create calming spaces and pedestrian safety. The speed limit will gradually go from 80 km / h to 40 km / h, and even at 25 km / h before the passage of students in the vicinity of schools, colleges and institutes.

5.1.4 Stopping Distance

The stopping distance, known as the sum of the distance perception and reaction, and the braking distance is calculated with formula 1.

$$s = v \cdot t + \frac{v^2}{2g \cdot f} \quad \text{Fórmula 1}$$



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Where,

D_1 = Stopping distance (m).

V = Given speed (km/h)

t = perception and reaction time (segundos)

f = longitudinal friction coefficient between tire and road surface i = absolute value of the slope (positive when it rises, negative when lower)

Upon adoption of a perception and reaction time of 2.5 sec, a friction coefficient of 0.30, for the Guideline speed of 80 km / h, with speed safe launched between 70 and 80 km / h, and wet pavement condition , the recommended mstop distance in the SIECA SOPTRAVI guide books is of:

- In horizontal surface 113 y 140m.
- In ascending slope of up to 3%, 1071m
- In descending slop of up to 3%, 149m

On AASHTO 2011 behalf a value of 130 m is recomended for a horizontal surface, value that is in a range of the mentioned criteria.

5.1.5 Service Level

With the geometric design it is expected to reach at least a "C" Level of Service, where the flow is stable, although there is no access control.

5.1.6 Lateral friction coefficient

The mathematical expression developed to take into account factors such as the lateral coefficient of a vehicle traveling at a set radius curve, known speed and steepness defined, in order to obtain a balanced and safe design, is the Formula 2.

$$f = \frac{V^2}{127R} - \frac{P}{100}$$

Formula 2



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Where,

f = lateral friction coefficient. R = curve radius (m) V = guideline rate (km/h) p = cant

The coefficient of lateral friction adopted for the project is 0.14 for a steering speed of 80 km / h, as recommended by AASHTO 2011 (see Figure 4).

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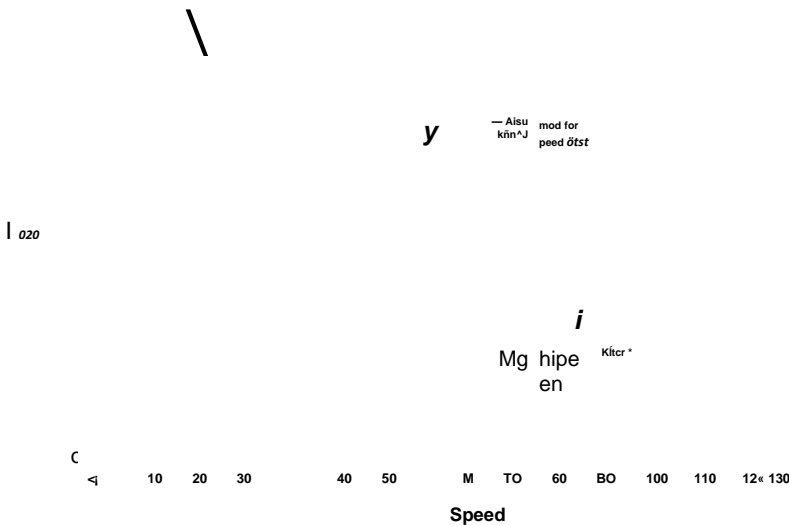


Figure 4 Coefficient of friction according to the lateral speed guideline (source: AASHTO 2011)

5.1.7 Superelevation rate or Maximum Superelevation

Factors such as the characterization of the road, topographical conditions, stages of vehicle operation, traffic and expected service level, influence the choice of the maximum rate of superelevation or cant of the highway.



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SOPTRAVI and SIECA guide bookes suggest the adoption of maximum camber of 8% for flat rural areas and 6% in the areas next to urban areas, with vehicles operating at lower speeds.

The selected line as the rotation axis for each road superelevation is its own axis.

5.1.8 Minimum Radius of Curvature

Considering the values of the lateral friction coefficient (0.14), the maximum cant (8%), and the guideline speed (80 km / h), the minimum radius of curvature is rounded to 230m .

