



**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						
<b>Application Submission Date: (filled by a SINEIA authority )</b>						
<b>Place of Presentation:</b>						
I.- General Information of the Project, Work or Activity						
<b>1</b>	<b>1.1 NAME OF THE PROJECT</b>	TOURISM CORRIDOR PROJECT: TRANCHE EL PROGRESO - TELA				
	<b>1.2 ACTIVITY BASED ON THE CATEGORIZATION TABLE</b>	CONSTRUCTION OF ROADS, HIGHWAYS, RAILWAYS				
	<b>1.3 PROJECT AMOUNT (LEMPIRAS)</b>	L. 1559,389,708.48 (exchange rate on September 3, 2013 = 20.47) B/. 76,179,272.52				
<b>2</b>	<b>2.1 EXACT LOCATION</b>	The tranche to be evaluated initiates on abutment N°2 of the Democracia Bridge, following the new bypass proposed for the city of El Progreso to be added to the existing road on Camalote Bridge and finalizing on the Bridge over Highland Creek River in the Municipality of Tela.				
	<b>2.2 MUNICIPALITY</b>	El Progreso, El Negrito, Tela				
	<b>2.3 DEPARTMENT</b>	YORO: El Progreso, El Negrito      ATLÁNTIDA: Tela				
	<b>2.4 COORDINATES</b>					
	<b>UTM(NAD 27 CENTRAL)</b>		<b>WGS84 (DEGREES, MINUTES AND SECONDS)</b>			
	X=	Y=	Latitude= 15° 24'13.39"	Longitude= 87° 49'8.11"	Beginning of the tranche La Democracia Bridge	
	X=	Y=	Latitude= 15° 46'55.85"	Longitude= 87° 26'1.20"	End of the tranche Highland Creek River Bridge	
	<b>2.5 PROJECT LOCATION IN RELATION TO LAND USE PLAN</b>					
	<b>RESIDENTIAL</b>	<b>COMMERCIAL</b>	<b>INDUSTRIAL</b>	<b>AGRICULTURAL</b>	<b>FORESTRY</b>	<b>OTHERS</b>
						Road Use
<b>INFORMATION ONLY FOR COMPANIES IN OPERATION</b>						
<b>3</b>	<b>3.1 TELEPHONE NUMBER</b>		<b>3.2 FAX NUMBER</b>		<b>3.3 EMAIL</b>	

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			<a href="mailto:Ugasoptravi1@gmail.com">Ugasoptravi1@gmail.com</a> <a href="mailto:uga@soptravi.gob.hn">uga@soptravi.gob.hn</a>		
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 CIUU 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 from Camalote - Tela of 62.55 km, the construction of the bypass in the City of El Progreso of 5.94 km, from here on to El Progreso - Tela 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. 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.

## 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 m<sup>2</sup>**

The total project area is 2,750,000 m<sup>2</sup>. Within this area we include 40 meters of the existing road easements, two areas for location of camps of 5,000 m<sup>2</sup> (0.5 ha) each, totaling 10,000 m<sup>2</sup>, by the alignment length of El Progreso – Tela, of 68.5 km.

### **8.1.2 Net area of the project (Apn) in m<sup>2</sup>**

The net area of the project (Apn) is of 2,750,000 m<sup>2</sup>. Within this area we include 40 meters of the existing road easements, two areas for location of camps of approximately 10,000 m<sup>2</sup> (0.5 ha each), throughout the length of the tranche of El Progreso - Tela, that is 68.5 km.

### **8.1.3 Total construction area in m<sup>2</sup>**

The construction area will be of 1,575,500 m<sup>2</sup>. This area is defined by reference to an average typical section of 23 meters by the length of the tranche El Progreso – Tela of 68.5 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**

The tranche El Progreso – Tela that forms part of the Concession of the Tourism Corridor of Honduras, is aligned on CA-13 route from the main road network of the country and is a segment of the routes of Central American Integration. The CA-13 route is developed through the coastal plain parallel to the Caribbean Sea or West Indies of Honduras. The tranche El Progreso – Tela starts on abutment No2 of La Democracia Bridge over the Ulua River (Zone 16P, 412399.88 mE and 1703049.68 mN) and ends in the municipality of Tela, in the Highland Creek Bridge (Zone 16P, 1744914.90 mE and 453615.84 mN). See Figure 8.1:

***Figure 8.1. Geographic Location of the project***



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

### 8.1.5 8.1.5 Administration Location

The tranche El Progreso - Tela, is located in the departments of Yoro and Atlántida, connecting the municipalities of El Progreso, El Negrito and Tela.

### 8.1.6 Technical description of the tranche El Progreso – Tela

The project consists on the construction of a new roadway of two lanes, next to the existing two lane roadway, with an approximate length of 68.5 km, divided in four tranches, which are described as follows:

#### **SECTION I: El Progreso-Chindongo, approximate length of 12.0 km**

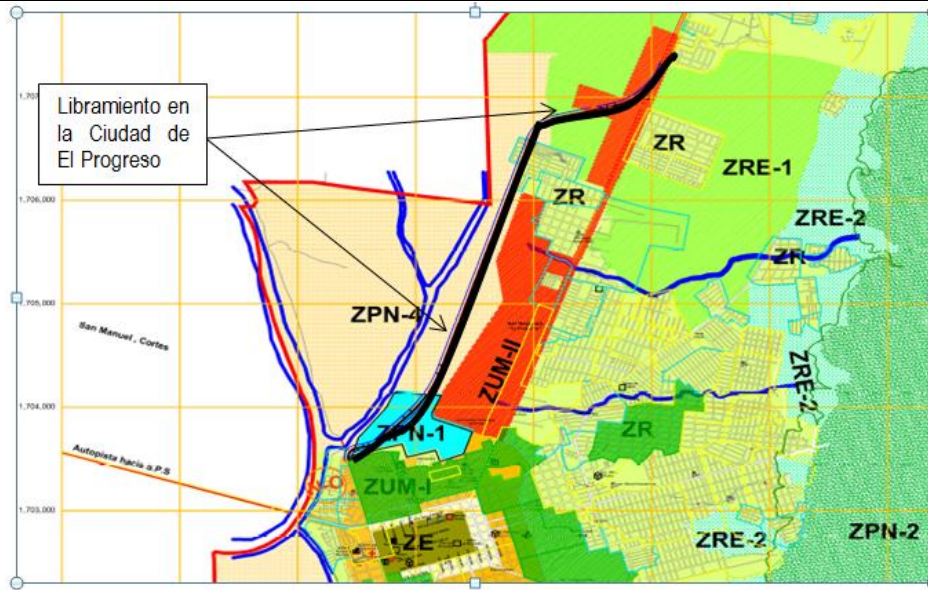
It is in this place where we have established the initiation of the Project with station 0 +000. From this point and with a predominantly SE orientation and on station 0 +500 we reach the interception of that road with the Boulevard that leads to the city of Santa Rita. This interception and with an orientation of approximately N75 ° W , practically 90 ° with the starting line, the line continues to develop at a length of about 700 meters, that is, up to station 1 +200, which is the site where the bypass starts in the city of El Progreso. See Figure 8.2

From this point the bypass develops on land suitable for agriculture, located between the right pit of the river relief stream of the Ulua River and the current existing road from El Progreso to Tela. The new alignment is separated from the existing street about 600 meters and consists of relatively long tangents and very ample curves with curves of less than 3°00'.

The following describes in detail this tranche of the bypass in the City of El Progreso:

#### **El Progreso Bypass**

**Figure 8.2. Alignment of the bypass in El Progreso**



Source: Proposed zoning and land use of El Progreso

El Progreso is one of the most populous cities of Honduras with 177.582 inhabitants, it is an important trade center and a mandatory passageway between San Pedro Sula, Puerto Cortes, Tegucigalpa and with the rest of the population centers of the north coast (Tela, La Ceiba, Tocoa, Trujillo).

Currently, the vehicular traffic is carried across the urban zone of this municipality, creating situations of vehicular accidents, high fuel consumption, sonic and air pollution, among other factors. This is why an alternative bypass of the urban zone will be designed, considering the following details:

The bypass will be developed to the left of the existing road, and with that, besides bypassing the aforementioned City, we would be bypassing the community of Quebrada Seca, near the Mall. This tranche of the bypass has an approximate length of 5.9 km, and starts in the neighborhood of San Miguel and ends about 200 meters ahead of the bridge over the Camalote Stream.

The tranche where the new bypass will be built, is an area not previously intervened before, and is considered according to the Municipal Development Plan, in view of the Land Ordinance Plan of El Progreso, as a Natural Protection Zone (ZPN-1), which is identified as an aquifer zone. In this case it is required for the Municipality to grant the permission for the change of land use, before initiating the construction of this tranche, which will be requested by SOPTRAVI and the Concessionaire. The request for change of land use is presented under Annex M.

From the junction of the bypass with the existing road at the bridge over the Camalote Stream, the project continues to develop so that the centerline of the existing road will become the center line of the new road made up of four-lanes up to the Chindongo Stream, at about km12 approximately, site in which Section I ends. Some photographs are presented under figure 8.3.

**Figure 8.3. Photographs of Section I**





*La Democracia bridge – El Progreso*



*Bridge on Camalote Stream*

Source: LB, field work. April, 2013.

### **Section II: Chindongo – El Aguacate, Approximate length of 18.1 km**

This section initiates at the Chindongo Stream and ends in the community of El Aguacate, through communities Guaymitas, Las Delicias and Toyos. On this tranche the horizontal alignment develops quite long tangents and extremely smooth curves, up to the height of the bridge over the Guaymón River, where the community of Las Delicias begins. It goes from the community of Las Delicias and immediately reaches the community of Toyos. Throughout this tranche the topography changes from flat to slightly wavy, so the tranches have horizontal more sinuous and oblique curves with slightly higher slopes. See Figure 8.4.

***Figure 8.4. Photographs of Section II***



*Entrance to the Village of Guaymitas*

*Bridge over Guaymón River*



*Toyós Village*

Source: LB, Field work. April, 2013.

**Section III: El Aguacate – La Mulera, Approximate length of 21.5 km**

This section begins in the community called El Aguacate, passing along its 21.5 km through several communities which, because of their size or because of the many houses on the edge of the existing road, makes them very important communities, such as: Las Metalias, Cooperativa Lempira, Paujiles, Los Planes, Santiago, Zoilabé, up to the community of La Mulera, in the vicinity of the bridge over Rio San Alejo River, which is precisely where Section III ends. See Figure 8.5.

***Figure 8.5. Photographs of Section III***



*Las Metalias Village*



*Paujiles Village*



*Entrance to San Alejo*



*Bridge over San Alejo River*

Source: LB, field work. April, 2013.

#### **Section IV: La Mulera – Tela. Approximate length of 16.5 km**

From the bridge over San Alejo River, Section IV continues to develop with an orientation predominantly to NW, through a series of communities allocated at the sides of the existing road, among these we could mention: San Alejo, located one kilometer to the left side of road, Cooperativa San Martin, La Montañita, Los Cerritos, Cooperativa Quebrada de Arena, Cooperativa Flores del Guano, Buena Vista, the urban zone of Tela, up just before Highland Creek Bridge on km 68.1 approximately, place where the end of the project is located.

On arrival to the community of Tela, near the Jardin Botanico de Lancetilla, there is on both sides of the road a very lush vegetation, which is important to preserve, reason for which typical sections have been designed to reduce the dimensions of the lanes and the construction of protective walls as a mitigation measure against the impact that construction sites could cause to these preservation species.

**Figure 8.6. Photographs of Section IV**



*El Guano Village*



*Bridge over La Esperanza River*



*Tela*



*Jardín Botánico Lancetilla*



*Highland Creek Bridge*

Source: LB, field work. April, 2013.

## 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 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.

Two areas to allocate temporary facilities are proposed, one of these is presented below under Figure 8.7 and is only expected to occupy an area of approximately 0.5 ha at each site.

**Figure 8.7. Current conditions of the proposed site for Camp**



Source: LBG, field work, June, 2013.

- **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.

- **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.
- **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 (10) 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 8.1

**Table 8.1. List of the borrow pits that have been identified**

N°	Location	Verified use	Pit Capacity	Owner	Observations
1	1.0 km after Highland Creek, on Greensong Memorial Cemetery, right side of the road from Tela-Ceiba road, 200 meters along the way. Coordinates UTM (454908; 1745268)	<ul style="list-style-type: none"> <li>• Dirt road</li> <li>• Sub-base</li> </ul>	Enough	Mr. Mario Fuentes; Exploited by M & M, you can talk to Luis Mayorga and Mario Rivas; Tel 448 32 433	For its exploitation must cross the ce... Strong sandy soil little plasticity, ye... brown. Investigat... hardness using th... Angeles method.
2	A 0.75 km after Highland Creek, on the right side of the Tela-Ceiba road, 250 m. coordinates UTM (454588; 1745083)	<ul style="list-style-type: none"> <li>• Dirt road</li> <li>• Sub-base</li> </ul>	Enough	Mr. Rubén Flores;	Strong sandy soil little plasticity, ye... brown. Best explo... conditions are appreciated. Inve... hardness using th... Angeles method.
3	A 0.50 km after Highland Creek, on the right side of the Tela-Ceiba road, 200 meters along the way. coordinates UTM (454042; 1744899) La	<ul style="list-style-type: none"> <li>• Dirt road</li> <li>• Sub-base</li> </ul>	Enough	Unknown	Strong sandy soil little plasticity, ye... brown. Investigat... hardness using th... Angeles method. three pits materia... present the same characteristics.

	Fortuna Ranch				
4	La Citranela Pit, Citranela Village , San Alejo Sector, 2.1 km from the turnoff to the community of San Alejo, at the right side of the center line of the road of El Progreso-Tela, 15 km from the city of Tela. The pit is in the bed of San Alejo River. Coordinates UTM (438689; 1735748)	<ul style="list-style-type: none"> <li>• Gravel for concrete</li> <li>• Sand for concrete</li> <li>• Crushed base</li> <li>• Filler</li> <li>• Stone embankments</li> <li>• drainage beds</li> </ul>	Enough	Cooperativa Mixta Teleña Limitada, COMTEL. Representative: Mr. Marco Obdulio Carranza. Tel: 98 76 95 65; 33 98 22 89 The Cooperativa (credit union) has a Concession for its exploitation.	The pit is in the river, upstream. materials are boulders, basalt, very resistant, gray color. Upstream we find thicker materials. By crushing and screening we obtain the required different materials. The Concession currently has been authorized by DEFOMIN.

N°	Location	Verified use	Pit Capacity	Owner	Observations
5	El Naranjo pit in the community of El Naranjo, on the road that leads to Mezapa, 1.8 km on the left of the road to El Progreso – Tela, Coordinates UTM (429659; 1721084)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Sr. Eduardo... Representative of the owner: Sr. Amadeo Galdámez Tel: 32 11 65 90	Yellowish-brown, very fine and very plastic but possibly with 10, possibly require stabilized with lime-loam material.
6	El Naranjo Pit, in the community of El Naranjo, on the road leading to Mezapa, 2.7 km off The left side of the road to El Progreso - Tela, besides "Licores Hernández", Coordinates UTM (429281; 1721789)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Ms. Martha Lazo Tel: 98 47 90 80	Yellowish-brown, very fine and possibly plastic, but with a 10, possibly require stabilized with lime-silt-clay material.



7	Guaymón River Pit, on both sides of the bridge, the bridge is located in station 22+000, Coordinates UTM (428459; 1715832)	<ul style="list-style-type: none"> <li>• Gravel for concrete</li> <li>• Sand for concrete</li> <li>• Crushed base</li> <li>• Filler</li> <li>• Stone embankments</li> <li>• drainage beds</li> <li>•</li> </ul>	Enough	Concession Granted under concession to Transportes Juárez	The pit is in the river, upstream the materials are boulders, basalt, very resistant, gray color. Upstream the materials are thicker. By crushing and screening we can be obtain other required materials.
8	Machi quarry, located 2.5 km. On the right side of the road to El Progreso – Tela, the entrance is located besides the PEPSI CORESA distribution center front of the telecommunications center. Coordinates UTM (416720; 1706278)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Owner: Oscar Hawit Contact: Ing. Jerson Mendoza cel. 94744685	Yellowish-brown material, with high quartz content and possibly plastic sheet but with a CBR > 10, possibly required to be stabilized with lime, sand-silt clay materials. It was used in the filling of Megaplaza Mall.
9	El Salto Pit, located in the south-east side of El Progreso, the entrance is located by the Hospital Materno Infantil of El Progreso, Coordinates UTM (415798; 1701677)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Owner: Carlos Kattan cel. 96600368 Office: 26171010	Grayish material, coarse granular, with some clay content, it was used in the filling of the Technological University of Honduras (UTH). fig

N°	Location	Verified use	Pit Capacity	Owner	Observation
10	Dirt road cut near Portion No. 2 on Guaymon Bridge	<ul style="list-style-type: none"> <li>• Dirt Road</li> </ul>	70,000 m <sup>3</sup>	Owner: Government of Honduras, it is found in the new road passage.	Sandy silt and clay materials, with relatively low plasticity index

Source: The Concessionaire

**Figure 8.8. Current conditions and location of borrow pits**



**Pit 01, 1.0 km after Highland Creek, in Greensong Memorial**

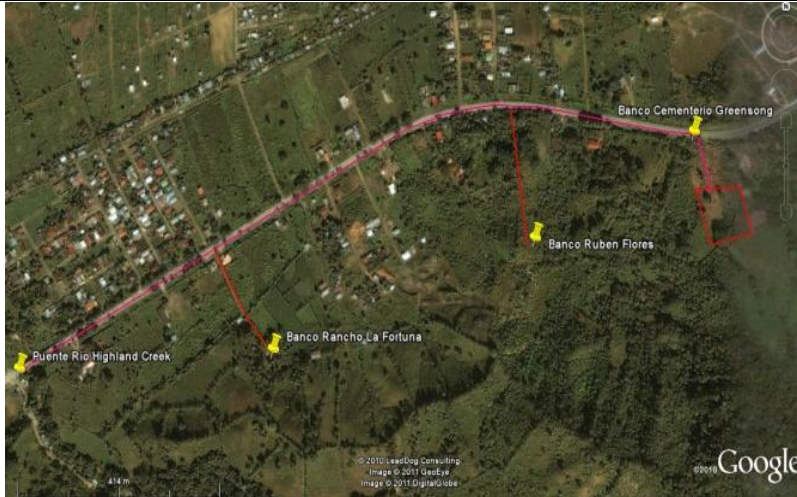


*Pit 02, 0.75 km after Highland Creek- Rubén Flores*



*Pit 03, La Fortuna Ranch*

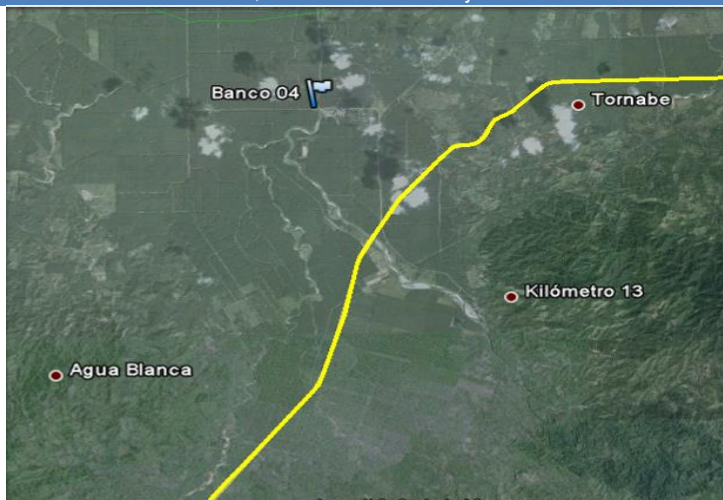
**Figure 8.9. Location of borrow pit 1, 2 and 3**