However, it should be noted that this is a widening project, so the horizontal curvature radii are essentially based on the existing path.

5.1.9 Minimum Radius of Curvature Requires no Cant

For radii smaller than 2500 m, if the values of the cants obtained were lower than the superelevation cross slope of the pavement, SOPTRAVI recommends adopting the value of the transversal slope as a cant in the whole width of the roadway.

This is conditions of maximum cant adopted (8%) and for guideline speed (80 km / h).

5.1.10 Maximum and Minimum slopes

The limits on the slopes of the gradient are defined by the topographic conditions and existing vertical alignment of the road stretch. However, if we refer to the bibliography for a design speed of 80 km / h in undulating terrain, to a main street, the maximum slope of the slope should be between 5% to 7%.

Thus ensures compliance with this recommendation, given that the maximum slope of the current road is of about 4%.



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As for tranches of flat topography, only a value of 0% slope in individual cases where there is no curb and to ensure the proper cross drainage of the road, otherwise allowed minimum slope value is limited between 0.3 and 0.5%.

5.1.11 Spiral Transition Curves

To get dynamic and gradual transition of the horizontal curvature of the road, avoiding abrupt changes between layout elements are usually interspersed spirals curves showing gradual changes along its length. To this end, the project was adopted as the transition curve, clothoid, or spiral of Euler.

5.1.12 Parameter "K" or Convex Vertical Curves Crest

The minimum length of the convex vertical curves or crest, is determined by the distance of visibility and stopping distance to provide traffic safety.

Thus, for a steering speed of 80 km / h, and the stopping distance for design between 115 and 140m, the minimum rate of vertical curvature K is between 32 and 49, respectively.

5.1.13 Parameter "K" of Vertical Curves or Swings

The minimum length of the concave vertical curves or swing, is determined by several criteria, such as distance illuminated by the headlights of the vehicle, the feeling of comfort in the conduction abnormalities, roadway drainage, and aesthetics.

For a guideline speed of 80 km / h, the value of the minimum rate of vertical curvature K, is between 25 and 32.

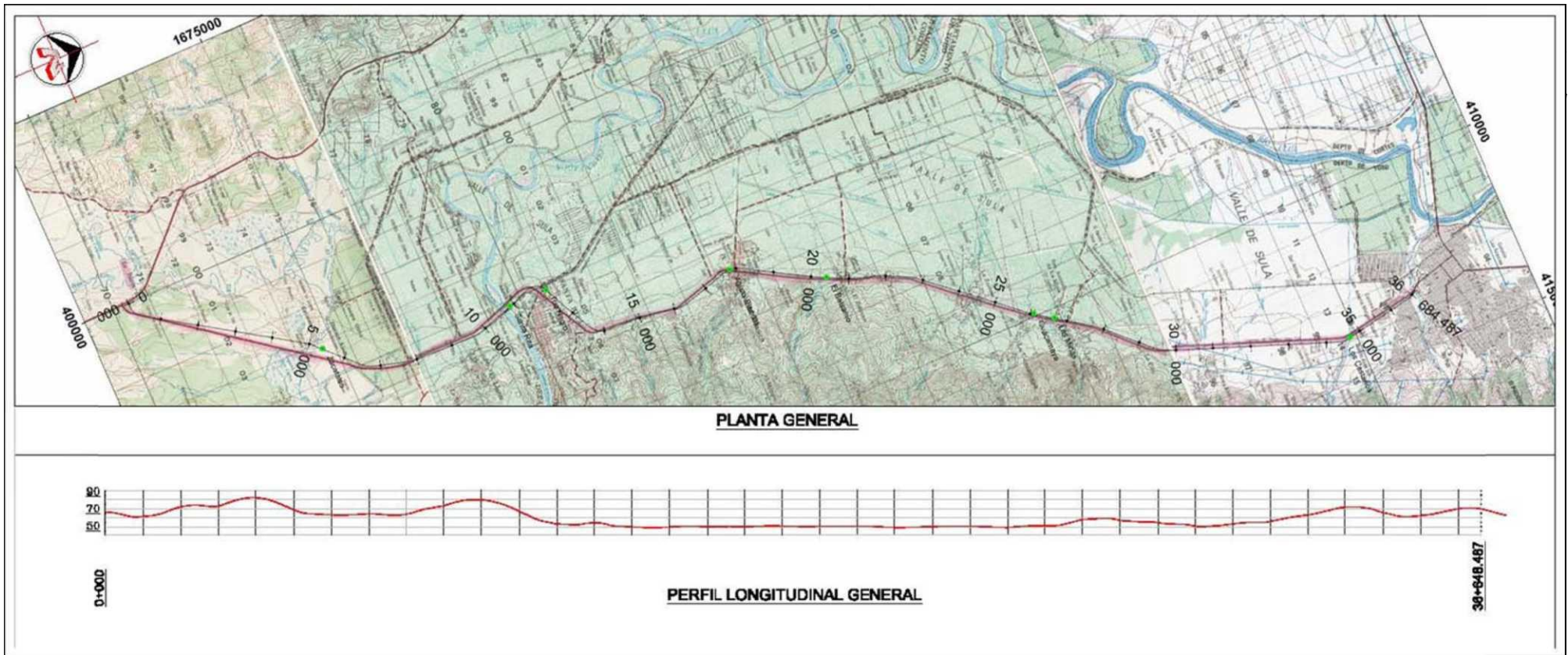


Figura 5 Esquema General del Trazado Geométrico



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5.2 HORIZONTAL ALIGNMENT

Being a road widening project on an existing path with definite structures, and that crosses several populated areas, the geometric alignment design is very flexible, even when it comes to avoiding the occupation of additional land to current right of way for the road axis.

The horizontal alignment was based on the projection of two parallel axes, called AXIS 1 and AXIS 2, one for each road, forking in the vicinity of the new bridges, to converge again after passing. Listing parameters characteristic of the horizontal alignment for Axes 1 and 2 are included in Annexes 1 and 2 of this report, respectively.

5.3 VERTICAL ALIGNMENT

The projection of the vertical alignment of the parallel axes follows the trend of the topography, as observed in Figure 5, besides the route of the existing road axis. However near the works of the new vehicular step execution, such as bridges parallel to the existing bridge, there is a tendency to raise the grade to accompany the structure, designed to meet the hydraulic capacity of the project.

Listing parameters characteristic of vertical alignment for Axes 1 and 2 are included in Appendices 3 and 4 of this report, respectively.

5.4 GENERAL DESCRIPTION OF THE LAYOUT

As noted in Section 3.2 of this report, the trace has as starting point on the deviation from the CA-5 to El Progreso, Km 0 +000 where the project is located with a



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Short tangent eastbound, followed by a succession of left curves and straights that direct the stretch northeast, reaching approximately km 11 +500.

From this point a right hand curve of 280 m radius changes the direction of travel to the northeast, to continue along the Sula Valley after passing through the Humuya River and the municipal capital of Santa Rita, approximately at km 13 + 500. Up to this point the slope of the longitudinal profile accompanies the undulating topography of the area. Continues a succession of curves and tangents that run the tranche north accompanied by a flat terrain to about km 25 +000, from which the ground is still adjusting to the undulating topography of the area and the straight path and uniform leads to El Progreso, where the end of the project is located at km 36 +624.49.

Figure 5 outlines the general layout of the trace and can see the trend of the slope along the project.

5.5 TYPICAL CROSS SECTIONS

The cross section of a superior category project as is the widening of the existing road to four lanes, requires the consideration of several determinants such as those listed below, which are linked to that prescribed characterization in the Republic of Honduras for the projected road class.

5.5.1 DESIGN CRITERIA

5.5.1.1 Walkway and Cross Slope

A cross section of undivided roadways, separated with a median of 1.40 m wide by limited with a straight curb to prevent drafts and returns was adopted, given the expected traffic volume on the section is high.

Two lanes of 3.65 m wide make up each roadway , for a total width of 7.30 m.