**Figure 8.10. Current conditions of the borrow pits and their location**



*Pit 04, La Citranela in San Alejo River*



**Figure 8.11 pit 07, Guaymón River**



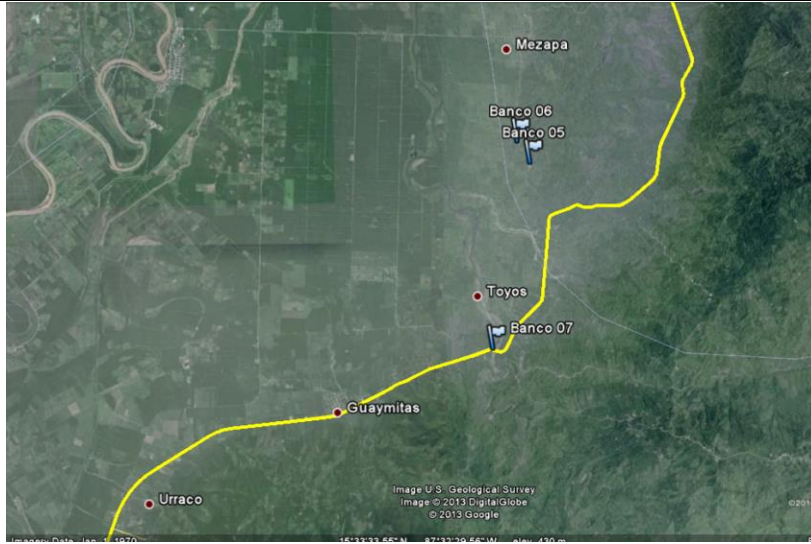
*Pit 05 in El Naranjo*

*Pit 06 in El Naranjo*



*Pit 07, Guaymón River*

**Figure 8.12. Location of Pits 5,6 and 7**



**Figure 8.13. Identified borrow pits**



- 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 8.2 we present the description of the current conditions of the sites chosen as dumps for this work and under figure 8.14, their location:

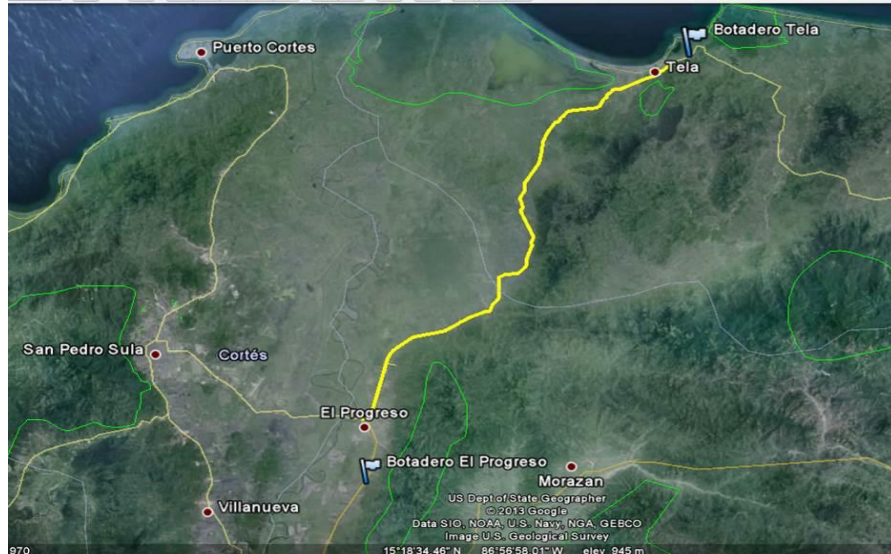
**Table 8.2. Description of the Dump Sites**

N°	TRANCHE	TYPE OF ALLOWED WASTE	CURRENT CONDITION
1	<b>EL PROGRESO - TELA</b>  <b>Coordinates:</b> Zone 16 East: 16455879 North: 1745122 <b>Location:</b> Department: Atlántida Municipality: Tela	Solid Wastes	

N°	N°	TRANCHE	TYPE OF ALLOWED WASTE
2	<b>EL PROGRESO – TELA</b>  <b>Coordinates:</b> Zone 16 East: 412670 North: 1694523 <b>Location:</b> Guacamaya, Progreso Department: Yoro Municipality: El Progreso	Solid Wastes	

Source: The Concessionaire based on field work.

**Figure 8.14. Location of dump sites**



Source: Google Earth.

### 8.2.2 Construction 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.
- **Exploitation 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. The bridges and boxes to be built are listed below:

**Table 8.3. List of bridges to build**

N°	Name	N°	Name
1	Bridge Bypass El Progreso	12	Bridge Pajuiles (La Montañita)
2	Bridge Caracol	13	Bridge Mezapa
3	Bridge Seca	14	Bridge Santiago
4	Bridge Camalote	15	Bridge Zoilabé
5	Bridge Agua Blanca Norte	16	Bridge San Alejo
6	Bridge Chindongo	17	Bridge La Mulera
7	Bridge Guaymitas	18	Bridge La Fragosa
8	Bridge Guaymón	19	Bridge El Junco
9	Bridge Las Metalias I	20	Bridge La Esperanza
10	Bridge Mayorquin o Chirimil	21	Bridge Lancetilla
11	Bridge Toyós	22	Bridge HighLand Creek

Source: Design & Environmental Studies of the Tourism Corridor: El Progreso – Tela, in the departments of Yoro and Atlántida

**Table 8.4. List of boxes to be designed**

N°	Name	N°	Name
1	Double box over La Cuarenta N° 1 Stream	15	Single box over El Portillo River
2	Double box over La Cuarenta N° 2 Stream	16	Double box over Las Metalias Stream
3	Double box over La Colorada Stream	17	Double box over Pajuiles Stream
4	Double box over Los Jutes Stream	18	Single box over La Roca Stream
5	Double box over El Zorrillo Stream	19	Double box over Las Metalias N°3 Stream
6	Double box over Las Delicias Stream	20	Single box over La Amargosa Stream
7	Double box over El Sapo Stream	21	Triple box over Santiago N°1 Stream
8	Single box over San Jerónimo Stream	22	Double box over Buenos Aires Stream
9	Triple box over Las Nuñez or Yoro Stream	23	Double box over Nameless
10	Single box over Maquila El Porvenir Stream	24	Quadruple box Nameless
11	Single box over Las Lichas Stream	25	Double box Nameless
12	Double box over Las Flores Stream	26	Single box Nameless



13	Quintuple box over Congo River	27	Single box Nameless
14	Triple box over La Galana Stream	28	Two boxes

Source: Design & Environmental Studies of the Tourism Corridor: El Progreso – Tela in the departments of Yoro and Atlántida

- **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 8.5):

**Table 8.5. 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 8.6:

Table 8.6. <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 8.7** List of surface water bodies passing through the alignment

Name	Location	Name	Location
Camalote River	5+600	Metalias 2 River	33+300
El Porvenir River	7+900	Pajuiles River	35+500
Agua Blanca River	9+820	Mezapa River	36+200

Chindongo River	11+300	Santiago River	41+400
Toyos River	17+370	Zoilabe River	45+700
Guaymitas River	17+700	San Alejo River	49+150
Guaymon River	22+600	La Hulera River	51+200
Congo River	25+950	La Fragosa River	56+700
Chirichil River	26+400	El Junco River	58+600
Potrillo River	31+000	La Esperanza River	61+000
Metalias 1 River	33+000	Highland Creek River	68+600

Source: 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 8.8. 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
<b>49</b>	<b>Total</b>

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 8.9. 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
<b>132</b>	<b>Total</b>

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:

- Carriage maintenance
- Drainage Works maintenance.
- Bridge maintenance
- Road signals maintenance and illumination

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.

9



Ambulance service

For the attention of the injured 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	roadway, drainage works, and bridges maintenance	Backhoe
		Dump trucks
	Road signal and illumination maintenance	Others (sweepers, etc.) 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) materials</i>
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
<b>41</b>	<b>Total</b>

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**

Name	Location	Name	Location
Camalote Stream	5+600	Metalias 2 River	33+300
El Porvenir River	7+900	Metalias 3 Stream	33+800
La Nuñez Stream	8+730	La Roca Stream	33+900

Agua Blanca River	9+820	Pajuiles Stream	34+900
Chindongo River	11+300	Pajuiles River	35+500
La Cuarenta No. 1 Stream	14+070	Mezapa River	36+200
Las Delicia del Jute Stream	15+300	La Amargosa Stream	37+800
La Cuarenta No. 2 Stream	16+000	Santiago River	41+400
Toyos River	17+370	Cuarenta y Uno Stream	41+500
Guaymitas River	17+700	Santiago Stream	42+000
La Colorada Stream	19+000	Zoilabe River	45+700
El Sapo Stream	20+430	Buenos Aires Stream	47+000
San Jerónimo Stream	20+980	San Alejo River	49+150
Guaymón River	22+600	La Hulera River	51+200
El Zorrillo Stream	23+400	Los Jutes Stream	53+300
Las Delicias Stream	24+130	Avícola Las Palomas Stream	55+000
Las Lichas Stream	24+930	La Fragosa River	56+700
Las Flores Stream	25+100	El Junco Stream	57+500
Congo River	25+950	Los Morales Stream	58+350
Chirichil River	26+400	El Junco River	58+600
La Galana Stream	26+900	La Esperanza Stream	60+000
El Zorrillo Stream	23+400	La Esperanza River	61+000
Potrillo River	31+000	Venecia Stream	63+000
Las Metalias Stream	31+900	Lancetilla River	67+700
Metalias 1 River	33+000	Highland Creek River	68+600

Source: The Concessionaire, based on field work.

#### 10.1.2 Basin

The territory of Honduras has 19 watersheds, but if added, since there are the small permanent or temporary watersheds on the islands in the Atlantic and Pacific, they would add total of 21. National Autonomous Water and Sewerage System (hereinafter called SANAA).

It is evident that the territory of El Progreso is located entirely in the Uluá River Basin. This basin covers one fifth of the country, many of the production activities are carried out on this area.

For Section I, three of the 5 micro-basins were evaluated, given that these are areas of greater drainage size throughout this tranche, these are: Pelo River located at the beginning of the project in (station 0 +000); micro-basin of Camalote located at station 5 +678 and the micro-basin of Chindongo located at the end of Section (12 +000).

#### **Pelo River Micro-basin**

It is located southeast of the project is a micro-basin that has a declaratory and which supplies drinking water to the urban area of the city of El Progreso, it has an area of 3,538 hectares, according to the current land use in 2002 this drainage area has the following conditions: agriculture areas with greater percentage (54%), mixed forest (34%) and broadleaf (12%). Despite a basin with an oblong shaped (longer retention time), the conditions of coverage make it susceptible to increase turbidity and rate of runoff.

#### **El Camalote Micro-basin**

This micro-basin has an area of 1,161 hectares located in the east sector of the project the current use of this micro-basin. This micro-basin has better coverage, where 62% is broadleaf or mixed forests. It is generally considered a basin in general terms of low threat to flooding's or landslides.

#### **Chindongo Micro-basin**

Like other Micro-basins, Chindongo is located east of the project, it has an area of 716 hectares and a composed vegetative coverage. Agriculture occupies 55% and these areas are located on the top part, making it more vulnerable to sediment transport. 32% is occupied by broadleaf and 13% mixed forests.

In section II, 3 micro-basins that divide the road from Tela El Progreso are identified, these drainage areas are: Guaimitas Stream, which is located in El Progreso at station 5+864; 1Guaimas River at 0+697 and Toyos River micro-basin at 15 +490 in the town of El Negrito.

#### **Guaimitas Stream Micro-basin**

This is located south of the project, it starts in the Mico Quemado Mountain and has an area of 3,282 hectares. The highest percentage of the micro-basin is covered by broadleaf, conifer, mixed forest areas with 57% and the rest is occupied by traditional agriculture and shrubs.

### **Guaimas Stream Micro-basin**

Also located in the southern sector of the project site it is the largest micro-basin of all sections with an area of 31,831 hectares. It is located in the municipalities of El Negrito, Yoro and Morazán. The forest cover is approximately 59% of the total area of the micro-basin. The remainder is occupied by areas with traditional agriculture and shrubs.

### **Toyos River Micro-basin**

This micro-basin has an area of 2,211 hectares. It is the micro-basin of the smaller size of Section II and the one with the most forest cover 62% of broadleaf forest, but at the bottom (road side) you find subsistence farming and cultivation of African palm.

The highest point is located on the mountain of Nombre de Dios of about 900 m and the lowest point on the road at 20 meters. It is one of the most healthiest ecosystems in view of its good coverage on the high side and composed of broad-leaf vegetation.

Section III, is located in the Municipality of Tela, 3 micro-basins were identified: San Alejo River at station 33 +323, Santiago at 41 +585 and Las Metalias at station 49 +309. The characteristics of each of the micro-basins that are located in this section are described as follows.

### **Las Metalias Micro-basin**

Located in the Municipality of Tela and its length is 462 hectares. The highest percentage of land use in this micro-basin is occupied by broadleaf forests with 49%, followed by traditional agriculture with 34% and 17% grassland.

The forest area is concentrated in the upper part with elevations of 1060 m and a minimum of 180 m high located on the road. The small size of the micro-basin makes low river flows.

### **Santiago River Micro-basin**

Located at station 41+585 has an area of 1,388 hectares. Unlike other micro-basins that have been characterized, it has 38% of the land employed in technical agriculture, which are oil palm crops. The highest point is located on the mountain of El Tiburon with 1168 m and the lowest point at 60 meters on the road, much traditional subsistence farming is found on the top part in the site in the nascent so its effects are, increased turbidity and runoff affecting drainage Works and siltation in the lower parts.

### **San Alejo River Micro-basin**

Characterized by their areas of broadleaf forests that occupy 41% of the micro-

basin's surface and its technical farming of single crops with 2,087 ha in other words 35%.

In Section IV, 3 micro-basins are identified: La Esperanza River, located on station 62+100, Lancetilla River and Highland Creek River at the end of the project on kilometer 68+600.

#### **Esperanza River Micro-basin**

Located south of the project and has an area of 3945 hectares. According to the above Table this micro-basin has good forest cover in the upper part with more than 50% broadleaf forest this discharges in the exit point of Los Micos lagoon at its lower part it presents technified agriculture composed of Oil Palm, also the development of villages such as La Esperanza which is one of the main community of Tela.

Its highest point is located in Cerro Peña Blanca with an elevation of 943 m and its lowest point as 0 m.

#### **Lancetilla Micro-basin**

It occupies an area of 3,199 ha and it has (66%) broadleaf coverage in the medium high part. In the medium low part we find the Jardin Botanic de Lancetilla. This basin is threatened on the east by agriculture and the urban growth of Tela.

The Lancetilla River Basin, which river originates in the Biological Reserve and crosses the Arboretum and the Experimental Plantations, generates more than 30% of the water used by residents of the city of Tela, besides its lush vegetation it is a microclimate controller, acting like a sponge that absorbs each year the impacts of nature, thereby avoiding damage to infrastructure and citizens; becoming a vital area for residents and visitors to the Bay of Tela. (Botanical Garden and Research Centre Lancetilla, 2002-2005).

#### **Highland Creek Micro-basin**

This micro-basin is located at the end of the project and has an area of 1,006 hectares. This micro-basin is heavily threatened by livestock activities, traditional agriculture and urban growth by 57% of the drainage area.

### **10.1.3 Production and water recharge zones**

As for water producing micro-basins, 7 have been identified, which currently supply water to some communities of the municipality. Micro-basins are located in the municipality of El Progreso, as well as the communities it serves.

The only micro-basin declared as a Water Production Area is the micro-basin of Pelo River, located in the Range of Mico Quemado. The total area is 3,570 hectares and provides water to the municipal capital by 70% being consumed. This micro-basin has a management plan for its protection.

Except for the micro-basin of Pelo River, no other micro-basin in the municipality of El Progreso has been declared as a water producer, therefore no management plan has been planned, which becomes a disadvantage for the people of this municipality, since there is nothing to guarantee the quality and quantity of water production of these micro-basins.<sup>1</sup>

**Table 10.2. Water Producing Micro-basins in El Progreso**

Micro-basin	Community It supplies
<b>Pelo River</b>	El Progreso Col. Rodas Alvarado
<b>La Sarrosa Stream</b>	Col Las Palmas Buenos Aire Sur
<b>La Danta Stream</b>	Agua Blanca Norte
<b>Guacamaya Stream</b>	Guacamaya
<b>Camalote Stream</b>	Col. 7 de Abril El Porvenir Norte Col. San José Castaños Carlos R. Reina San Jorge Col. Primavera
<b>Corocol Stream</b>	Col. Corocol
<b>El Milagro Stream</b>	Agua Blanca Sur

Source: water boards Shop, Municipality of El Progreso.

In the Municipality of Tela, water producing areas are Lancetilla River Basin, which produces approximately 34% of the water that feeds its urban area, La Esperanza (Bañaderos) River which supplies 60% and the remaining 6% corresponds to Highland Creek.

#### **10.1.4 Possible location of underground water**

In general, all the Sula Valley presents highly productive aquifers, especially

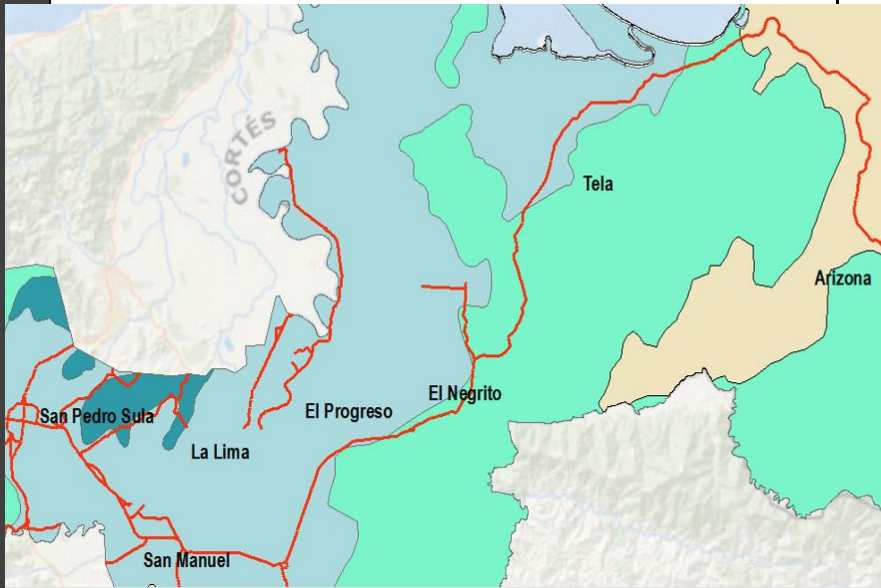
<sup>1</sup> Multidimensional Integral Diagnosis, El Progreso, Yoro.



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 Uluá River.

**Figure 10.1. 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**

**Section I: El Progreso – Chindongo**

In Section I, El Progreso – Chindongo, within the municipality of El Progreso,

various soil types are present (according to the Simmons y Castellano classification):

- **Floodplain Soils:** These sand and gravel soils with a thickness greater of 90 meters, which generally constitute aquifer material . This type of soil is the most representative in the City of El Progreso.
- **Soils of the Valleys Soils:** These soils are well-drained with coarse sandy loam texture. They are suitable for intensive cultivation and pasture, with soft and low landslide hazard slopes.
- **Jacalepa:** These soils are well-drained, shallow, derived in steep terrain, with slopes from 20 to 40%. They are associated with the Orica soil . The soil sandy loam to a depth of 15 cm, very fine silt loam , friable, dark brown. Its reaction is very acidic pH 5. This soil type presents in a minor proportion in the Municipality.
- **Sulaco Soils:** They are relatively well-drained soils derived from limestone or marble, steep terrain with slopes of 60%, with rocky outcrops and cliffs. The A horizon up to 30 cm is dark brown clay. 7.0 neutral reaction pH.
- **Tómala Soils:** These soils are well-drained, shallow, derived from shale gneiss with a mixture of marble and quartzite. They are located at 1200 m. The slopes are steep with slopes of up to 60%. Silt loam, friable, brown yellow up to 20 cm. The reaction is strongly acid, pH 5.0.
- **Toyos Soils:** They are deep, well-drained, of hilly relief with slopes that go from 20 to 40% at altitudes below 500 m. silt loam to silty clay loam, friable, brown yellow soil of up to 25 cm deep. The reaction is strongly acidic, with a pH of 5.0.

We conclude that Section I is developed on floodplain soils whose characteristic is having floodplain sediment sand type materials.

In Section II, Chindongo - El Aguacate, you may also find Valley, Toyo and Tomala soils, concluding then that in this section very fertile soils are presented, where technified crops like palm oil predominate. See Figure 10.2.