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The cross slope adopted for the entire road stretch is 2%, from the center outward the road corridor (dihedral type profile), favoring the evacuation of surface runoff, drainage and pavement cleaning.

5.5.1.2 Type and Size of shoulders or berms

In order to provide space to eventually accommodate vehicles suffering any damage along the route helping the structural stability of the traffic lanes further and even providing additional clearance for movement of cyclists or occasional pedestrians, exterior berms have been projected.

The width is 1.50 m, and its cross slope is 2%, continuing driveways. (the recommends SIECA guidebook recommends widths with external berms of 1.20-1.80 m for rural areas).

The shoulders are paved by double surface treatment and its continuity is maintained along the road except for urban areas where it is replaced with sidewalks.

5.5.1.3 Widths

For easy maneuvering of trucks and trailers that make up the heavy traffic of the road, despite the projected lane width, we included in widenings small radii curves. Thus, the circulation is favored in an efficient, safe, convenient and economical manner.

Guideline speed function, the radius of curvature and the design characteristics vehicle, and based on the tables provided by AASHTO 2011, the value of the widening was selected to apply in each curve. Minimum values of 0.60 m and maximum of 1.00 m were determined.



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5.5.1.4 5.5.1.4 Embankment and Slope

Given the space limitations of the right of predominant pathway in the trace, the embankment slopes are defined in relation 2H: 1V, while the slope in cutting sections is defined in the relacion 1H: 1V.

When lature of the embankment is greater than or equal to 3.00 m, with the above-defined slopethe installation of vehicle restraint barrier will be required, for which an additional berm 1.00 m wide adjacent to the outside shoulder will be allocated unpaved.

5.5.1.5 Sidewalks

Urban areas crossed by the road, and those where pedestrian traffic is expected, will be equipped with continuous walkway parallel to the sidewalk with a minimum width of 1.50 m in suburban sections and 2.00 m in areas of high population density.

5.5.2 PROJECT TYPICAL SECTIONS

Figure 6 shows four typical basic works for the road stretch between La Barca and El Progreso sections, along with application intervals as are described below:

■ TYPICAL SECTION I

Represents the case of the extension to one side of the existing roadway, either to the left or right margin, as appropriate, and in intercity and rural sections. With rails

■ TYPICAL SECTION II

Includes sections focusing on urban sections with a reduction treatment on the width of 3.50 m of the lanes and sidewalks.



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■ **TYPICAL SECTION III**

Cross section showing the expansion of roads to the center of the existing road, in rural or intercity sections

■ **TYPICAL SECTION IV**

It is the last urban transition section between the separate roads, and access to the section of the bridge over the Pelo River at the end of the project in El Progreso.

Moreover, the continuity is highlighted in the dimensions of these sections of step structures on natural waterways, as based on the following point.

5.5.3 GEOMETRIC SECTION OF BRIDGES

For the election of the typical section of the bridges in the project design, the following criteria were taken into account:

- a) According to AASHTO, Standard Specification for Highway Bridges (16a. Edition), in item 2.3.3.3, the width of the bridge will not be less than the width of the section of the road approach, including shoulders or curbs, gutters, and sidewalks.
- b) According to the road Handbook issued by SOPTRAVI (Honduras, December 1996), Volume 6, Drainage and Bridges, Chapter II-3, ideally the superstructure should cover the entire width of of the embankment crown. When, for economic reasons this can not be done, the superstructure will run with a width equal to the width of roadway equal to the width of the road plus a safety overwidening of 0.50 m on each side. The width of the berm in the bridge area, as well as the geometry of the barriers in the backcourt, will meet the specific needs of each project to be established by the competent authority.



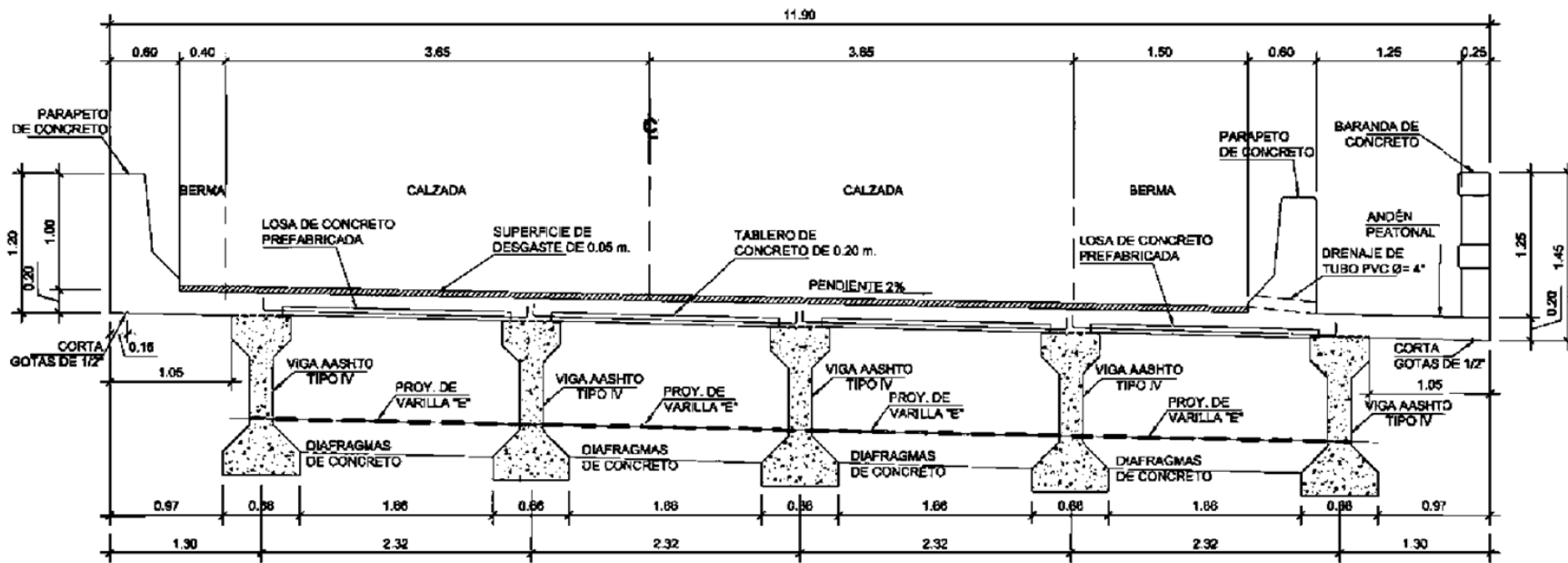
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- a) According to The Regulations and Recomendations of Geometric Design and Road Safety of the DNV (Argentina, 2010), Geometric Design, paragraph 3.10, the bridge width should be equal the width of the crown of the accesses. In urban areas, if necessary project sidewalks on the bridge, they will be projected with a width between 1.2 and 3.00 m, depending on the expected traffic conditions.

- b) According to the Central American Handbook for Reultions for the Geometric design of regional roads, 2nd Edition, March 2004, paragraph 7.2.8, the design of bridges, culverts, tunnels and other major drainage structures and passage, should keep a thin correspondence with the AASHTO regulations, reason fr which we refer to criterion

- a) Finally, the typical configuration of the bridge section for a reinforced concrete roadway is illustrated in Figure 7, and two lanes in Figure 8.



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Figura 7 Sección Típica de Puentes con Una Calzada