In turn Section III, El Aguacate - La Mulera are presented equally to the Toyos soils, which lie at the foot of the slopes of hills on the northern coast of Honduras. Some of these soils in this Section are occupied with subsistence crops such as maize, beans, in a shifting agricultural system and a considerable area dedicated to open grazing. See Figure 10.3:

*Figure 10.2. Cultivation of Palm Oil*



Source: TLBG, field work. April, 2013

*Figure 10.3. Areas dedicated to open grazing*



Source: TLBG, field work. April, 2013

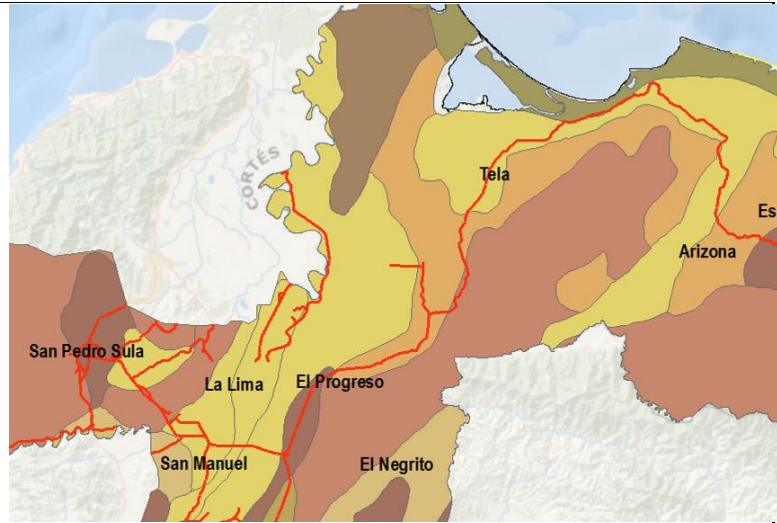
The other type of soil present in this section are Tomalá soils, which to a depth of about 60 cm are clay loam to clay, friable, yellowish reddish brown, and in some places have rock fragments.

Most of the area is covered with Tomalá soil covered with tropical grass, but an important part is located in the Department of Cortés, engaged in coffee production. In areas where these soils predominate are used for subsistence crops such as maize, beans and cassava, in a system of shifting cultivation and they grow much unimproved pasture.

Lastly, in Section IV, La Mulera - Tela, flood plain soils are presented, with the presence of sand.

The classification of soil in the project area is presented under figure 10.4:

***Figure 10.4. Types of soil according in the Project Area, according to Simmons***



### Map Key

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

Source: Type of soil according to Simmons. Technical Secretariat of Planning and External Cooperation (SEPLAN). National Land Information System.

### 10.2.2 SLOPE

The area of the project site is located in the Intermountain unit that is in the area between the end of the valley and the beginning of the range of Mico Quemado and Nombre de Dios between elevations of 30 to 160 m standing at slope ranges between 0-15%.

### 10.2.3 Geology

The Tourism Corridor of Honduras: Tranche El Progreso - Tela, runs along two geological formations, which are described below:

- **Recent marine continental sediment (Qal):** This formation includes deposits of foothills and gravel terraces, floodplains and river bed deposits. It is occupied by the largest area of the municipality of El Progreso.
- **Intrusive Rocks (Ki):** This formation of intrusive rocks comprising granites, granodiorites, diorite, tonalite of variable ages.

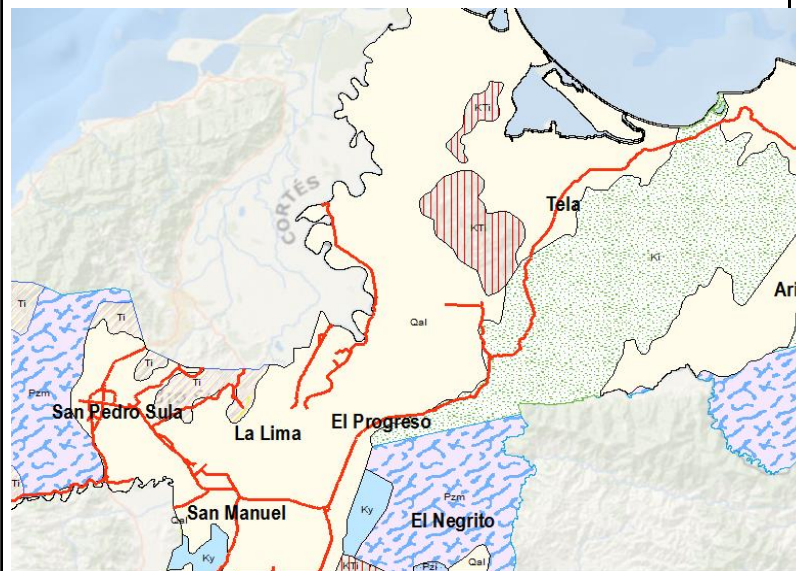
Section II is characterized by a geological stratum called recent marine

continental sediments (Qal). Although no large slopes exist in the study area (10-20%) the type of material is indicative of small landslides, mainly in cut sites at station 10 +804 on the Guaimas River.

In Section III, besides being on the Quaternary Alluvium (Qal) we further include Intrusive Rocks, comprising granites, granodiorites, diorites tonalite of variable ages.

Lastly in Section IV, we can see a whole quaternary alluvium and at the end of the tranche we see part of intrusive rocks. View summary of geologic units under figure 10.5:

**Figure 10.5. Geology of the Tourism Corridor: El Progreso - Tela**



Qal

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

Ki

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

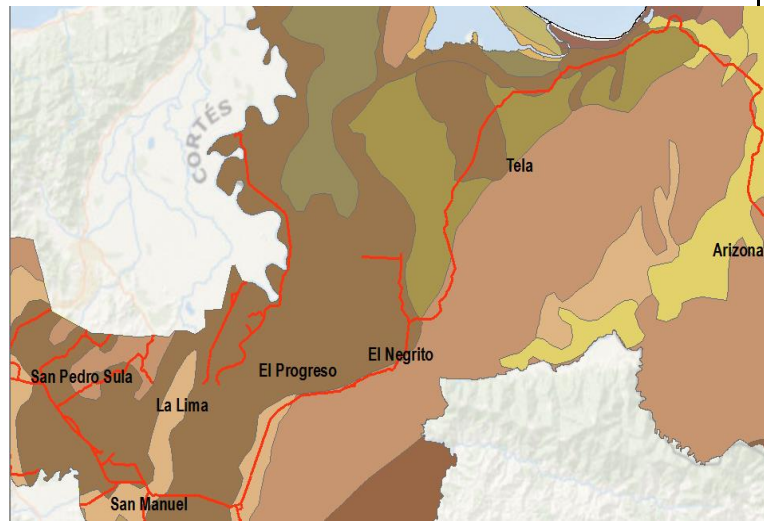
Source: National Geologic Map. Technical Secretariat of Planning and External Cooperation (SEPLAN). National Land Information System.

#### 10.2.4 Capacity of land use

Close to El Progreso, areas of cyclical crops and areas of selective logging and

forest protection (broadleaf ) are found. Near the municipality of El Negrito, we can observe soils of permanent vegetation use (grasses, fruit) and near the Municipality of Tela, we see soils that are capable of intensive and extensive use. See Figure 10.6:

**Figure 10.6. Soil usability tranche La Barca – El Progreso**



**Map Key**

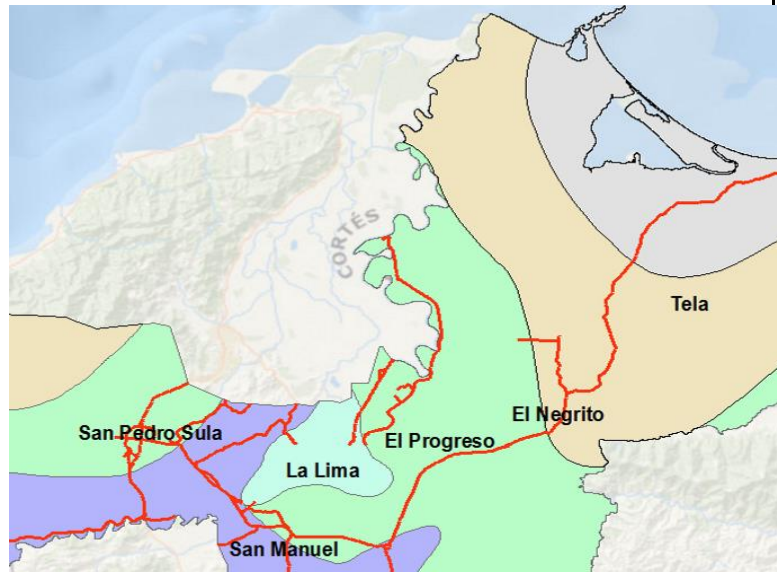
- I.II Cultivos Intensivos
- II Cultivo intensivo y extensivo
- III.I Cultivos en Rotacion
- IV.2 Vegetacion permanente, cultivo ocasional
- IV.3 Vegetacion permanente
- M Regeneracion de biomasa
- Reservorios de Agua
- V.I Cultivo Intensivo, drenaje
- VI.3 Agroforesteria
- VI.I Vegetacion Permanente(pasto,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

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

### 10.3 Climate

According to the Zuñiga's climate classification, the following climates are present in the project's area: late rainy season (El Progreso), very rainy tropical (EL Progreso, El Negrito), very rainy with regular rain distribution (Tela) and very rainy with a rainy winter (Tela). See Figure 10.7:

**Figure 10.7. Climatic classification of Honduras**



#### Map Key

- 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

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

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

Rainfall in the study area is increased significantly during the arrival of cold fronts and masses of modified polar continental cold air, reaching the Gulf of Honduras, specifically between the months of October, November and December.

Thus, the month with the highest average rainfall in the year is November with 577.45 mm. In addition, decreased rainfall averages during April, May and

June, being May the least rainy month with an average of about 96 mm, the annual average rainfall is 3,276 mm, with maximum values of 6,201 mm in 1966 and minimum of 2,334 mm in 1965. two distinct seasons are presented, the rainy season extends from October to January and the dry season from March to June. The average precipitation in millimeters in the area in the zone is presented as follows. See Table 10.3

**Table 10.3. Average millimeters of precipitation (1995-2004)**

Ja n	Fe b	Ma r	A pr	M ay	Ju n	J ul	Aug	Sep	Oct	Nov	Dec
36	24	17	10	96	97	2	240.	193.	372.	577.	520.
9	5.3	6.9	8	.9	.5	2 3	59	47	58	45	98

Source: Design and Environmental Studies of the Tourism Corridor: El Progreso – Tela In the Departments of Yoro and Atlántida, 2011.

According to data provided by the National Meteorological Service of Honduras (June, 2013), in the Climatology Station of Climatology the annual rainfall is estimated at 2,200 mm and the Weather Station of Tela the average annual rainfall is 2,800 mm. The average relative humidity is 75% Yoro and Tela is 82%. In case of the winds in Yoro winds with average speed of 3 knots and a direction of 90°, for Tela the average speed is of 5 knots and a direction 360°.

### 10.3.2 Average annual temperature

Tela has an average annual temperature of 27°C, with the months of May, June and July as the hottest, with temperatures averaging 29°C, and less warm during December and January, with temperatures ranging between 23 and 24°C. The Monthly average temperatures in the station Tela cover only a period of 10 years (1995-2004), with the following results, See Table 10.4

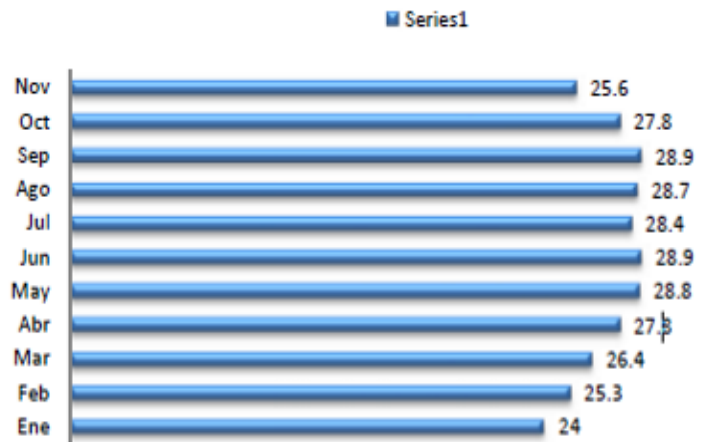
**Table 10.4. Average monthly temperature (1995-2004)**

Ja n	Fe b	Ma r	Ap r	Ma y	Ju n	Jul	Au g	Se p	Oc t	No v	De c
24	25.	26.	27.	28.	28.	28.	28.	28.	27.	25.	24
	3	4	8	8	9	4	7	9	8	6	

Source: Design and Environmental Studies of the Tourism Corridor: El Progreso – Tela In the Departments of Yoro and Atlántida, 2011.

**Figure 10.8. Average monthly temperature**





Source: Design and Environmental Studies of the Tourism Corridor: El Progreso – Tela In the Departments of Yoro and Atlántida, 2011.

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

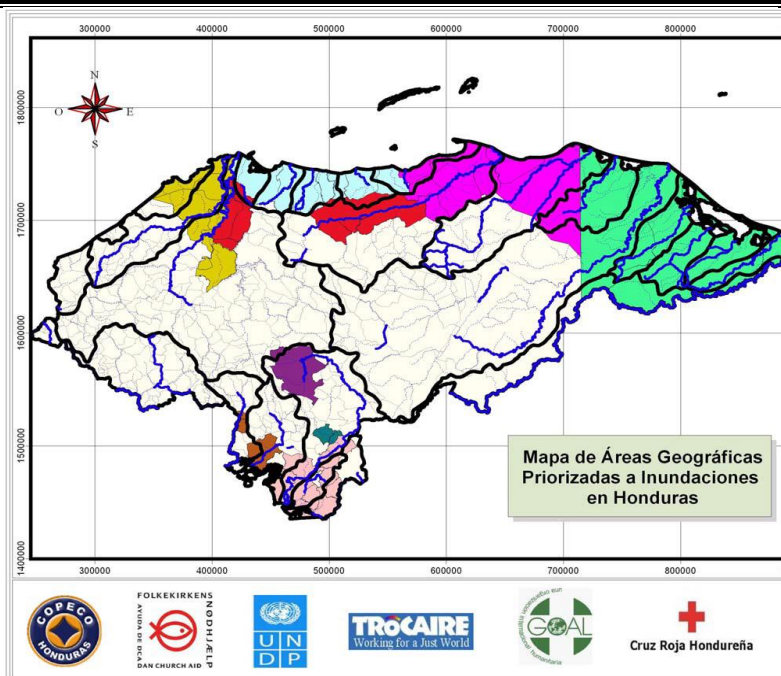
The areas most affected by the floods have been the floodplains by major rivers (Ulúa Chamelecón Patuca, Choluteca, Sico and Paulaya and other) the areas adjacent to major rivers and the nearby communities of all basins and short sub-basins, where the times of concentration of flood water are very low.

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-Lislis Macrobasin, Aguan River, Irióna and Gracias a Dios Basin, and Choluteca River Macrobasin.

**Figure 10.9. 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 10.5. Priority basins**

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

Source: Country Document, DIPECHO. 2007

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

**Table 10.6. 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
	Potrerillos	22,194
	Santa Cruz de Yojoa	61,461
Yoro	San Francisco de Yojoa	13,968
	El Progreso	186,971
	Santa Rita	17,165
	El Negrito	35,651
<b>Total</b>		<b>1,481,236</b>
<b>TOTAL</b>		<b>3,742,237</b>

Source: Country Document, DIPECHO. 2007

Meanwhile, the exposed population within the Mezapa Basin in the department of Atlántida, are presented below:

**Table 10.7. Mezapa – Lislis Basin**

Cuencas Mezapa – Lislis		
Departamento	Municipio	Población Expuesta 2007
Atlántida	La Ceiba	21,548
	Esparta	19,835
	Jutiapa	16,469
	La Masica	32,725
	San Francisco	169,922
	Tela	27,199
	Arizona	12,011
	El Porvenir	87,022
Colon	Santa Fe	6,275
	Balfate	10,713
<b>Total</b>		<b>403,719</b>

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.

El Progreso is located at the foot of the mountain (Cerro Mico Quemado), it is one of the reasons why this municipality, specially the urban area, is vulnerable to flooding by the water discharge in short times, supported by the crossing of the Ulua River on the southeast.

The project starts on abutment No2. of Bridge La Democracia on the Ulua River, separating from the river bed as the project progresses, thus reducing the risk of flooding. 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.

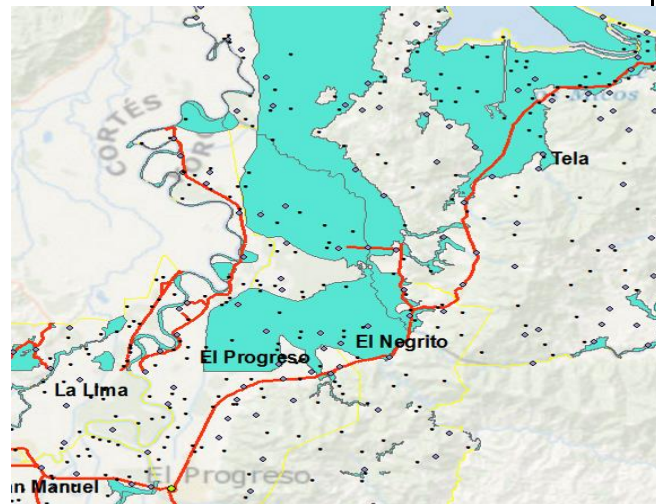
Among the factors that make these areas more vulnerable to suffer the ravages

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 .

Within the Municipality of El Negrito, flood-prone areas exist such as: Guaymón, Toyos, Nuevo San Antonio and El Naranjo.

In the Municipality of Tela, flood prone areas are: Zoilabé, Jute, Los Cerritos, El Guano, El Junco and La Tarralosa. These areas can be seen under figure 10.10:

**Figure 10.10. Map of flood and population by Municipality of Honduras**



**Map Key**

 Flood threat

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

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

The main causes of landslides threats are deforestation and soil type in El Progreso, up to this date no event like this has happened, however it is known of the existence of active landslides in the municipality, landslides may develop slowly without people noticing. The locations are: Los Sarmientos, Goteras, La Mulia, Jujú, Pelo River pits and La Mina Creek, In the last two have no inhabitants, according to the Municipal Emergency Plan, (2010).

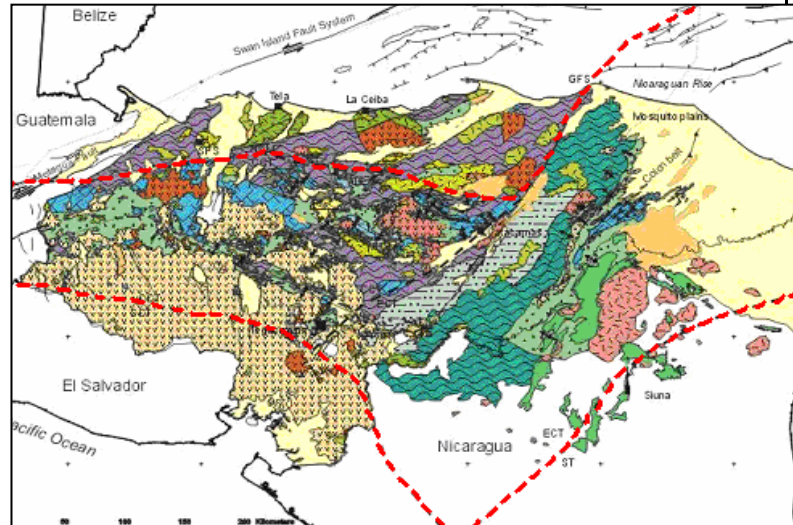
The risk of occurrence of landslides in the municipality is low.

## 10.6 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 10.11. 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 El Progreso - Tela, 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 (El Progreso - Tela), 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)

With the selective rehabilitation and maintenance undertakings and expansion of tranche El Progreso - Tela, no affectation will fall over the protected areas. However, for purposes of this document, protected areas near the alignment, taking as reference their conservation status and reported species.

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 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.