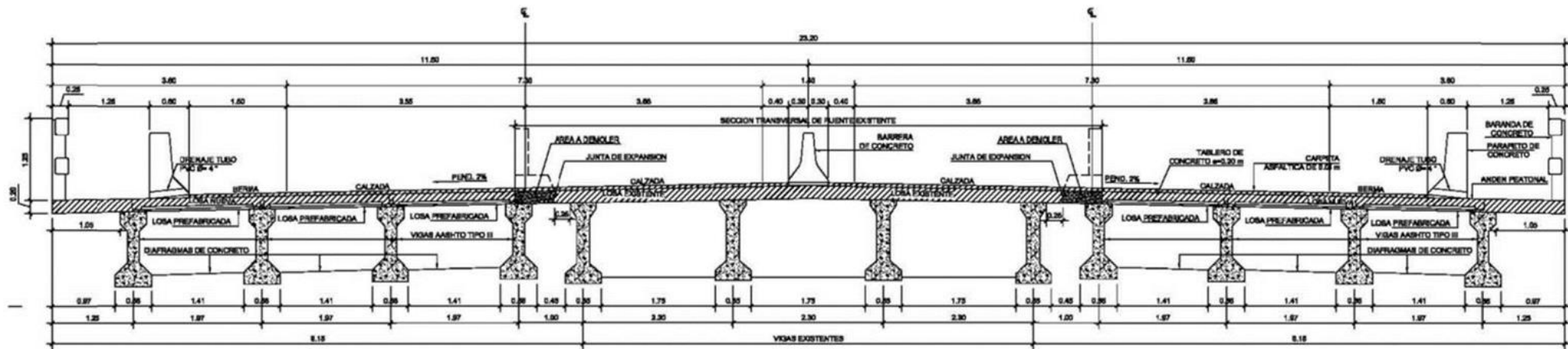


Figura 8 Sección Típica de Puentes con Dos Calzadas

CORREDOR TURISTICO DE
HONDURAS TRAMO: LA BARCA - EL
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6 BUS STOPS

As a first approximation to the final design, the location of bays for buses covering the different services of urban and intercity transportation between El Progreso and La Barca was raised. Table 5 includes its location in both directions. **PARADAS DE AUTOBÚS "**

SENTIDO: LA BARCA - EL PROGRESO		SENTIDO: EL PROGRESO - LA BARCA	
4+060	SAN LUIS ZACATALES	4+320	SAN LUIS ZACATALES
4+925	SAN LUIS ZACATALES	4+570	SAN LUIS ZACATALES
7+900	EL BATEY- ALDEA DE MANUEL DE JESÚS - SUBIRANA DE OLIVAR	7+970	EL BATEY- ALDEA DE MANUEL DE JESÚS - SUBIRANA DE OLIVAR
8+340	INSTITUTO OFICIAL CULTURA MAYA (EL BATEY)	8+340	INSTITUTO OFICIAL CULTURA MAYA (EL BATEY)
9+560	EL LLANO - CAMPO BARRANCO	9+470	EL LLANO - CAMPO BARRANCO
10+110	CAMPO LLANO	10+110	CAMPO LLANO
11+270	B. ECHEVERRY	11+470	B. ECHEVERRY
12+250	B. SUBIRANA - SANTA RITA	12+310	B. SUBIRANA - SANTA RITA
13+160	SANTA RITA	13+210	SANTA RITA
13+760	SANTA RITA	13+830	SANTA RITA
14+200	COLEGIO SAN MIGUEL	14+330	COLEGIO SAN MIGUEL
16+230	GUANCHÍAS	16+350	GUANCHÍAS
16+660	AGUA BLANCA SUR	16+860	AGUA BLANCA SUR
17+190	AGUA BLANCA SUR	17+280	AGUA BLANCA SUR
18+100	AGUA BLANCA SUR	18+050	AGUA BLANCA SUR
18+690	AGUA BLANCA SUR	18+670	AGUA BLANCA SUR
19+480	INSTITUTO ROBERTO MICHELETTI BAIN	19+470	INSTITUTO ROBERTO MICHELETTI BAIN
19+910	COLONIA CRISTO REY	19+960	COLONIA CRISTO REY
20+750	COLONIA LA ESPERANZA - EL BÁLSAMO	20+920	COLONIA LA ESPERANZA - EL BÁLSAMO
21+440	URRACO SUR	21+580	URRACO SUR
22+450	ESCUELA JUAN F. LINDO - URRACO SUR	22+370	ESCUELA JUAN F. LINDO - URRACO SUR
23+470	COLONIA BELLA AURORA	23+490	COLONIA BELLA AURORA
24+100	LA SARROSA	24+080	LA SARROSA
24+810	LA SARROSA	24+860	LA SARROSA
25+200	EL GUACAMAYO	25+200	EL GUACAMAYO
25+520	LA GUACAMAYA	25+520	LA GUACAMAYA
26+970	ALDEA LAS MINAS	26+850	ALDEA LAS MINAS
27+390	ALDEA LAS MINAS	27+350	ALDEA LAS MINAS
27+920	CEMENTERIO - LAS MINAS	27+960	CEMENTERIO - LAS MINAS
29+820	Sin definir	29+970	Sin definir
31+350	ARENA BLANCA	31+380	ARENA BLANCA
34+840	COLONIA LOS CASTAÑOS	34+900	COLONIA LOS CASTAÑOS
35+320	INSTITUTO INTEC	35+480	INSTITUTO INTEC
35+890	EL PROGRESO		

Tabla 5 Listado de Paradas de Autobús Proyectadas a lo Largo de la Ruta



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The spacing of the stops is determined by the location of generation sources of demand, such as activity centers, pedestrian routes and intersections of importance. Its initial location responds to the research field, which allowed the detection of sites that are currently allocated for boarding passengers along the road way..

The most important intersections where there may be transfer to or from other lines or vehicles and the restriction of not locating stops within 15m of cross streets or intersections, were determining factors of their choice, plus the visibility and topography of the trace.

The bays were projected with a normal lane width of 3.65 m, as recommended by SOPTRAVI with a length of 30m, so that it can accommodate two buses, and flares with relation of 4H: 1V (entrance and exit). At low population densities, and confined spaces, the length of detention was limited to 15m, sometimes for up to a single bus.

7 RETURNS

Due to the need to avoid crossing the median for maneuvering turns or returns, works were projected for indirect "U" turns, with the inclusion of a shelter lane as protection from transit, and with appropriate transit of articulated trucks (trailers) and cane carrier trucks, typical of the area.

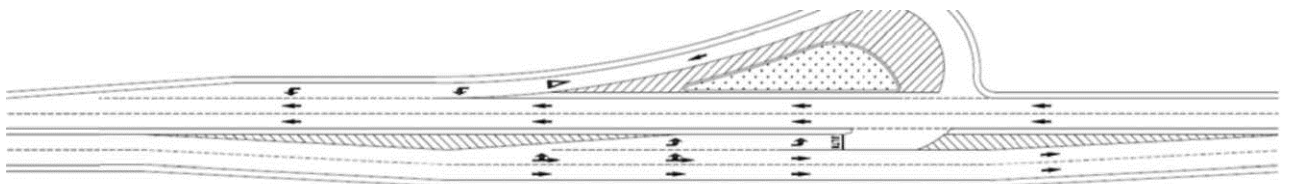


Figura 9 Planta General Típica de los Retornos Indirectos



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A general view in plan of the returns is illustrated in Figure 9, its geometry is the product of an analysis of turns towards a more restrictive design of the automobile park that is present in the zone. For this we went to AutoTURN Pro 3D program, and the effectiveness of such turns was proven for vehicles of type:

- WB-33DM (AASHTO 2004)
- WB-30TM (AASHTO 2001)
- WB-20DM (AASHTO 2001)

Location of returns is included in Table 6.

RETORNOS

SENTIDO: LA BARCA - EL PROGRESO			SENTIDO: EL PROGRESO		LA BARCA
inicia	fin		inicia	fin	
5+670	5+990	Hacia Zacatales (La Barca) Hacia	3+600	3+280	Hacia Zacatales (El Progreso)
8+600	8+920	El Batey (La Barca) Hacia Santa	7+860	7+540	Hacia El Batey (El Progreso)
14+420	14+740	Rita-Yoro (La Barca)	15+950	15+630	Hacia Guanchías (El Progreso)
16+470	16+790	Hacia Guanchías (La Barca) Hacia	19+800	19+480	Hacia El Bálsamo (El Progreso)
19+090	19+410	Agua Blanca (La Barca)	23+150	22+830	Hacia La Sarrosa (El Progreso)
23+580	23+900	Hacia El Bálsamo (La Barca) Hacia	32+970	33+290	Hacia El Progreso
29+010	29+330	Las Minas (La Barca)			

Table 6 Overview of Projected Returns Along Route

8 INTERSECTIONS

While the project includes the projection of some intersections in conflicting nodes, given the change of category of the road and the inability to cross directly to the left by the presence of a median separating lanes, its final design requires a more detailed study regarding their location, capacity, safety, functionality and economic viability.