**Figure 11.1. Mico Quemado National Park**



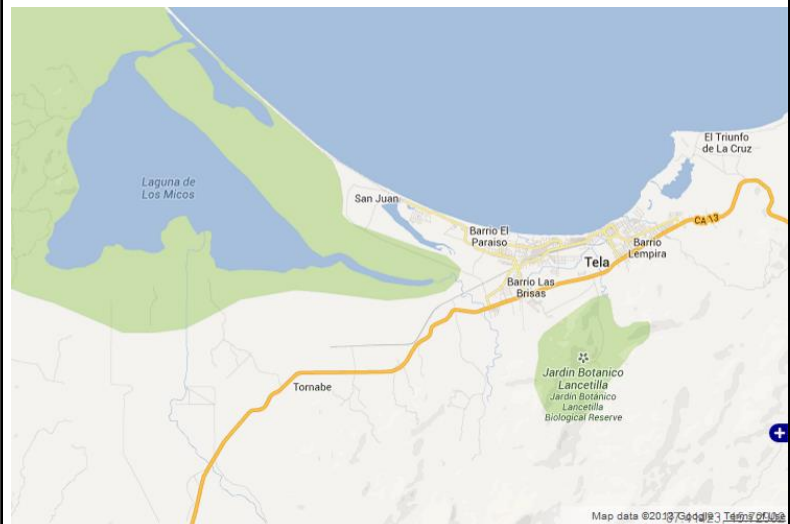
Source: Technical Secretariat of Planning and External Cooperation - SEPLAN.  
National Land Information System.

This protected area is located approximately 4 kilometers away from where the alignment of the Tourism Corridor: El Progreso-Tela passes, which is outside of the area of influence.

Besides the Biological Reserve of Mico Quemado, the Botanical Research Center Lancetillais is located in the Municipality of Tela, which is one of the most important protected areas in Honduras that receives a great amount of

visitors annually. See Figure 11.2:

**Figure 11.2. Lancetilla Botanical Garden and Punta Sal National Park**



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

The Lancetilla Botanical Garden is located at a distance of approximately 1 kilometer from the alignment of the tranche of El Progreso - Tela.

Lastly, very close to the alignment of the project, the Punta Sal National Park is also located, created by Decree 154-94 with the objectives of:

- Maintain representative samples of ecosystems in their natural state
- Maintain ecological diversity and environmental regulation
- preserve genetic resources in their natural state
- Protect sites and objects of cultural, historical and archaeological heritage and scenic beauty
- Provide environmental education, research, environmental monitoring, recreation and ecotourism.

Besides the Protected areas, this Decree creates the Authority of Punta sal

National Park is, which consists of: the Secretariat of the Environment, Secretariat of Natural Resources, Honduran Corporation for Forest Development (COHDEFOR), Honduran Institute of Tourism, Institute of Anthropology and History, Municipality of Tela, Foundation for the Protection of Lancetilla, Punta Sal and Texiguat, the municipal associations of the Area, Tela Bay Trust and the Black Fraternal Organization of Honduras.

## **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 transepts 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 11.3:

Figure 11.3. Booklet used for reference to the presence of mammals



### 11.2.1 Diagnostic of the bypass zone

#### Birds

Birds have a varied density and generally related to the climatic conditions according to geographical region. In the case of the United States even with its large surface extension, there are only about 688 species of birds, while in Honduras, with a considerably smaller area there are approximately 740 bird species of which 520 are reproduced in Honduran territory and approximately 200 are migratory (Bonta and Anderson 2003). Finding only one that is endemic, the Honduran Emerald Hummingbird *Amazilia luciae* (Monroe 1968).

The diversity of birds in the town of Cortes, Yoro and Atlántida including all the ecosystems, Rainforest, mangroves, agricultural systems, riparian and aquatic systems, due to this diversity of ecosystems, it is estimated at about 400 to 500 species of which 750 species are recorded for Honduras (Thorn et al 2012).

In the case of the tranche of the project, during the tour of the area where the new bypass of the City of El Progreso will be built, we observed 12 species of birds, including 11 common and the Road Hawk, besides being an important species for being in the top of the food chain, it is a species found in Appendix II of CITES. No other vertebrate species were reported, but no doubt, by the amount of cultivated plants, we are sure to find small rodents and bats.

**Table 11.1. Bird species observed in the area of the bypass**

No	Order	Family	Scientific Name	Common Name	Status	CITES
1	Pelecaniformes	Ardeidae	<i>Ardea alba</i>	Garzón Blanco	R	
2	Pelecaniformes	Ardeidae	<i>Bubulcus ibis</i>	Garcita bueyera	R	
3	Accipitriformes	Cathartidae	<i>Coragyps atratus</i>	Zopilote	R	
4	Accipitriformes	Accipitridae	<i>Buteogallus anthracinus</i>	Gavilán cangrejero	R	Ape. II
5	Columbiformes	Columbidae	<i>Zenaida asiatica</i>	Paloma ala Blanca	R	
6	Columbiformes	Columbidae	<i>Columbina talpacoti</i>	Turquita rojiza	R	
7	Cuculiformes	Cuculidae	<i>Crotophaga sulcirostris</i>	Tijul	R	
8	Coraciiformes	Momotidae	<i>Eumomota superciliosa</i>	Taragon turquesa	R	
9	Piciformes	Picidae	<i>Melanerpes aurifrons</i>	Carpintero	R	
10	Passeriformes	Tyrannidae	<i>Pitangus sulphuratus</i>	Cristo fue	R	
11	Passeriformes	Tyrannidae	<i>Myiozetetes similis</i>	Chilero social	R	
12	Passeriformes	Emberizidae	<i>Sporophila torqueola</i>	Semillero de collar	R	

Source: Diagnostic conducted in June 2013.

Observation: R = Resident; M= Migratory

**Figure 11.4. Bird species reported in the tranche**



***Buteogallus anthracinus* (Gavilán Gangrejero juvenil)**

***Myiozetetes similis* (Chilero social)**

### 11.2.2 Diagnosis in the expansion zone

In the four lane expansion tranche El Progreso - Tela, the following species of wildlife are presented:

#### Fish

During the tour, 08 families 09 genera and 10 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 El Progreso - Tela, are presented below:

**Table 11.2. Fish species observed in the area of expansion**

N°	Family	Scientific Name	Common Name	Status
1	Pimelodidae	<i>Rhamdia laticauda</i> *	Chunte, bagre	Nativo
2	Mugilidae	<i>Agonostomus monticola</i> *	Tepemechín	Endémico
3	Mugilidae	<i>Joturus pichardi</i> *	Cuyamel	Endémico
4	Characidae	<i>Astianax fasciatus</i> *	Sardina plateada	Nativo
5	Eleotridae	<i>Dormitator maculatus</i> *	Dormilón	Nativo

6	Poeciliidae	<i>Poecilia sp.1</i>	Bubucha	Nativo
7	Poeciliidae	<i>Poecilia sp.2</i>	Bubucha	Nativo
8	Poeciliidae	<i>Alfaro huberi*</i>	Olomina	Nativo
9	Centropomidae	<i>Centropomus sp.</i>	Robalo	Nativo
10	Lujanidae	<i>Lutjanus sp.</i>	Ronco	Nativo
11	Cicidae	<i>Oerochromis sp.</i>	Tilapia	Exótico
12	Cicidae	<i>Paracromis managuensis</i>	Guapote	Nativo
* Reported species: Design & Environmental Studies Tourism Corridor:: El Progreso - Tela, in the departments of Yoro and Atlántida				

Source: Diagnostic conducted in June 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 vittatus*) and Stripped Pichete (*Cnemidophorus sp.*). However for the type of ecosystem you can find flag pichetes *Norops sp.*, iguana and striped Pichete *Sceloforus.sp* among others.

It is also possible to find amphibian species as *Hyla microcephala*, *Smilisca bahudini*, *Sinax staufferi* *Lithobates* and hopefully red eye frogs *Duelmanohila salvavida* (endemic) or *Agalychnis*.

**Table 11.3. Reptile species observed and reported in the tranche expansion**

Nº	Order	Family	Scientific Name	Common Name
1	SQUAMATA	Coritophanidae	<i>Basiliscus vittatus</i>	Charancaco
2		Iguanidae	<i>Iguana iguana*</i>	Iguana Verde
3		Iguanidae	<i>Ctenosaura similis</i>	Garrobo
4		Teiidae	<i>Cnemidophorus sp</i>	Pichete rallado
5		Colubridae	<i>Lampropeltis triangulum*</i>	falso coral
6		Colubridae	<i>Clelia clelia*</i>	Zumbadora
7		Colubridae	<i>Drymobius margaritiferus*</i>	falso tamagás verde
8		Elapidae	<i>Micrurus nigrocinctus*</i>	serpiente de coral

\* Reported species: Design & Environmental Studies Tourism Corridor:: El Progreso

- Tela, in the departments of Yoro and Atlántida. Source: Diagnostic conducted in June 2013..

### Birds

08 orders, 23 genera and 25 residents species, 3 of which are included in Appendices II of CITES, 2 prey species (Gavilanes) and a species of hummingbird were identified. Raptors while being on the top of the food chain are considered to be important records because their presence is a witness of the existence of other species that serve as support, like nocturnal raptors. Furthermore since hummingbirds are pollinators they contribute to the maintenance of vegetative resources, and all are included in the CITES appendices.

**Table 11.4. Bird species observed in the area of expansion**

No	Order	Family	Scientific Name	Common Name	Status	CITES - UICN
1	Pelecaniformes	Ardeidae	<i>Bubulcus ibis</i>	Garcita bueyera	R	
2	Accipitriformes	Cathartidae	<i>Coragyps atratus</i>	Zopilote	R	
3	Accipitriformes	Cathartidae	<i>Cathartes aura</i>	Tincute	R	
4	Accipitriformes	Accipitridae	<i>Buteogallus anthracinus</i>	Gavilán cangrejero	R	Ape.II
5	Accipitriformes	Accipitridae	<i>Buteo magnirostris</i>	Gavilán de caminos	R	Ape.II
6	Columbiformes	Columbidae	<i>Zenaida asiatica</i>	Paloma ala Blanca	R	
7	Columbiformes	Columbidae	<i>Columbina inca</i>	Turquita inca	R	
8	Columbiformes	Columbidae	<i>Columbina talpacoti</i>	Turquita rojiza	R	
9	Cuculiformes	Cuculidae	<i>Crotophaga sulcirostris</i>	Tijul	R	
10	Apodiformes	Trochilidae	<i>Amazilia tzacatl</i>	Gorrión colarufa	R	Ape.II
11	Coraciiformes	Momotidae	<i>Eumomota superciliosa</i>	Taragon turquesa	R	
12	Coraciiformes	Alcedinidae	<i>Chloroceryle amazona</i>	Martin pescador	R	
13	Piciformes	Picidae	<i>Melanerpes aurifrons</i>	Carpintero	R	
14	Passeriformes	Tyrannidae	<i>Pitangus sulphuratus</i>	Cristo fue	R	
15	Passeriformes	Tyrannidae	<i>Myiozetetes similis</i>	Chilero social	R	



16	Passeriformes	Tyrannidae	<i>Tyrannus melancholicus</i>	Tirano	R	
17	Passeriformes	Hirundinidae	<i>Stelgidopteryx serripennis</i>	Golondrina gris	R	
18	Passeriformes	Turdidae	<i>Turdus grayi</i>	Zorzal	R	
19	Passeriformes	Thraupidae	<i>Thraupis episcopus</i>	Tanagra azuleja	R	
20	Passeriformes	Thraupidae	<i>Thraupis abbas</i>	Tanagra ala amarilla	R	
21	Passeriformes	Emberizidae	<i>Sporophila torqueola</i>	Semillero de collar	R	
22	Passeriformes	Emberizidae	<i>Volatinia jacarina</i>	Saltarín	R	
23	Passeriformes	Icteridae	<i>Dives dives</i>	Clarinero	R	
24	Passeriformes	Icteridae	<i>Quiscalus mexicanus</i>	Zanate	R	
25	Passeriformes	Passeridae	<i>Passer domesticus</i>	Pinzón Casero	R	

Source: Diagnostic conducted in June 2013.

### **Mammals**

During the tour, 3 people in the area were interviewed. They pointed out that on the road they have seen skunks of the *Conepatus* sp genera, Tacuazín (*Didelphis marsupialis*) and in the area passing through the Botanical Garden said that the jaguar (*Panther onca*) was spotted near the road. This species is reported for the Lancetilla Botanical Garden and for Janeth Kawas National Park.

**Table 11.5. Mammal species in the area of expansion**

Order	Family	Scientific Name	Common Name
Didelphimorphia	Didelphidae	<i>Didelphis marsupialis</i>	Tacuazín
Rodentia	Dasyproctidae	<i>Dayprocta punctata</i>	Guatusa
Carnivora	Procyonidae	<i>Procyon lotor</i>	mapache
Carnivora	Mephytidae	<i>Conepatus</i> sp	Zorrillo

Source: Diagnostic conducted in June 2013.

### 11.3 Flora (trees and plants, etc.)

To perform the representative flora inventory, 13 points were evaluated in the tranche expansion and the construction area of the new bypass in the city of El Progreso.

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 Diagnostic of the bypass zone

The area designated for the bypass is an area suitable for agriculture near the Ulua river channel. We were able to observe 16 species of plants, which stand out as plants for human consumption: Mango, Papaya, Yuca, guava, sugar cane and occasionally non-agricultural species like: Coal, indio desnudo, Guarumo, sauce, Guazuma and a group of Tecas. In addition to these species we found oil palm in some tranches.

**Table 11.6. Flora species in the bypass area of El Progreso**

No	Family	Species	Status	Common Name
1	Anacardiaceae	<i>Mangifera indica</i> L.	Native	Mango
2	Boraginaceae	<i>Cordia dentata</i> Poir.	Native	Tigüilote
3	Burseraceae	<i>Bursera simaruba</i> (L.) Sarg.	Native	Indio desnudo
4	Caricaceae	<i>Papaya cauliflora</i> (Jacq.) Poir.	Exotic	Papaya Hawái
5	Euphorbiaceae	<i>Manihot esculenta</i> Crantz	Native	Yuca
6	Euphorbiaceae	<i>Ricinus communis</i> L.	Native	Cagalera
7	Leguminosae	<i>Senna reticulata</i> (Willd.) H.S. Irwin & Barneby	Native	
8	Leguminosae	<i>Mimosa pellita</i> Humb. & Bonpl. ex Willd.	Native	Carbón
9	Moraceae	<i>Cecropia peltata</i> L.	Native	Guarumo
10	Musaceae	<i>Musa paradisiaca</i> L.	Cultivada	Plátano
11	Mytaceae	<i>Psidium guajava</i> L.	Native	Guayaba
12	Poaceae	<i>Saccharum officinarum</i> L.	Cultivada	Caña
13	Poaceae	<i>Bambusa</i> sp	Exotic	Bambú
14	Salicaceae	<i>Salix chilensis</i> Molina	Native	Sauce
15	Ulamceae	<i>Guazuma ulmifolia</i> Lam	Native	Guazuma
16	Verbenaceae	<i>Tectona grandis</i> L. F.	Exotic	Teca
17	Palmae	<i>Eleaís oleifera</i> (Kunth) Cortés 1897	Exotic	Palma africana

Source: Diagnostic conducted in June 2013.

### 11.3.2 Diagnostic of the tranche expansion

In the 13 points assessed, 64 tree species, distributed in 58 genera and 28 families, which are distributed according to the Table below with an indication of the status of the plant between native and exotic (introduced species) were reported. See Table 11.7:

**Table 11.7. Observed flora species in the tranche of El Progreso - Tela**

	Family	Scientific Name	Status	Common Name
1	Anacardiaceae	<i>Mangifera indica</i> L.	Native	Mango
2	Anacardiaceae	<i>Spondias mombin</i> L.	Native	Jobo
3	Apocynaceae	<i>Cascabela thevetia</i> (L.) Lippold	Native	Quebra muelas
4	Apocynaceae	<i>Stemmadenia donnell-smithii</i> (Rose) Wood	Native	Cajón de burro
5	Bignoniaceae	<i>Crescentia alata</i>	Native	
6	Bignoniaceae	<i>Jacaranda mimosifolia</i>	Native	Jacaranda
7	Bignoniaceae	<i>Spathodea campanulata</i>	Exotic	Miona
8	Bignoniaceae	<i>Tabebuia rosea</i> (Bertol.) A. DC.	Native	Macuelizo
9	Bignoniaceae	<i>Tecoma stans</i> (L.) Juss. ex Kunth	Native	San Andrés
10	Bombacaceae	<i>Ceiba pentandra</i> (L.) Gaertn.	Native	Ceiba
11	Boraginaceae	<i>Cordia alliodora</i> (Ruiz & Pav.) Cham.	Native	Laurel
12	Boraginaceae	<i>Cordia dentata</i> Poir.	Native	Tigüilote
13	Burseraceae	<i>Bursera simaruba</i> (L.) Sarg.	Native	Indio desnudo
14	Caricaceae	<i>Papaya cauliflora</i> (Jacq.) Poir.	Native	Papaya
15	Combretaceae	<i>Terminalia catappa</i> L.	Native	Almendro

16	Eleocarpaceae	<i>Muntingia calabura</i> L.	Nativa	Capulín
17	Euphorbiaceae	<i>Jatropha gossypifolia</i> L.	Nativa	
18	Euphorbiaceae	<i>Manihot esculenta</i> Crantz	Nativa	Yuca
19	Euphorbiaceae	<i>Ricinus communis</i> L.	Nativa	Cagalera
20	Lamiaceae	<i>Gmelina arborea</i> Roxb.	Exótica	
21	Lecythidaceae	<i>Couropita guianensis</i> Aubl.	Exótica	Bala de cañón
22	Leguminosae	<i>Acacia collinsii</i> (Lam.) de Wit	Nativa	Cachito
23	Leguminosae	<i>Acacia fistola</i> L.	Nativa	cañafistula
24	Leguminosae	<i>Albizia</i> sp	Nativa	
25	Leguminosae	<i>Caesalpinia coriaria</i> (Jacq.) Willd	Nativa	acacia
26	Leguminosae	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Nativa	Acacia roja
27	Leguminosae	<i>Cassia grandis</i> L. f.	Nativa	Carao
28	Leguminosae	<i>Cassia siamea</i> Lam.	Exótica	Acacia amarilla
29	Leguminosae	<i>Clitoria fairchildiana</i> R.A. Howard	Nativa	
30	Leguminosae	<i>Cojoba graciliflora</i> (S.F. Blake) Britton & Rose	Nativa	Barba de jolote
31	Leguminosae	<i>Delonix regia</i> (Bojer ex Hook.) Raf	Exótica	Morazán
32	Leguminosae	<i>Enterolobium cyclocarpus</i> (Jacq.) Griseb.	Nativa	Guanacaste
33	Leguminosae	<i>Eritrina</i> sp	Nativa	Gualiqueme
34	Leguminosae	<i>Gliricidia sepium</i> Kunth ex Steud.	Nativa	Madriado
35	Leguminosae	<i>Inga punctata</i> J. León	Nativa	Guama
36	Leguminosae	<i>Inga vera</i> Kunth	Nativa	Guama
37	Leguminosae	<i>Leucaena leucocephala</i> (Lam.) de Wit	Nativa	Leucena
38	Leguminosae	<i>Lysiloma auritum</i> (Schltdl.) Benth.	Nativa	Quebracho

39	Leguminosae	<i>Mimosa pellita</i> Humb. & Bonpl. ex Willd.	Native	Carbón
40	Leguminosae	<i>Pithecellobium lanceolatum</i> (Humb. & Bonpl. ex Willd.) Benth.	Native	
41	Leguminosae	<i>Samanea saman</i> (Jacq.) Merr.	Native	Carreto
42	Malpighiaceae	<i>Byrsonima crassifolia</i> (L.) Kunth	Native	Nance
43	Meliaceae	<i>Cedrela odorata</i> L.	Native	Cedro
44	Meliaceae	<i>Melia azedarach</i> L.	Native	Paraíso
45	Meliaceae	<i>Swietenia macrophylla</i> King	Native	Caoba
46	Moraceae	<i>Arthocarpus altilis</i> (Parkinson) Fosberg	Native	Mazapán
47	Moraceae	<i>Cecropia peltata</i> L.	Native	Guarumo
48	Moraceae	<i>Ficus benjamina</i> L.	Exotic	Ficus

	Family	Scientific Name	Status	Common Name
49	Moraceae	<i>Ficus insipida</i> Willd.	Native	amate
50	Myrtaceae	<i>Eucaliptus</i> sp	Exotic	Eucalipto
51	Myrtaceae	<i>Psidium guajava</i> L.	Native	Guayaba
52	Palmae	<i>Atelea guinensis</i> L.	Native	Corozo
53	Palmae	<i>Cocos nucifera</i> L.	Native	Coco
54	Palmae	<i>Eleais oleifera</i> (Kunth) Cortés 1897	Exotic	Palma africana
55	Palmae	<i>Roystonea regia</i> (Kunth) O.F.Cook	Native	Yagua
56	Piperaceae	<i>Piper aduncum</i> L.	Native	Cordoncillo
57	Poaceae	<i>Bambusa</i> sp	Native	Bambú
58	Rubiaceae	<i>Morinda citrifolia</i> L.	Native	Nonis
59	Rutaceae	<i>Citrus sinensis</i> (L.) Osbeck	Native	Naranja

60	Salicaceae	<i>Salix humboldtiana</i> Andersson	Native	Sauce
61	Simarubaceae	<i>Simarouba glauca</i> DC.	Native	Aceituno
62	Sterculiaceae	<i>Sterculia apetala</i> (Jacq.) H. Karst.	Native	Castaño
63	Ulmaceae	<i>Guazuma ulmifolia</i> Lam	Native	Caulote
64	Verbenaceae	<i>Tectona grandis</i> L. F.	Exotic	Teca

Source: Diagnostic conducted in June 2013.

Figure 11.5. Reported flora species in the tranche



***Cecropia peltata* L. Guarumo**

***Ficus insipida* Willd. Frutos Amate**



***Swietenia macrophylla* King. Caoba**



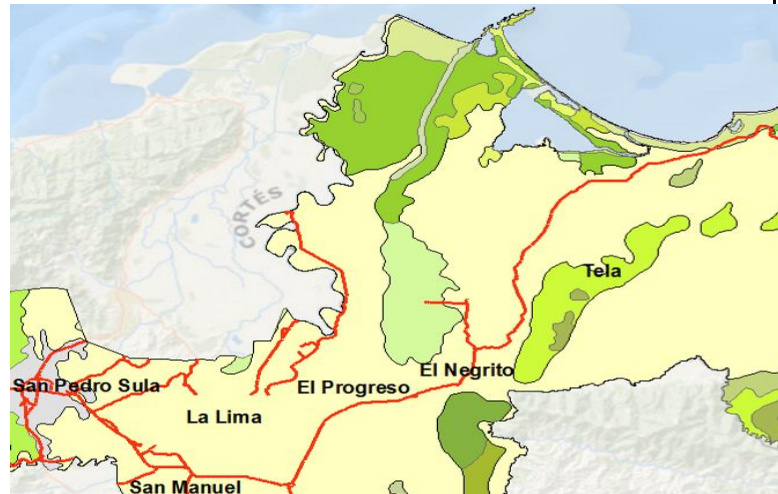
***Tabebuia rosea* (Bertol.) A. DC. Macuelizo**

Source: Diagnostic conducted in June 2013.

#### 11.4 Ecosystems

All alignment of the Tourism Corridor: El Progreso - Tela, 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 11.6.

**Figure 11.6. 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.

In the sector of El Progreso - Tela, most streams have appropriate vegetation cover, clear waters and natural shelter that could house very representative species of amphibians like the Hila salvavidas frog species a red eye endemic frog that has been reported in other studies in areas of similar habitat, for these reasons it is recommended to have a relevant Rescue Plan and Relocation of Flora and Fauna, before initiating construction activities, besides the accompaniment of a biologist who executes the rescue and mobilization, protection and reintroduction of fauna species during and after the construction.

The tranche of El Progreso - Tela, on mark 31+600 over the creek we found a tree with many species of epiphytic plants between which cactus (Risalis it vaccifera ) Orchids, ferns and bromeliads were observed. These 4 groups of plants are under CITES protected categories, so it is recommended to conduct a study to confirm the feasibility of moving this tree along with the containing species to another sector of the creek.

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

During the cleanup works, it is likely that snakes or lizards will be observed, we recommend educating people to perform this task and not to kill the fauna observed during the development of the activity.

### 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.

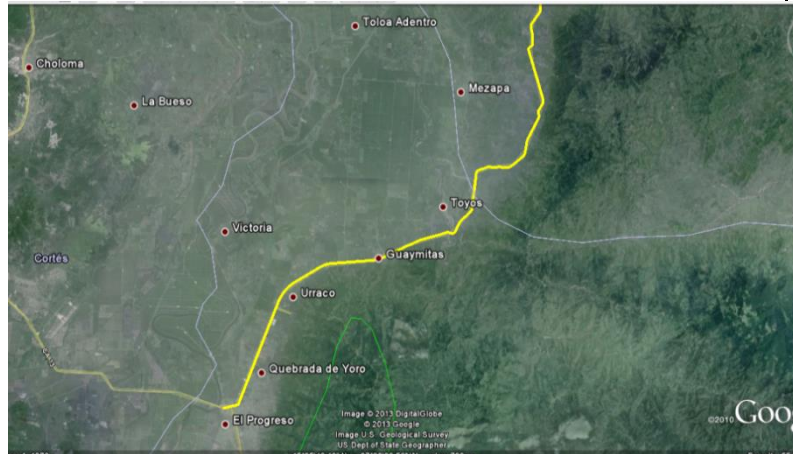
For this environmental assessment, the description of this section shall consist on the general aspects of the departments, municipalities, and in any possible cases, at the level of communities located along the alignment within the area of influence of the project.



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

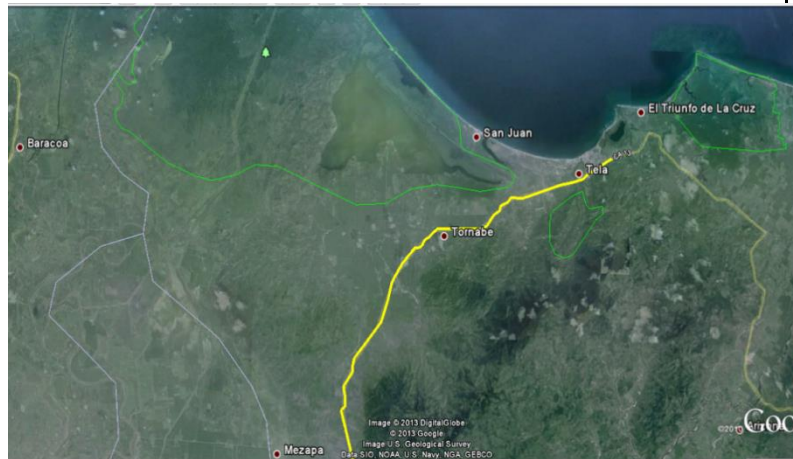
The road tranche, object of the present study, is located in the departments of Yoro and Atlántida, communicating the municipalities of El Progreso, El Negrito and Tela.

**Figure 12.1. Satellite image Section I y II**



Source: Google Earth.

**Figure 12.2. Satellite image Section III y IV**



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**

Municipality	Urban population			Rural Population		
	Men	Women	Total	Men	Women	Total
	141,171	152,487	<b>293,658</b>	131,475	126,967	<b>258,442</b>
	84,916	92,535	<b>177,451</b>	13,406	13,572	<b>26,978</b>
	9,564	9,940	<b>19,504</b>	12,424	12,126	<b>24,550</b>
	128,350	138,003	<b>266,353</b>	71,801	69,397	<b>141,198</b>
	22,179	23,354	<b>45,533</b>	21,330	20,780	<b>42,110</b>

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 El Progreso the majority of the population lives in urban areas (87%); however, in the municipality of El Negrito and the Municipality of Tela, the urban population is reduced to 56% and 52% correspondingly.

The villages or towns that are located near the project's Tourism Corridor alignment: El Progreso - Tela, are listed below in Table 12.2:

**Table 12.2. Villages or communities near the project alignment**

Municipality of El Progreso	Municipality of Negrito	Municipality of Tela
<ul style="list-style-type: none"> <li>• El Progreso</li> <li>• Quebrada de Yoro</li> <li>• Brisas de la Libertad</li> <li>• Colonia La Democracia</li> <li>• Agua Blanca del Norte</li> <li>• 1 de Enero</li> <li>• Las delicias del Jute</li> <li>• Guaymitas</li> <li>• Guaymitas viejo o el Castaño</li> <li>• La Colorada</li> </ul>	<ul style="list-style-type: none"> <li>• Guaymón N°1</li> <li>• Bella Vista</li> <li>• Las Delicias</li> <li>• Crique amarillo</li> <li>• Toyos</li> <li>• Finca 34</li> <li>• Nuevo San Antonio</li> <li>• El Aguacate</li> </ul>	<ul style="list-style-type: none"> <li>• Las Metalias</li> <li>• Paujiles</li> <li>• Las Eses Santiago</li> <li>• Zoilabé</li> <li>• La Ica</li> <li>• San Alejo</li> <li>• El Jute</li> <li>• El Guano – Col Flores del Guano</li> <li>• Colonia Buena Vista</li> <li>• El Junco</li> <li>• Tarralosa</li> <li>• Lancetilla</li> </ul>

Source: The Consultant

Then, having a total population of 336.147 inhabitants (2010), in the area of socio-economic influence.

#### 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 12.3. Total occupied housing in the Municipalities**

Municipality	Total private homes occupied
El Progreso	29,485
El Negrito	6,637
Tela	15,766

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 12.4. School attendance of the population in the area of socio-economic influence**

Municipality	Assists	Does not assist	Total	Not Considered
El Progreso	40,520	87,136	127,656	19,713
El Negrito	8,506	21,592	30,098	5,553

<b>Tela</b>	21,817	45,002	66,819	10,212
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Source: Honduras National Statistics Institute. Complying school. Census 2001.

**Table 12.5. Knows how to read and write**

Municipality	Knows	Does not know	Total	Not Considered
<b>El Progreso</b>	104,070	23,586	127,656	19,713
<b>El Negrito</b>	20,389	9,709	30,098	5,553
<b>Tela</b>	51,961	14,858	66,819	10,212

Source: Honduras National Statistics Institute. Can read and write. Census 2001 .

**Table 12.6. Last level or passed grade in Formal Education**

Last passed grade	El Progreso	El Negrito	Tela
None	20,513	8,535	12,306
Basic (Grade School – High School)	103,411	21,393	53,240
Superior (not university)	684	49	348
University (post studies)	3,048	121	925
<b>Total</b>	<b>127,656</b>	<b>30,098</b>	<b>66,819</b>
<b>Not Considered</b>	<b>19,713</b>	<b>5,553</b>	<b>10,212</b>

Source: National Statistics Institute of Honduras. Last level or grade passed in Formal Education. 2001 Census. Observation: Es importante mencionar que estas cifras, pertenecen al último censo realizado en el año 2001.

#### **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 attends, 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.

#### **Municipality of El Negrito**

A certain percentage of the population of the municipality was not considered in the census for these educational variables 5,553 (18%). All analysis performed concentrated on 82% of the population of the Municipality:

- As for school attendance we have that 28% of the population of the municipality is complying school and the remainder 72%, does not assists, however 68% of the studied population are literate and only the remaining 32% is not.
- With respects to the last level or grade approved, we can see that approximately 28% of the population of the municipality has no degree approved, on the contrary 71% of the population has a basic education at grade school and high school and 0.4 % has a college degree.

**Municipality of Tela**

A percentage exists of the population of the Municipality, which was not considered in the Census for these educational variables 5,553 (18%). All analysis performed were concentrated in 82% of the population of the Municipality:

- As for school attendance we have seen 33% of the population of the municipality is complying school and the remainder 77%, does not assists, however 78% of the population studied are literate and only the remaining 22% is not.
- With respect to the last level or grade approved, we can see that approximately 18.4% of the population of the municipality has no approved grade, on the contrary 80% of the population has a basic education at grade school and high school and 1.3 % has a college degree.

**Education Centers**

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

***Table 12.7. Education centers closes to the Project's alignment***

Municipality	Location	Name of the education Center	Level
Progreso	La Colorado	CE: John F. Kennedy	Basic
	Aldea Brisas de la Libertad	CE: Alvaro Contreras	Basic
	Urraco Sur	CE: Juan Lindo	Pre B
	Delicias del Jute	CE: Marcos Rodríguez Reyes	Pre B
	Qda. Seca El Progreso	CE: José Ángel Zúñiga	Basic
El Negrito	Toyos	CE: José Trinidad Reyes	Pre B

Atlántida	Tela	El Sauce	CE: José Antonio Fuentes Pasas	Basic	32
		La Tarralosa	CE: La Independencia	Basic	75
		Santiago	CE: República de Honduras	Pre Basic	110
		Santiago	CE: Rafael Pineda Ponce	Secondary	185
		Paujiles	CE: Visitación Padilla	Basic	335
		Miramar	CE: José Antonio Murillo Soto	Basic	

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

## 12.2 Economic activity of the population

### 12.2.1 Department of Yoro

Among the economic activities of the Department the agricultural crops that stand out are: bananas, sugar cane, oil palm, banana, coffee, corn, rice, beans and activities related to livestock are also performed.

#### 12.2.1.1 Economic activities in the Municipality of El Progreso

The economic development of the municipality has changed, with trade in commerce in the first place with 27.27%, manufacturing industry 23.60%, service sector 13.64%, agriculture 6.6%, and the rest of the PEA is distributed in the other economic activities in the area of the municipality, where hotel, transportation and construction activities are the ones in which the population is least engaged.

The municipality of El Progreso has two industrial processing zones, the maquila has generated about 6,000 direct jobs. El Progreso generates employment for inhabitants of neighboring municipalities, who come to work for companies that operate within it.

In Table 12.8, the employed and unemployed population in the municipality of El Progreso is shown as follows:

**Table 12.8. 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
<b>Total</b>	<b>119,601</b>	<b>100</b>

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.

#### 12.2.1.2 Economic activities in the Municipality of El Negrito

Currently land use is divided into:

- 60% agriculture
- 30% housing
- 10% livestock

The soil is sandy clay loam with potential agriculture and forestry. Many of the inhabitants of this municipality are engaged in agricultural production (grains, coffee, bananas, rice, tobacco, citrus, vegetables and fruits) and livestock.

Less than 50% of the cultivated land is used for the production of grains and permanent crops, being maize the most predominant. In the sector of Guaymas oil palm is grown on a large scale.

In Table 12.9, the employed and unemployed population in the Municipality of El Negrito is presented as follows:

**Table 12.9. Employed and unemployed population in the municipality of El Negrito**

Type of main occupation	Cases	%
Employed	9,371	34
Unemployed	115	0
Inactive	18,321	66
<b>Total</b>	<b>27,807</b>	<b>100</b>
<b>NSA:</b>	<b>7,844</b>	

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

It is evident from the above Table that 34% of the population is engaged in some activity, while 66% was inactive.

#### 12.2.2 Department of Atlántida

Palm Oil, cocoa, coffee, sugar cane, banana, pineapple, grapefruit, coconut, livestock and port services.

### 12.2.2.1 Economic activities of the Municipality of Tela

The main activities in the municipality of Tela are related to the primary sector of the economy, mainly oriented to agriculture and livestock activities characterized for involving traditional production systems none-technified. As for the secondary sector, there is no developed industry, except for food agroindustry such as dairy products for consumption in the municipality and sales within the region. Among the services (tertiary sector), the municipality has mainly companies engaged in commerce, transport and tourism.

42.9% of the working population in the municipality of Tela is engaged in "agriculture, forestry, hunting and fishing", followed by 16.3% dedicated to "wholesale and retail commerce, hotels and restaurants" and 12.1% works in other credit-commercial and lending activities "community, social and personal services". See Table 12.10:

**Table 12.10. Percentage of population by economic activity in Tela**

Branch or activity	% of population
<b>Agriculture, forestry, hunting and fishing</b>	42.9
<b>Wholesale and retail commerce, hotels and restaurants</b>	16.3
<b>Community, social and personal services</b>	12.1
<b>manufacturing</b>	9.9
<b>Construction</b>	6.9
<b>Non-specified activities</b>	6.4
<b>Transport, storage and communications</b>	3.0
<b>Finance, insurance, real estate and business services establishments</b>	2.3
<b>Electricity, gas and water</b>	0.2
<b>Mine and quarry exploitation</b>	0.1

Source: INEH, 2001 Census.

### 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 12.11. Water supply in the houses of the Municipalities**

Sources of Water	El Progreso		El Negrito	
	Cases	%	Cases	%
public or private system	24,429	83	5,065	76
	461	2	184	3



Wells with pumps		1,758	6	355	5	462	3
From watershed, river o stream		1,866	6	755	11	1,953	12
From lake or lagoon		35	0	9	0	16	0
From itinerant vendor or dealer		52	0	4	0	36	0
Other		884	3	265	4	380	2
<b>Total</b>		<b>29,485</b>	<b>100</b>	<b>6,637</b>	<b>100</b>	<b>15,766</b>	<b>100</b>
<b>NSA:</b>		<b>6,392</b>		<b>1,402</b>		<b>3,911</b>	

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

### **Municipality of El Progreso**

By 2007, 85% of homes in the municipality of El Progreso, had drinking water systems. As for the type of service was 69% was supplied from the public service, 23% of wells and the rest by another system.

In relation to hydrogeology, all Sula Valley area has highly productive aquifers, ensuring supply. Thus this kind of aquifers account for 70% of the municipality's territory, thanks to the presence of the Ulua River in its western limit.

### **Municipality of Tela**

According to a socio-economic study by Bermello, Ajamil & Partners, INC. Phase I Final Report: Study of Cruise Port and Master Plan for the Bay of Tela in October 2005, at the municipal level the coverage of drinking water is just 16.8%. In the urban area there is a greater than 90% coverage. The sources of supply for the city of Tela are La Esperanza, Piedras Gordas (Highland Creek) and Lancetilla rivers, who provide in 80% the water used by the city of Tela, in which the service is operated by the Municipal Water Division of Tela (DIMATELA). In the case of the Municipality of Tela, it has about 60% of the system of water supply, it is found in good condition and the other 40% is in poor condition and should be replaced.

The Bañaderos system that caters to New Tela, Tela low sector and the communities of San Juan and Tornabé, has a water treatment plant using chlorine, which operates in good condition. The Garifuna community of Triunfo de la Cruz, La Ensenada, San Juan, Tornabé, Barra Vieja and Miami, primarily use wells for the production of drinking water.

## **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. "

### **Municipality of Tela**

In the municipality of Tela has the old building belonging to the Tela Railroad Company, it has not yet been put into tourism value.

In general, settlements and urban nuclei of the Leán Valley Region date from the eighteenth century onwards, for which antique and representative edifications and vernacular architecture is identified and can be put in value as part of tourism in the municipalities and the department in general.

#### **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**

In the municipality of Tela lies an important part of the Garifuna population of the country. This ethnic group lives in Honduras since 1797; originating in the Caribbean island of St. Vincent in the Lesser Antilles, they were products of miscegenation between the Caribbean and Arawak natives and descendants of black slaves from Africa.

The Garifuna people in the municipality are in the communities of Tornabé, San Juan and Miami.

#### **12.4.3 Cultural interest sites**

In the city of Tela we find the Garifuna Museum, which presents an ethnographic exhibition of its cultural wealth.

### **12.5 Transportation**

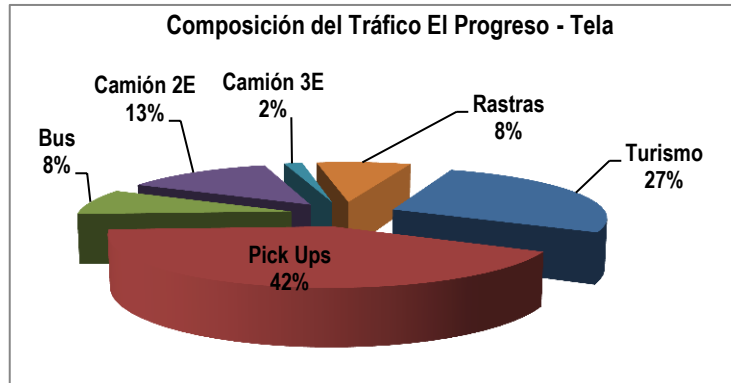
There are routes of urban and interurban transportation, intercity transportation with a good number of runs throughout the day. In addition there are transport routes at a regional level that connect El Progreso with the surrounding municipalities and major cities in the country. We find, the north-south 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.