Therefore, in subsequent reports we will mention this type of road features.



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3. www.soptravi.gob.hn Secretariat of Public Works, Transportation and Housing of Honduras.
4. <http://direccionnacionaldetransito.gob.hn> National Transit Directorate of Honduras Santa Rita
5. <http://santaritayoro.org> National Transit Directorate of Honduras Santa Rita
6. www.dgcg.ip.gob.hn General Directorate of Cadastre and Geography

1. -INTRODUCTION

The Louis Berger Group within the contract that has constituted with the government of Honduras, due to the expansion and improvement of the Tourist Corridor in La Barca-El Progreso tranche is developing the study and design of bridges over different rivers that cross this tranche and will form part of the new alignment that will be built on this road. To carry out the design of such a project, it was necessary to conduct a thorough geotechnical study to determine the type of material from which soils are composed in each study site.

The subsurface investigation was performed by running 17 perforations, all with samples recovery. These surveys were conducted vertically, being located at critical sites where the abutments and piles of the structure will be built. These perforations are executed by using the rotational method, using diamond drill bit diameter of 69.2 mm, exploring the subsurface to a depth of 20.00 m.

At the same time SPT standard penetration tests were performed on each probe, These tests were carried out according to the specifications of the standard ASTM D-1586.

The execution of tests of the subsoil determined the stratigraphy, the thickness of each layer that composes its vertical layout, the presence and depth of the water table and likewise the index values were obtained materials such as: grain size limits consistency, natural moisture and unit weight of each stratum.

From the values obtained in the laboratory the material classification was performed, thereby being used for the unified system. Added to this the values of shear strength that the soils have, values that are fundamental to the calculation of the bearing capacity were determined.

3. - RESEARCH METHOD

To determine the geotechnical drilling site conditions, the application of two research methods are required, which are intended to more accurately determine subsurface conditions. The methods used were as follows:

- > Surveys by Dynamic (Standard Penetration Test) method
- > Rotation Method

Surveys by the Dynamic Method

For the implementation of the surveys the Dynamic Method for Standard Penetration was used (SPT), for which the standard of the American Society for Testing and Materials ASTM D1586-67 was applied. To implement the test a safety hammer was used, with a weight of 140 pounds and a free fall of 30 inches (76.2 cm).

During execution of the survey samples were obtained on altered condition with the presence of all the elements that form the subsoil, being used to determine the index properties (particle size, consistency limits, natural moisture and unit weight). From the values obtained in the laboratory the material classification was performed, being used for this the Unified Soil Classification System.

Rotation method

The rotary drilling method was applied for the purpose of advancing the execution of drilling, plus strata used in the presence of high level of consolidation considered as rocks or rock fragments. Using a diamond drill bit with external diameter of 69.2 mm was made, the type being NQ.

4. - LABORATORY TESTS

The laboratory tests were performed on samples obtained during the execution of standard penetration tests (SPT) they consist in determining the particle size, consistency limits (liquid limit, plastic limit and plasticity index), natural moisture and unitary weight . For the implementation of the aforementioned studies, the following procedures standardized by the American Society for Testing and Materials procedures were applied (ASTM):

ENSAYO	NORMA
Granulometría	ASTM D 421-58
Limite Líquido	ASTM D 423-66
Limite Plástico e índice de Plasticidad	ASTM D 424-59
Humedad Natural	ASTM D 2216-71
Peso Unitario	ASTM D 2937-71

²En el anexo 4 resumen de laboratorio, se muestran los resultados obtenidos mediante los ensayos efectuados a las muestras durante la ejecución del sondeo.