### 12.5.1 Traffic

The composition of the current traffic on the tranche: El Progreso - Tela 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**

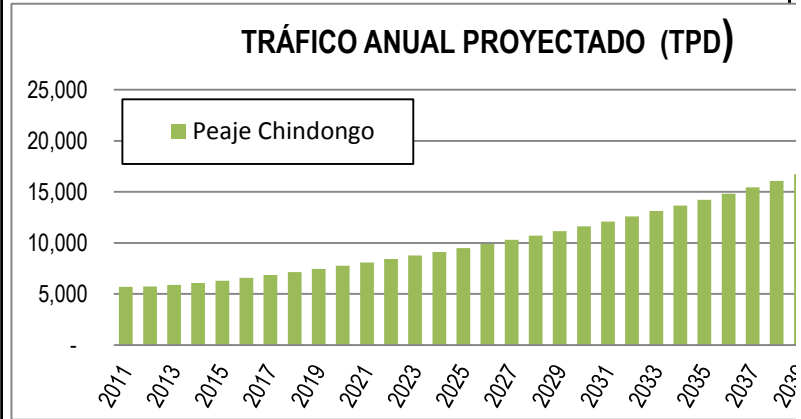


Source: Consultant, based on performed projections.

Yearly traffic (TPD) in the tranche El Progreso - Tela, is of 5,894 vehicles. Completing the construction of the Tourism Corridor Project: Tranche El Progreso - Tela, on 2016, we will have an annual traffic of about 6,592 vehicles.

After the construction, the annual increase in traffic will be along 3%, 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 12.12. Disposing of garbage in the area of socio-economic influence**

Waste Disposal	El Progreso		El Negrito	
	Cases	%	Cases	%
Street, river, creek, lake or sea	1,003	3	623	9.4

Is picked up by the garbage truck	13,411	45	78	1.2	4,401	28
IS taken to the deposit or container	199	1	17	0.2	172	1
Is burned or buried	13,505	46	5,676	85.5	9,849	62
Pays a particular person to dispose of it	1,161	4	88	1	157	1
Other	206	1	155	2	327	2
<b>Total</b>	<b>29,485</b>	100	<b>6,637</b>	100	<b>15,766</b>	100
<b>NSA:</b>	6,392		1,402		3,911	

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

As for the garbage disposal, we have that in the Municipality of El Progreso, at least 45% of the elimination of waste, is done by a garbage truck and in 46% of cases it is burned or buried . On the other hand in the municipality of El Negrilo, the highest percentage of households (85%) buries it and only 1.2% is collected by the garbage truck and in the Municipality of Tela, collection services and disposal of solid waste is provided by the Municipality with a coverage close to 90% only taking care of the principal municipality. In the Garifuna communities service collection and disposal of solid waste is carried out by private entities, either individually with basic equipment or by small businesses, however there still are many people who bury or burn their trash and do not use of private systems.

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

In the case of the municipality of El Progreso, they currently cover 100% of the urban area (3 routes) and 70% of rural areas. 8 units are used for collecting and compacting garbage and count with a claims management system for immediate response. See Figure 12.3:

**Figure 12.3. Garbage truck in the Municipality of El Progreso**



Source: LBG, Field work, April 2013.

In the municipality of Tela, solid waste generated within the urban zone is only collected and transported to the municipal dump of the municipality, through two subcontracted trucks.

### 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 Tela. Figure 12.4 presents the current conditions found in each of these sites.

**Figure 12.4. Waste disposal sites in the area of socio-economic influence**



*Controlled dump in El Progreso*

*Dump in the Municipality of Tela*

Source: LBG, Field work, April 2013.

## 12.7 Collection, treatment and disposal of wastewater

The table below shows what concerns the sanitary services in the municipalities of the area of influence:

**Table 12.13. Municipal sanitary service in the area of influence**

Sanitary Service	El Progreso		El Negrito	
	Cases	%	Cases	%
the sewage system	13,291	44	303	4
a septic tank	11,088	37	3,488	51
with river discharge, creek, lagoon,	462	2	7	0
	3,279	11	1,485	22
	1,942	6	1,517	22
	30,062	100	6,800	100
	23		5	

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

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. <sup>2</sup>

It is evident in the municipality of El Negrito, that 51% of occupied private homes, are connected to a septic tank. Otherwise only 4% of households are connected to the sewage system and 22% of households has a simple pit latrine or no toilet.

In relation to waste water management, in the municipality of Tela, the network coverage of the sanitary sewage system barely reaches 24.6%, the rest of the municipality, specially the Garifuna villages makes use of latrines. At the level of the municipal capital, Tela has a sewage system divided into two sections called Tela Nuevo and Tela Viejo. Tela Viejo sector has a network of sewage systems built in 1952 and has a coverage of 42%. The Tela Nuevo sector has a network of sewage systems built by the Tela Railroad Company and currently only covers about 46% of households in the sector.

### 12.8 Health

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

#### 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 12.14. Health installations in the Municipality of El Progreso**

Health Center	Attended population on 2007	Staff that provides assistance
---------------	-----------------------------	--------------------------------

<sup>2</sup> Multidimensional Integral Diagnosis, Municipal Development Plan, with a focus on territorial ordinance plan, El Progreso, Yoro

<b>CESAMO Carlos B. González</b> Location: El Progreso	78,847	physician, nurse, assistant nurse, psychologist, microbiologist,
<b>CESAMO y Clínica Materno Infantil</b> Location: El Progreso, Col. Berlín	43,325	Physician, nurse, assistant of the nurse
<b>CESAMO</b> Location: Urraco Pueblo	18,529	2 auxiliary nurses, 1 general physician, 2 assistants in environmental health, one fund raiser
<b>CESAMO</b> Location: Guaymitas	11,106	2 auxiliary nurses, 1 social service Doctor, 1 ss dentist ., 1 Environmental health technical(tsa), 1 watchman, 1 cleaning woman
<b>CESAMO</b> Location: La Mina	14,807	2 auxiliary nurses, one Cuban doctor, 1 environmental health technical (EHT), 1 pharmacy clerk, 1 watchman
<b>CESAMO</b> 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
<b>CESAR</b> 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.

#### **Municipality of El Negrito**

The municipality has 2 CESAMO in the urban area and 2 CESAR in rural areas. It also has a semi-private clinic located in the urban zone. The health service coverage is 60%.

#### **Municipality of Tela**

The table Below presents a summary of public health facilities presented in the Municipality of Tela:



**Table 12.15. Health facilities in the Municipality of Tela**

Municipality	Location	Health Unit
Tela	Tela	The areas Hospital
	Mezapa del Norte	CESAMO
	Paujiles	CESAMO
	Puerto Arturo	CESAR
	Rio Tinto	CESAR
	San Juan Tela	CESAR
	Triunfo de la Cruz	CESAMO
	Tornabé	CESAR
	VillaFranca	CESAR
	Buenos Aires	CESAR
	Cangelica	CESAR
	El Zapote	CESAR
	Melcher 6.5	CESAR
	Agua Chiquita	CESAR
	Las Minas	CESAR
4 de Enero	CESAR	

Source: Department of Health Atlántida District. 2009.

### 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 El Progreso, El Negrito and Tela**; 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.

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\_\_\_\_\_  
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 El Progreso - Tela** in the municipalities of **El Progreso, El Negrito and Tela**, is true at the time of the inspections. In witness whereof I sign this in the city de \_\_\_\_\_ on \_\_\_\_\_ of the year \_\_\_\_

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\_\_\_\_\_  
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	NA
	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 (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	Value per Component		
							a	b	c	d	e				
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>B. OPERATION STAGE</b>															
1.3 Water															
1.3.1 Consumption in public supply network	Water consumption does not exceed 50 m <sup>3</sup> /month.		Water consumption between 50 and 200 m <sup>3</sup> /month.		Water consumption greater than 200 m <sup>3</sup> /month.								0.00		
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	8.00	General Water Law
1.3.3 Consumption of underground source		Water consumption is no greater than 50 m <sup>3</sup> /day.	Water consumption between 50 y 200 m <sup>3</sup> /day.	Water consumption greater than 200 and less than 500 m <sup>3</sup> /day.	Water consumption greater than 500 m <sup>3</sup> /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 and less than 7,500,000 liters of fuel per year are consumed								0.00		
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	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 Glacis.
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 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					4.00		
												<b>A Consumptio</b>	<b>30.00</b>		

# 2. IMPACT ON THE BIOLOGICAL 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	Value per Component		
							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.	5			3				15.00		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	30.00	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.	5			3				15.00		Environment General Law
2.2.2 Aquatic flora			There will be some impacts (extraction, cutting, siltation, etc.)		There will be an impact on endangered species, indicators, CITES, endemic or with small populations.	3			3				9.00	39.00	Environment General Law
2.2.3 Wetlands					There will be impact.	5			3				15.00		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	9.00	
	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.						0.00		
	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		
											<b>SEI Biological environment</b>	<b>87.00</b>		

### 3. Physical Environment

A. Construction Stage															
Component/ subcomponent	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	y	Regulatory Framework (z)					X = y * z	Valuation by component		
	(Value = 1)	(Value = 2)	(Value = 3)	(Value = 4)	(Value = 5)		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 by 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 it 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 <sup>2</sup> of waterproof area	More than 7,500 to 15,000 m <sup>2</sup> of waterproof area	More than 15,000 to 30,000 m <sup>2</sup> of waterproof area	More than 30,000 m <sup>2</sup> of waterproof area.	5					3	15.00	15.00	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	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 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	6.00	Health Code



3.3 Soil	3.3.1 Reactions solids	3.3.1.1 Specials	Disposed in cell of confinement in controlled landfills or use means of sterilization 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		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	26.00	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	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 it 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 carrying it outside the AP up to volumes of 1,000 m <sup>3</sup> are foreseen.	Soil movements and carrying it outside the AP up to volumes of 10,000 m <sup>3</sup> are foreseen	Soil movements and carrying it outside the AP up to volumes greater to 10,000 m <sup>3</sup> 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.		Air pollution will be generated, but it is not 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.		There is generation of noise or vibrations and it exceeds the limit of the applicable regulation and/or could not 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 <sup>3</sup> and less than 3,785 m <sup>3</sup> per day or, industrial sewage, agro-industrial, agricultural and aquaculture		3					1	3.00	7.00	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	Unload wastewater to receiving body, without complying with the regulations					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.		A density greater than 200 occupants per hectare are expected.							0.00	0.00	
											Physical Environme	190.00		

## 4. SOCIAL ENVIRONMENT

### A. CONSTRUCTION STAGE

Component/subcomponent	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	y	Legal Framework ( Z )					X= z * y	Valuation per component		
	(Value = 1)	(Value = 2)	(Value = 3)	(Value = 4)	(Value = 5)		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 an 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 Validad	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							0.00		
	4.9.2 Solid wastes			The RW collection system has no ability to provide total service to the project.		5				2		10.00	10.00	Regulations for the Integral Management of Solid Waste
	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.		3				2		6.00		
	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	27.00	Health Code Regulations
	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		
	4.11.2 Forest				The project will decrease the availability of forests for energy purposes in the community.							0.00	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	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						
5.1. 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			General Regulations for Prevention of Accidents at Work and Occupational Diseases
	5.1.5 Handling of risky biological material					Yes there is consumption, handling, transport or storage of hazardous biological material								0.00			
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		Ley de SINAGER	
	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		Ley de SINAGER	
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					2		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
											<b>SEI Risk</b>	<b>101.00</b>			

## 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.			
<b>1. SEI preliminary value, i.e. the sum of all the SEI values of each evaluated mean (<math>\Sigma</math>)</b>			<b>524</b>
<b>2. According to the regulations applicable to the operation of the activity, work or project (p)</b>			
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)	<b>1</b>
<b>3. Value of SEI adjusted by regulations (SEI<sub>R</sub>) =</b>			<b>524</b>
<b>4. Classification of the area according to the location of the project area (<math>\beta</math>)</b>			
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)	<b>1.5</b>
<b>5. Final score of the SEI:</b>			<b>786</b>
<b>6. Classification on the basis of the final score and that establishes the procedure of the SINEIA, according to the decision path.</b>			
Type	Grade	Final Category	Procedure
<b>Moderate</b>	Less or equal to 850	<b>2</b>	Guide for good environmental practices or in its defect the over view of the Environmental Management Plan
<b>High</b>	Greater than 850 and less or equal to 2,800.	<b>3</b>	Environmental Management Plan using an established structure in the terms of reference indicated by the SINEIA scheme of the Evaluating and Environmental Manual.
<b>Very High</b>	Greater than 2,800	<b>4</b>	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 El Progreso - Tela 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:

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

The Financial Institutions signatory of the Equator Principles (EPFIs, for its acronym in English) financed projects only when they meet the following requirements <sup>3</sup>:

**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

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<sup>3</sup> 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.



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 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 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, not withstanding 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 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).

#### **2.2.1.8 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.

### 2.2.1.9 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 sanitarly, 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. 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 sanitarly - 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.

### **2.2.2.4 Zoning Regulations and Land use in the Municipality of El Progreso**

Article 5 -. Definition. The zonification of the City of El Progreso, is defined as a basic tool to establish the mechanisms of occupation and land use, its regulations, its restrictions and easements that correspond to the orderly and sustainable development of the community. Zonification involves the division of the territory of the city of El Progreso into "ZONES", each for different land uses. Properly applied zoning promotes the following benefits:

- a. Uses land for the most appropriate and beneficial purposes.
- b. Protects and maintains the values of the land.
- c. Promotes public health and safety.
- d. Protect the environment.
- e. Sort, controls and manages traffic and vehicular circulation.
- f. Controls housing and construction densities.
- g. Encourages and promotes housing for a variety of lifestyles and economic and social levels.
- h. Monitors and promotes urban aesthetics.
- i. Promotes and provides a more orderly growth and development.
- j. Helps to attract investment.
- k. Promotes the wise use of public services.

**Article 6.** Definition of ZONE. It is the area corresponding to each of Sections defined in territorial Zoning Map of the city, for which specific rules govern aimed at regulating the use categories for the intended land, the characteristics of buildings to preserve the aesthetic and unity of the population context, urban indexes of buildings and to seek a balance in population densities for the benefit of the community.

**Article 14.-** Of Multiple Use Zones (MZ). The Zones of Multiple use, are also hereinafter called Mixed Use Zones and are characterized by its focus towards the development of industrial, commercial and service activities in medium or large scale, displacing previous land uses which by their characteristics and new demand tend to be displaced.

Multiple Use Zones (MUZ), are classified in: Multiple Use Zones 1, (MUZ -1) and Multiple Use Zones 2, (MUZ -2)

Multiple Use Zones 1 (MUZ-1), is characterized by the presence of Institutional Services Uses for ISU-2; the uses for Intermediate Facilities of Transport Services (UST-2), there is little presence of residential use.

Multiple Use Zones 2 (MUZ-2) is characterized by the presence of commercial uses 3 (CU-3), Transport Services people (UST-1), Application for Freight Terminals (UST -3). Industrial Application 1 (UI-1) and UI-2 without specific predominance. No residential presence. These zones are bounded by the parallel major road in which it is located.

Article 43 -. Natural Areas of Preservation (NAP). They are characterized by concentrating the main natural resources essential for the life and preservation of adequate ecological and environmental conditions of the city -. They are areas that require special treatments and manipulations for its best use, for its preservation or for improvement under lines and unique parameters.

These special zones are established to ensure that the municipality will have areas of natural forest reserve, water sources, landscapes, sites of special importance for citizenship.

These zones are defined in the General Zoning Map and shall be governed by special regulations managed by the Environmental Management Units (DEMA) by itself or in partnership with other institutions or individuals

However, if a zone or area of interest was not defined in the Zoning Map, the Honorable municipal corporation, at any time can make a specific declaration, indicating the motivations and goals of this new area of Natural Preservation.

Article 44.- Of the classification of Natural Preservation Zones (NPZ). These zones are classified in:

- Natural Preservation Zone 1 (NPZ-1): Aquifer.
- Natural Preservation Zone 2 (NPZ 2) "Biological Reserve Mico Quemado"
- Natural Preservation Zone 3 (NPZ 3) Production of Water Catchments
- Natural Preservation Zone 4 (NPZ 4) in the Buffer Zone (Eastern) right pit of the River Ulua
- Natural Areas Preservation 5 (NPZ 5): Forest Protection Areas.

**Article 45.-** Natural Preservation Zone 1 (NPZ 1). Corresponds to highly productive aquifers corresponding to the city of El Progreso, declared and defined by the municipality.

It is essential to make the demarcation of sites that will be left as producers of water for the future of the city, making the corresponding "Declaration of Public Interest" and prepare the corresponding Management Plan for each area accordingly.

**Article 50.-** Environmental Licensing. All interventions carried out in zones of Natural Preservation (NPZ) require the Environmental Licensing under the law before the competent municipal authority may authorize the appropriate municipal permits. Each Natural Preservation Zone must have a management plan, particularized and corresponds to the Municipal Environmental Department (DEMA) compliance with the laws in each case.

**Article 213.-** Obligation to Request Authorization. Prior to the planning and execution of a public Works project within the municipal area to be carried out by any state institution even if decentralized, they need approval of the Mayor if the project is a Plan Community Development and Municipality set. If it is not aligned with the Development Plan of the city of El Progreso, it will require approval of the Honorable municipal corporation.

### 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

Which has by objective to regulate the operations of solid waste management in order to avoid risks to health and the environment. National implementation and will be mandatory for municipalities, public service users collection or other public or private entities that are responsible for the operations of solid waste management and officials required to give judgments in this field .

**Article 11:** The users of the ordinary collection service will have the following responsibilities regarding the storage of waste:



- a) Will not deposit in common receptacles used for garbage collection any liquid substances, sewage, garbage or pathogenic, toxic, combustible, flammable, explosive, volatile, radioactive, packages or containers of chemicals of any nature and their packaging or containers .
- b) Place the containers in the collection site, in accordance with the schedule established by the Municipality.
- c) The sites will be designed to facilitate the separation and recovery of materials with recyclable potential.

Article 14: The containers for the temporary storage of waste shall meet the following minimum requirements:

- a) Be properly located and covered
- b) Have adequate capacity to store the volume of solid waste generated.
- c) Be constructed with waterproof materials and the strength necessary for the purpose for which they are intended.
- d) Have adequate maintenance; and
- e) Have identification on the use and types of waste.

Article 20: Where by nature, location, or volume of the waste produced, the municipality is not required to execute the collection thereof, such obligation will fall on the natural or legal person producing waste and also its transport to the disposal site, prior to the approval of the Municipality.

**Article 54:** The storage of solid waste with special features, must be carried in different containers than those intended for the regular service they shall be clearly identified and must observe in them special measures of sanitary and safety character in order to protect human health and the environment.

#### **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 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
<b>Extraction of Non-Renewable Resources</b>	<b>40-48</b>	<ul style="list-style-type: none"> <li>- Fee for extraction of renewable and nonrenewable natural resources. Hunting of aquatic species up to 200 meters deep.</li> <li>- Request for records at the Municipal Environmental Unit.</li> <li>- Presentation of plan for closing usage areas.</li> <li>- Permit for domestic usage of non-metallic mining.</li> <li>- Requirement for Environmental License.</li> </ul>
<b>Solid Wastes</b>	<b>54, 109-117</b>	<ul style="list-style-type: none"> <li>- Cleaning, collection and disposal of solid waste.</li> <li>- Service charge rates.</li> <li>- 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.</li> <li>- 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.</li> <li>- - 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</li> <li>- The accumulation of tires or any container with features that can generate vector proliferation is prohibited</li> </ul>
<b>Wastewater</b>	<b>55, 118-119</b>	<ul style="list-style-type: none"> <li>- Operation and maintenance of the sanitary sewage system.</li> <li>- 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.</li> <li>- 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</li> </ul>
<b>Extraction of Water for Industrial and Commercial Use</b>		<ul style="list-style-type: none"> <li>-Rate charge for use of the resource.</li> <li>- Permit or License of Resource Utilization To the Municipality.</li> <li>- Penalties.</li> </ul>
<b>Environmental Services</b>	<b>75-77</b>	<ul style="list-style-type: none"> <li>- Implementation of regulatory framework to guide and allow direct control and sustainable use of natural resources.</li> <li>- The municipality is responsible to preserve and protect the</li> </ul>

Environmental Aspects	Articles	Observations
		ecological balance and environmental protection.
<b>Forests and green areas.</b>	<b>78-90</b>	<ul style="list-style-type: none"> <li>- Prohibition of cutting trees.</li> <li>- The rate of pay for cutting trees.</li> <li>- Forest fires are prohibited.</li> <li>- Prohibition of logging.</li> <li>- Permission request to cut trees.</li> <li>- Penalties.</li> </ul>
<b>Water for human consumption and pollution of water bodies.</b>	<b>91-97</b>	<ul style="list-style-type: none"> <li>- Prohibition on the following activities:               <ul style="list-style-type: none"> <li>a) Installation of human settlements.</li> <li>b) Discharge of raw sewage on bodies of water.</li> </ul> </li> <li>- The discharge of treated wastewater will only be permitted by the Municipal Environmental Unit.</li> <li>- Any operator of the water supply for human consumption should be sticking to the technical standard for consumption of drinking water.</li> <li>- Application for permit for drilling.</li> </ul>
<b>Environmental Sanitation</b>	<b>98-102</b>	<ul style="list-style-type: none"> <li>-All excreta, sewage, wastewater and storm water must be connected properly.</li> <li>- All buildings must be connected to the system</li> </ul>
<b>Regulation of Latrines</b>	<b>106-108</b>	<ul style="list-style-type: none"> <li>- Installation of latrines in places where coverage of sewage systems exists is prohibited or within 250 meters with respect to a water birth and 150 meters on both sides of a permanent water course or lagoons.</li> <li>- Penalties.</li> </ul>
<b>Control of visual, sonic and radioactive contamination.</b>	<b>120-127</b>	<ul style="list-style-type: none"> <li>- It is strictly forbidden to exceed the noise levels or maximum sound allowed, which will be established according to zones and schedules.</li> </ul>

SOURCE: OWN COMPILATION

#### 2.2.4.2 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

Environmental Aspect	Articles	Observations
		filling
Environmental permits	78-80	<p>Permissions, registrations, authorizations, judgments and environmental records. Here are some collections that are made:</p> <ul style="list-style-type: none"> <li>- Inspection and preparation of records.</li> <li>-Permission to use coconut.</li> <li>- Registry of chainsaws.</li> <li>- Permission for cutting, grading and filling of urban and rural land areas.</li> <li>- Environmental Inspection of projects that have an environmental license in any category.</li> </ul>
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	<ul style="list-style-type: none"> <li>-Contamination of drinking water for human consumption.</li> <li>-Contamination of inland and marine waters.</li> <li>- Damage to the forest to nearby water sources.</li> <li>- Cuts of trees, damage to green areas and forests.</li> <li>- Use of land resources.</li> <li>- Air pollution.</li> <li>- Visual pollution.</li> <li>- Sonic pollution.</li> <li>- Penalties and fines.</li> </ul>
Discharges to the public sanitary sewage system.	178-183	<ul style="list-style-type: none"> <li>- Prohibitions on discharges to the sanitation sewage system.</li> <li>- Prohibitions on construction of latrines or septic tanks where the sanitary sewage system exists.</li> <li>- Fines and penalties.</li> <li>- Prohibited on connections of discharge of wastewater and any liquids and/or solid wastes to the storm water network system.</li> </ul>
Solid waste pollution.	184-188	Prohibition and penalties of dumpster in unauthorized sites.
Other Environmental Violations.	189	<p>Imposition of penalty for the following activities:</p> <ul style="list-style-type: none"> <li>- Performing unauthorized fillings in environmental susceptible areas, wetlands, natural water courses, winter streams etc.).</li> <li>- Implementation of activities in protected areas.</li> <li>- Prohibition of beach activities.</li> <li>-Prohibition of construction.</li> <li>- Penalties and fines.</li> </ul>
Control and Monitoring of Mitigation Measures Contracts.	190-192	<ul style="list-style-type: none"> <li>- 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 &amp; Environment Secretariat (hereinafter called SERNA).</li> <li>- Penalties and fines.</li> </ul>

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

Environmental Aspect applied to the design, construction and rehabilitation of road projects	Numeral	Observations
Environmental considerations and criteria for typical activities in construction projects, rehabilitation and maintenance	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
	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 m<sup>2</sup>**

The total project area is 2,750,000 m<sup>2</sup>. Within this area, 40 meters of the existing road easements are included, two areas for location of camps - 5,000 m<sup>2</sup> (0.5 ha) each totaling 10,000 m<sup>2</sup>, throughout the length of the alignment El Progreso - Tela, 68.5 km.

##### **Net area of the project (Apn) in m<sup>2</sup>**

The net area of the project (Apn) is 2,750,000 m<sup>2</sup>. Within this area 40 meters of existing road easements are included, two areas for location of camps of approximately 10,000 m<sup>2</sup> (0.5 ha each), throughout the length of the tranche El Progreso - Tela, which are 68.5 km.

##### **Total area to build in m<sup>2</sup>**

The construction area will be 1,575,500 m<sup>2</sup>. This area is defined taking as reference a typical average section of 23 meters by the longitude of the tranche El Progreso - Tela, 68.5 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). Also included in this area, the area of the new construction of the bypass in the City of El Progreso, with a length of 5.9 km.

##### **Area of influence of the project**

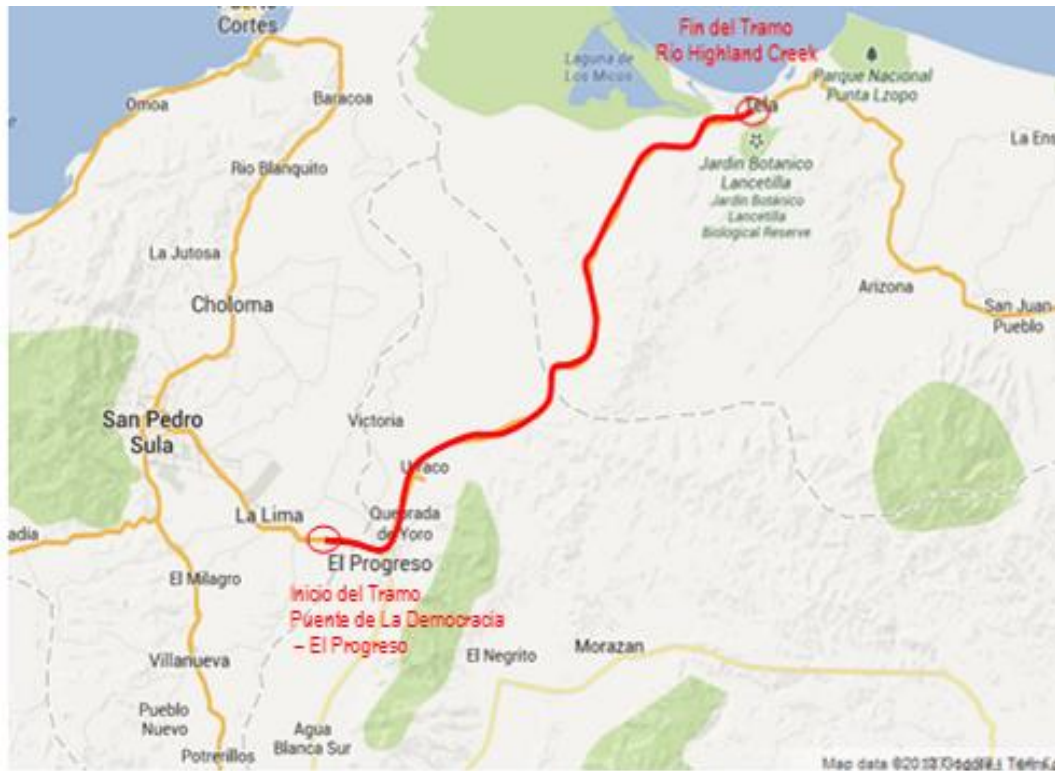
In the Environmental Evaluation and Control Guidebook – by SERNA 2009, the area of influence of the project is considered as: The project environment that is located outside the overall area of the project and extends from its boundaries to a distance of 500 meters.

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**

The Tourism Corridor El Progreso - Tela, is part of the CA-13 route from the main road network in the country and is a segment of the routes of the Central American Integration. The CA-13 route is developed through the coastal plain parallel to the Caribbean Sea or West Indies of the Honduran territory. The Geographical location of the project is shown in the map, with its starting point in Bridge La Democracia, in the Municipality of El Progreso, then passing its alignment by the Municipality of El Negrito and ending in the town of Tela, on the bridge over Highland Creek River. This route has a length of 68.5 km and includes a bypass in the city of El Progreso.

**Figure 3.1. Geographic Location of the Project**



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

### 3.1.2 Administrative location

The tranche El Progreso - Tela, is located in the departments of Yoro and Atlántida, connecting the municipalities of El Progreso, El Negrito and Tela.

### 3.2 Components of the project and its phases

The project involves the construction of a new two-lane roadway parallel to the existing two lane carriageway, with a length of 68.5 km, divided into four tranches, which are described below:

#### **(SECTION I: El Progreso-Chindongo, approximate length of 12.0 km**

This section initiates on abutment No.2 of La Democracia Bridge over Ulu River, it is on this site where the initiation of the project is established on station 0+000. From this point and with a SE orientation and on station 0+500 we arrive to the interception of that road with the Boulevard that from this city leads to the city of Santa Rita. From this interception and with an approximate orientation of N75°W, practically at 90° with the start line, it continues in a length of approximately 700 meters, up to station 1+200, which is the site where the bypass initiates, in the city of El Progreso. The bypass will be developed at the left of the existing road and besides of bypassing the previously mentioned city, the community of Quebrada Seca will also be bypassed, right by the mall. This tranche of the bypass has an approximate length of 5.9 km and initiated in Barrio San Miguel and ends 200 meters after the bridge over Camalote Creek.



## **SECTION II: Chindongo – El Aguacate, approximate length of 18.1 km**

This section initiates at the Chindongo Stream and ends in the community of El Aguacate, through communities Guaymitas, Las Delicias and Toyos. On this tranche the horizontal alignment develops quite long tangents and extremely smooth curves, up to the height of the bridge over the Guaymón River, where the community of Las Delicias starts. It goes from the community of Las Delicias and immediately reaches the community of Toyos. Throughout this tranche the topography changes from flat to slightly wavy, so the tranches present horizontal more sinuous and oblique curves with slightly higher slopes.

## **SECTION III: El Aguacate – La Mulera, approximate length of 21.5 km**

This section begins in the community hereinafter called El Aguacate, passing along its 21.5 km through several communities whose size or being housed at the edge of the existing road will makes them very important communities such as: Las Metalias, Cooperativa Lempira, Paujiles, Los Planes, Santiago, Zoilabé up to the community of La Mulera, in the vicinity of the bridge over Rio San Alejo River, which is precisely where Section III ends

## **SECTION IV: La Mulera – Tela. Approximate length 16.5 km**

### **Section IV: La Mulera – Tela. Approximate length of 16.5 km**

From the bridge over San Alejo River, Section IV continues to develop with a NW predominant orientation, through a series of communities allocated at the sides of the existing road, among these we could mention: San Alejo, located one kilometer to the left side of road, Cooperativa San Martin, La Montañita, Los Cerritos, Cooperativa Quebrada de Arena, Cooperativa Flores del Guano, Buena Vista, the urban zone of Tela, until just before Highland Creek Bridge on km 68.1 approximately, site where the end of the project is located.

On arrival to the community of Tela, near Jardin Botanico de Lancetilla, there is on both sides of the road a very lush vegetation, which is important to preserve, reason for which typical sections have been designed to reduce the dimensions of the lanes and the construction of protective walls as a mitigation measure against the impact that construction sites could cause to these conservation species

The activities to be performed in each of the phases of the project are described below:

### **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).
- 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.

- 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 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 UNDERTAKINGS**

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.

Two areas to allocate temporary facilities are proposed, one of these is presented below under Figure 8.7 and is only expected to occupy an area of approximately 0.5 ha at each site.

- **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.
- **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 3.1. List of surface water bodies**

Name	Location	Name	Location
Camalote River	5+600	Metalias 2 River	33+300
El Porvenir River	7+900	Pajuiles River	35+500
Agua Blanca River	9+820	Mezapa River	36+200
Chindongo River	11+300	Santiago River	41+400
Toyos River	17+370	Zoilabe River	45+700

Name	Location	Name	Location
Guaymitas River	17+700	San Alejo River	49+150
Guaymon River	22+600	La Hulera River	51+200
Congo River	25+950	La Fragosa River	56+700
Chirichil River	26+400	El Junco River	58+600
Potrillo River	31+000	La Esperanza River	61+000
Metalias 1 River	33+000	Highland Creek River	68+600

Source: The Concessionaire

- 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 (10) 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**

N°	Location	Verified Use	Pit Capacity	Owner	Observations
1	1.0 km after Highland Creek, on Greensong Memorial Cemetery, right side of the road from Tela-Ceiba road, 200 meters along the way. Coordinates UTM (454908; 1745268)	<ul style="list-style-type: none"> <li>• Dirt road</li> <li>• Sub-base</li> </ul>	Enough	Mr. Mario Fuentes; Exploited by M & M, you can talk to Luis Mayorga and Mario Rivas; Tel 448 32 433	For its exploitation we must cross the cemetery. Strong sandy soils with little plasticity, yellowish brown. Investigate hardness using the Los Angeles method. Fig 4.2
2	A 0.75 km after Highland Creek, on the right side of the Tela-Ceiba road, 250 m. coordinates UTM (454588; 1745083)	<ul style="list-style-type: none"> <li>• Dirt road</li> <li>• Sub-base</li> </ul>	Enough	Mr. Rubén Flores;	Strong sandy soils with little plasticity, yellowish brown. Best exploitative conditions are appreciated. Investigate hardness using the Los Angeles method. Fig 4.3
3	A 0.50 km after Highland Creek, on the right side of the Tela-Ceiba road, 200 meters along the way. coordinates UTM (454042; 1744899) La Fortuna Ranch	<ul style="list-style-type: none"> <li>• Dirt road</li> <li>• Sub-base</li> </ul>	Enough	Unknown	Strong sandy soils with little plasticity, yellowish brown. Investigate hardness using the Los Angeles method. In these three pits materials present the same characteristics. Fig 4.4
4	La Citranela Pit, Citranela Village , San Alejo Sector, 2.1 km from the turnoff to the community of San Alejo, at the right side of the center line of the road of El Progreso-Tela, 15 km from the city of Tela. The pit is in the bed of San Alejo River. Coordinates UTM (438689; 1735748)	<ul style="list-style-type: none"> <li>• Gravel for concrete</li> <li>• Sand for concrete</li> <li>• Crushed base</li> <li>• Filler</li> <li>• Stone embankments</li> <li>• drainage beds</li> </ul>	Enough	Cooperativa Mixta Teleña Limitada, COMTEL. Representative: Mr. Marco Obdulio Carranza. Tel: 98 76 95 65; 33 98 22 89 The Cooperativa (credit union) has a Concession for its exploitation.	The pit is in the river, upstream. materials are boulders, basalt, very resistant, gray color. Upstream we find thicker materials. By crushing and screening we obtain the required different materials. The Concession currently has authorized by DEFOMIN. Fig 4.6
5	El Naranja pit in the community of El Naranja, on the road that leads to Mezapa, 1.8 km on the left of the road to El Progreso – Tela, Coordinates UTM (429659; 1721084)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Sr. Eduardo... Representative of the owner: Sr. Amadeo Galdámez Tel: 32 11 65 90	Yellowish-brown material, very fine and very plastic, but possibly with a CBR> 10, possibly required to be stabilized with lime, clay loam material. Fig 4.8

N°	Location	Verified Use	Pit Capacity	Owner	Observations
6	El Naranjo Pit, in the community of El Naranjo, on the road leading to Mezapa, 2.7 km off The left side of the road to El Progreso - Tela, besides “Licores Hernández”, Coordinates UTM (429281; 1721789)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Ms. Martha Lazo Tel: 98 47 90 80	Yellowish-brown material, very fine and possibly plastic, but with a CBR> 10, possibly required to be stabilized with lime, sand-silt-clay material. Fig 4.8
7	Guaymón River Pit, on both sides of the bridge, the bridge is located in station 22+000, Coordinates UTM (428459; 1715832)	<ul style="list-style-type: none"> <li>• Gravel for concrete</li> <li>• Sand for concrete</li> <li>• Crushed base</li> <li>• Filler</li> <li>• Stone embankments</li> <li>• drainage beds</li> <li>•</li> </ul>	Enough	Concession Granted under concession to Transportes Juárez	The pit is in the river, upstream the materials are boulders, basalt, very resistant, gray color. Upstream the materials are thicker. By crushing and screening we can be obtain other required materials. Fig 4.9
8	Machi quarry, located 2.5 km. On the right side of the road to El Progreso – Tela, the entrance is located besides the PEPSI CORESA distribution center front of the telecommunications center. Coordinates UTM (416720; 1706278)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Owner: Oscar Hawit Contact: Ing. Jerson Mendoza cel. 94744685	Yellowish-brown material, with high quartz content and possibly plastic sheet but with a CBR> 10, possibly required to be stabilized with lime, sand-silt clay materials. It was used in the filling of Megaplaza Mall. Fig 4.11
9	El Salto Pit, located in the south-east side of El Progreso, the entrance is located by the Hospital Materno Infantil of El Progreso, Coordinates UTM (415798; 1701677)	<ul style="list-style-type: none"> <li>• Dirt roads</li> </ul>	Enough	Owner: Carlos Kattan cel. 96600368 Office: 26171010	Grayish material, coarse granular, with some clay content, it was used in the filling of the Technological University of Honduras (UTH). Fig 4.12
10	Dirt road cut near Portion No. 2 on Guaymon Bridge	<ul style="list-style-type: none"> <li>• Dirt Road</li> </ul>	70,000 m <sup>3</sup>	Owner: Government of Honduras, it is found in the new road passage.	Sandy silt and clayey silt materials, with relatively low plasticity index of 6.31

Source: The Concessionaire

**Figure 3.2. material pit 01, at 1.0 km after Highland Creek, in Greensong Memorial**



Source: LB, field work, April 2013

**Figure 3.3. material pit 02, at 0.75 km after Highland Creek- Rubén Flores**



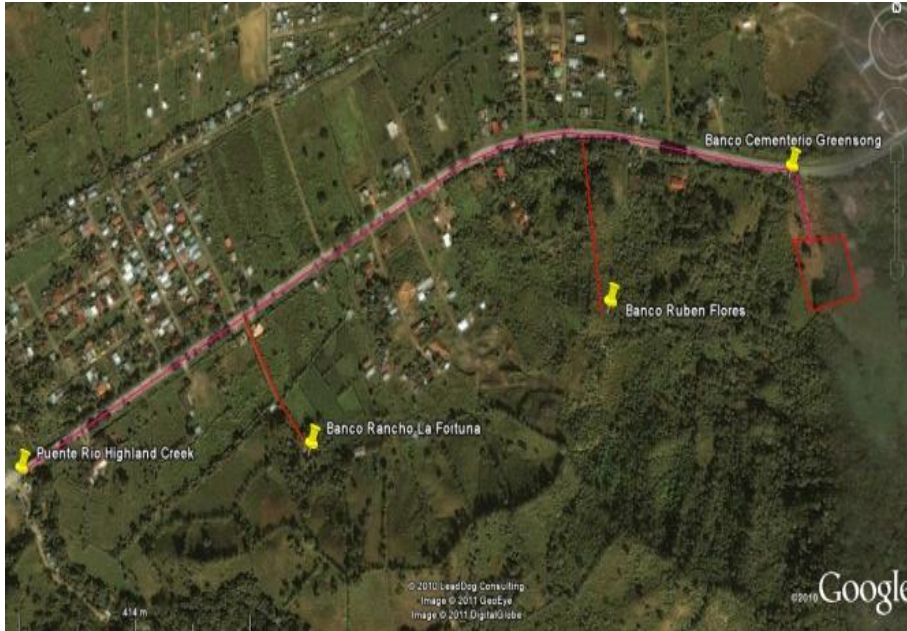
Source: LB, field work, April 2013

**Figure 3.4. material pit 03, La Fortuna Ranch**



Source: LB, field work, April 2013

**Figure 3.5. Location of borrow pit 1, 2 and 3**



Source: Google Earth

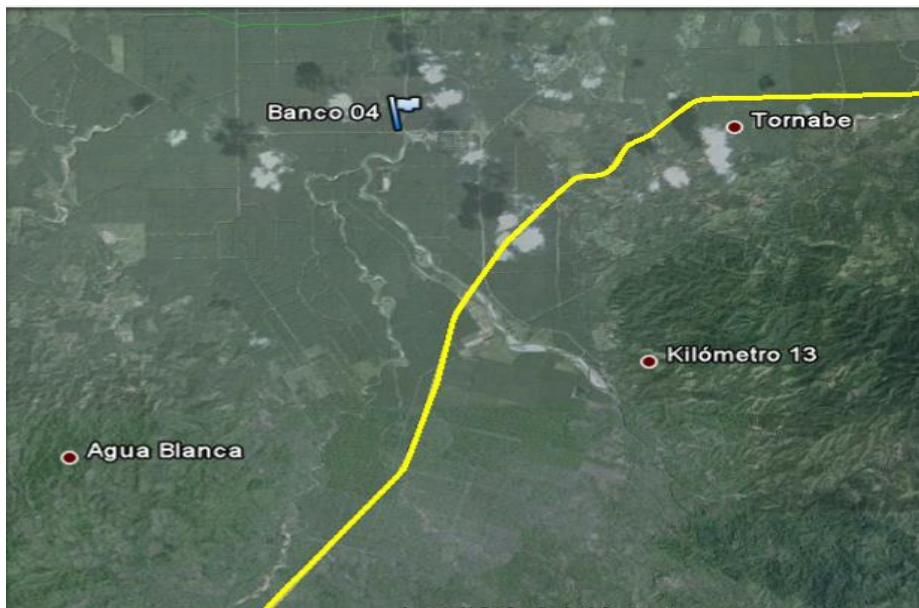


**Figure 3.6. Pit 04, La Citranela in San Alejo River**



Source: LB, field work, April 2013

**Figure 3.7. Location of material pit 04, in San Alejo River**



Source: Google Earth

**Figure 3.8. material pit 05 and 06, in El Naranjo**



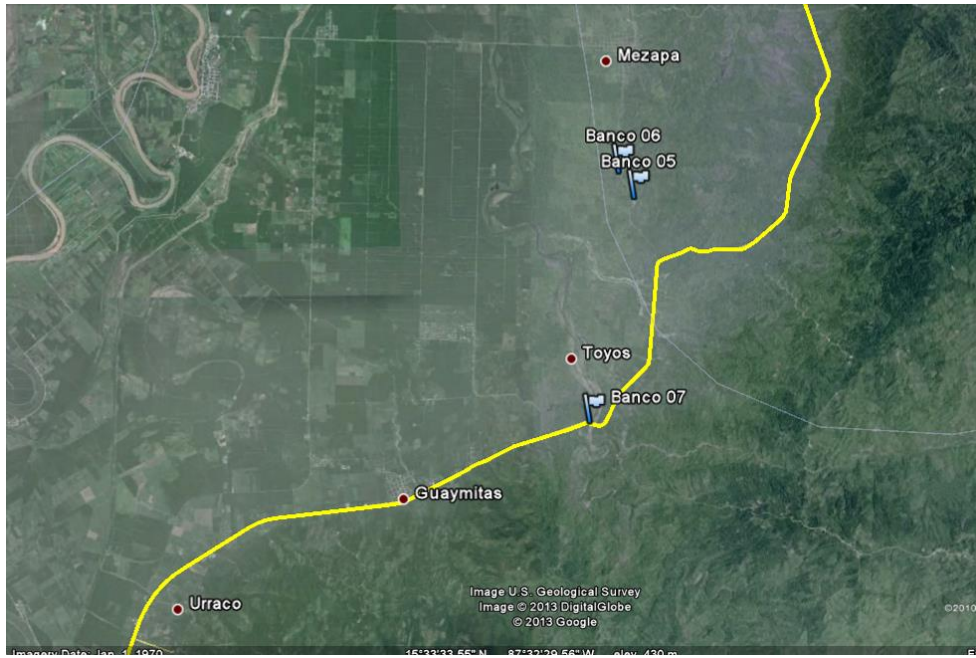
Source: LB, field work, April 2013

**Figure 3.9. material pit 07, Guaymón River**



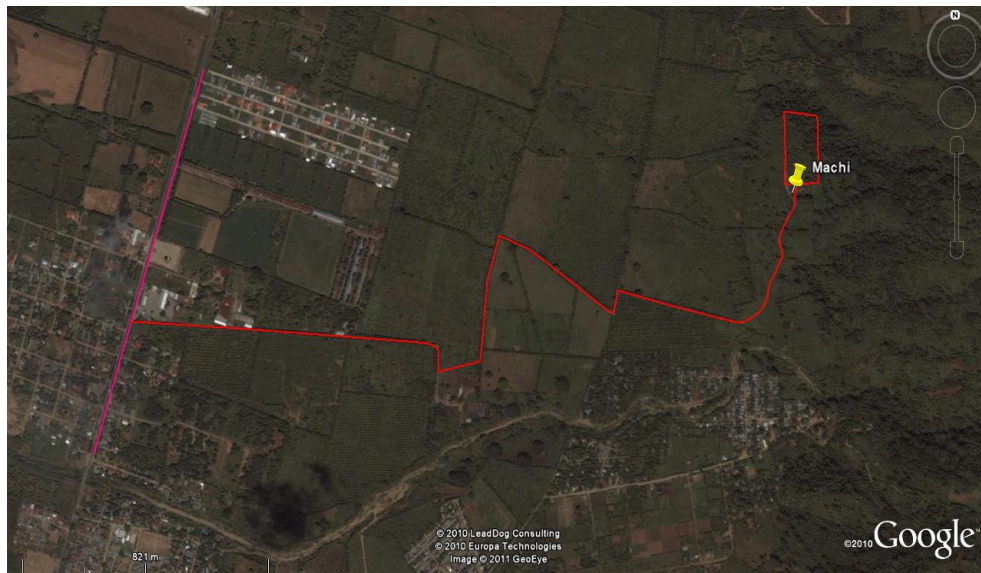
Source: LB, field work, April 2013

**Figure 3.10. Location of borrow pits 5, 6 and 7**



Source: Google Earth

**Figure 3.11. material pit 8, Machi**



Source: Google Earth



- **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.
- **Exploitation 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. The bridges and boxes to be built are listed below:

**Table 3.3. List of bridges to build**

N°	Name	N°	Name
1	Bridge Bypass El Progreso	12	Bridge Pajuiles (La Montañita)
2	Bridge Caracol	13	Bridge Mezapa
3	Bridge Seca	14	Bridge Santiago
4	Bridge Camalote	15	Bridge Zoilabé
5	Bridge Agua Blanca Norte	16	Bridge San Alejo
6	Bridge Chindongo	17	Bridge La Mulera
7	Bridge Guaymitas	18	Bridge La Fragosa
8	Bridge Guaymón	19	Bridge El Junco

9	Bridge Las Metalias I	20	Bridge La Esperanza
10	Bridge Mayorquin o Chirimil	21	Bridge Lancetilla
11	Bridge Toyós	22	Bridge HighLand Creek

Source: Design & Environmental Studies of the Tourism Corridor: El Progreso – Tela, in the departments of Yoro and Atlántida

**Table 4.4. List of boxes to be designed**

N°	Name	N°	Name
1	Double box over La Cuarenta N° 1 Stream	15	Single box over El Portillo River
2	Double box over La Cuarenta N° 2 Stream	16	Double box over Las Metalias Stream
3	Double box over La Colorada Stream	17	Double box over Pajuales Stream
4	Double box over Los Jutes Stream	18	Single box over La Roca Stream
5	Double box over El Zorrillo Stream	19	Double box over Las Metalias N°3 Stream
6	Double box over Las Delicias Stream	20	Single box over La Amargosa Stream
7	Double box over El Sapo Stream	21	Triple box over Santiago N°1 Stream
8	Single box over San Jerónimo Stream	22	Double box over Buenos Aires Stream
9	Triple box over Las Nuñez or Yoro Stream	23	Double box over Nameless
10	Single box over Maquila El Porvenir Stream	24	Quadruple box Nameless
11	Single box over Las Lichas Stream	25	Double box Nameless
12	Double box over Las Flores Stream	26	Single box Nameless
13	Quintuple box over Congo River	27	Single box Nameless
14	Triple box over La Galana Stream	28	Two boxes

Source: Design & Environmental Studies of the Tourism Corridor: El Progreso – Tela in the departments of Yoro and Atlántida

- **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 injures 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 m<sup>2</sup>.

### **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.

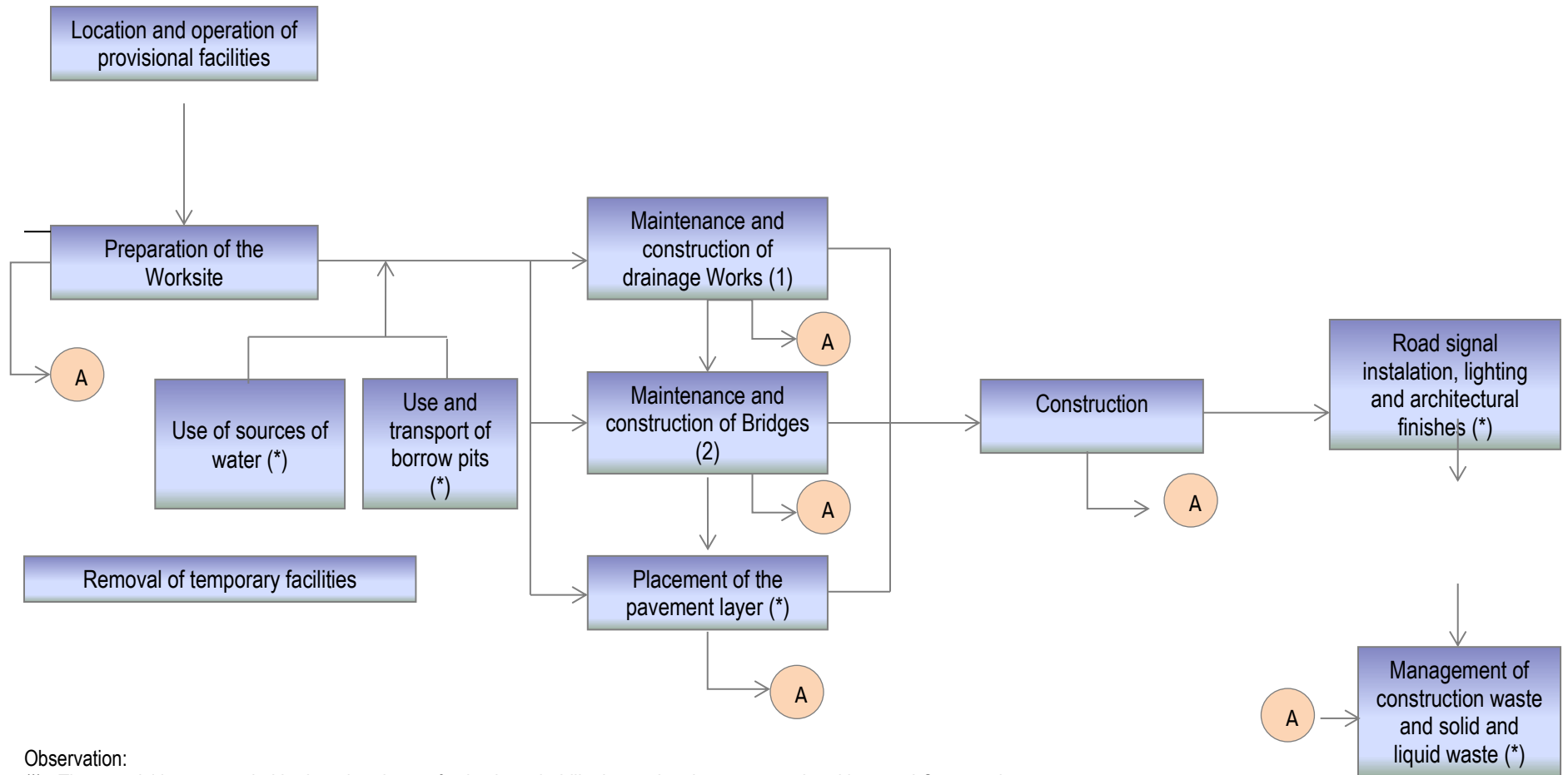
All sites intervened by the Concessionaire shall be thoroughly cleaned upon leaving each one of them.

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 3.13. 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 68.5 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 3.5 Equipment list – Construction Phase**

Phase	Activity	Machinery and Equipment
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 3.6. 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 3.7, 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 3.7. 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

Table 3.8, 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 3.8. 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 3.9, shows a general characterization of the waste that will be deposited directly into these authorized dumps:

**Table 3.9. General Characterization of non-toxic waste to be disposed in authorized landfills**

Non-toxic solids
Scrap wood
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
<b>1</b>	<b>Aquatic (water)</b>										
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 (-)							
<b>2</b>	<b>Atmospheric (air)</b>										
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 (-)
<b>3</b>	<b>Terrestrial (land)</b>										
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 (-)		
<b>4</b>	<b>Biotic (Flora and Fauna)</b>										
4a	Loss of vegetation cover	• B (-)	• B (-)								
4b	Disturbance or alteration of terrestrial or aquatic fauna	• B (-)	• B (-)	• B (-)	• B (-)				• B (-)		• B (-)
<b>5</b>	<b>Socioeconomic</b>										
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 (+)										
<b>6</b>	<b>Historical and cultural</b>										
6a	Impact on historic and archaeological sites										
<b>7</b>	<b>Landscape related</b>										
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	
<b>Id</b>	<b>FACTORS</b>															
<b>1</b>	<b>Aquatic (water)</b>															
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 (-)						
<b>2</b>	<b>Atmospheric (air)</b>															
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 (-)		
<b>3</b>	<b>Terrestrial (land)</b>															
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 (-)						
<b>4</b>	<b>Biotic (Flora and Fauna)</b>															
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 (-)			
<b>5</b>	<b>Socioeconomic</b>															
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 (+)			
<b>6</b>	<b>Historical and cultural</b>															
6a	Impact on historic and archaeological sites															
<b>7</b>	<b>Landscape related</b>															
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 El Progreso and Tela 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 El Progreso - Tela , there are three protected areas: 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 El Progreso - Tela in what has been called socioeconomic area of influence (AISE in Spanish). Thus, the socioeconomic study area is limited to the municipalities of El Progreso, El Negrito and Tela.

#### **In the construction phase**

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 El Progreso, El Negrito, Tela), 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.



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The relocation of utilities is expected during 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 El Progreso to Tela.

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.

It 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**

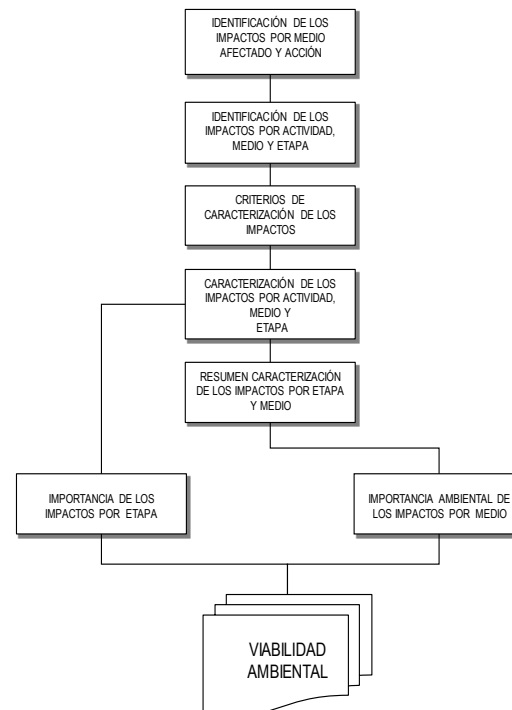
The area where the Tourism Corridor of Honduras tranche El Progreso-Tela will be developed, is an area that was previously intervened when the construction of the road occurred. The selective rehabilitation and maintenance works to be done, and the expansion of lanes, will concentrate within the existing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

Some activities that will affect 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 lit 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.

Classification	Typology	Description
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)	

Classification	Values	Classification	Values
Beneficial Impact (Positive)	+	Low	1
Harmful Impact (Negative)	-	Medium	2
		High	4
		Very High	8
		Total	12
<b>Extension (EX)</b>		<b>Moment (MO)</b>	
Punctual	1	Long Term	1
Partial	2	Medium Term	2
Extensive	4	Immediate	4
Total	8	Critical	(+4)
Critical (International)	(+4)		
<b>Persistence (PE)</b>		<b>Reversibility (RV)</b>	
Fleeting	1	Short Term	1
Temporary	2	Medium Term	2
Permanent	4	Irreversible	4
<b>Synergy (SI)</b>		<b>Accumulation (AC)</b>	
No Synergism (Simple)	1	Simple	1
Synergistic	2	Accumulative	4
Very Synergistic	4		
<b>Effect (EF)</b>		<b>Periodicity (PR)</b>	
Indirect (Secondary)	1	Irregular Or Discontinuous	1
Direct	4	Periodic	2
		Continuous	4
<b>Recoverability (MC)</b>		<b>Importance (I)</b>	
Immediately Recoverable	1	<b><math>I = \pm (3 I + 2 EX + MO + PE + RV + SI + AC + EF + PR + MC)</math></b>	
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	<b>&lt;25</b>
Environmental Impacts with moderate importance	<b>25 a 50</b>
Impacts with severe environmental importance	<b>50 a 75</b>
Important critical environmental impacts	<b>&gt;75</b>

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 El Progreso - Tela. 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		Physical							
IMPACTED FACTOR		Water							
POTENTIAL IMPACTS		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)								
<b>Chosen Value</b>									
2	2	4	2	1	1	1	4	4	4

<b>Importance I</b>	<b>31</b>
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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)								
<b>Chosen Value</b>									
2	2	4	2	1	1	1	4	4	4

<b>Importance I</b>	<b>31</b>
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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 6.6. 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)								
<b>Chosen Value</b>									
2	2	4	1	1	1	1	4	1	1

<b>Importance I</b>	<b>24</b>
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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							
		Bearing Layer Placement / 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 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)								
<b>Chosen Value</b>									
2	1	4	1	1	1	1	4	1	1

<b>Importance I</b>	<b>22</b>
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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							
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)								
<b>Chosen Value</b>									
2	1	4	4	4	1	1	4	4	4

<b>Importance I</b>	<b>34</b>
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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 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)								
<b>Chosen Value</b>									
4	1	4	4	4	1	1	4	4	8

<b>Importance I</b>	<b>44</b>
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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		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

<b>Importance I</b>	<b>33</b>
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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)								
<b>Chosen Value</b>									
4	4	4	2	1	1	1	4	2	4

<b>Importance I</b>	<b>36</b>
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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)								
<b>Chosen Value</b>									
4	1	4	2	1	1	1	4	4	1

<b>Importance I</b>	<b>32</b>
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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)								
<b>Chosen Value</b>									
2	2	4	2	1	1	1	4	2	4

<b>Importance I</b>	<b>29</b>
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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)								
<b>Chosen Value</b>									
4	1	4	2	2	1	1	4	2	2

<b>Importance I</b>	<b>32</b>
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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 6.15. 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)								
<b>Chosen Value</b>									
2	2	4	2	1	1	1	4	4	2

<b>Importance I</b>	<b>29</b>
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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 6.16. 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)								
<b>Chosen Value</b>									
4	2	4	1	1	1	1	4	2	2

<b>Importance I</b>	<b>32</b>
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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 6.17. Phreatic Level Alteration (-) – Worksite Preparation and Excavation and Cutting and Shaping of Filling

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Worksite Preparation/ Excavation and Cutting and Shaping of Filling							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		Water							
POTENTIAL IMPACT		Phreatic Level 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)								
<b>Chosen Value</b>									
4	2	4	2	1	1	1	4	2	2

<b>Importance I</b>	<b>33</b>
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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 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)								
<b>Chosen Value</b>									
4	2	4	1	1	1	1	4	1	1

<b>Importance I</b>	<b>30</b>
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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 6.19. 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)								
<b>Chosen Value</b>									
4	2	4	1	1	1	1	4	1	1

<b>Importance I</b>	<b>30</b>
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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 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)								
<b>Chosen Value</b>									
2	4	4	4	4	1	1	4	4	4

<b>Importance I</b>	<b>40</b>
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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 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

<b>Importance I</b>	<b>31</b>
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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 6.22. 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)								
<b>Chosen Value</b>									
2	4	4	4	4	1	1	4	4	4

<b>Importance I</b>	<b>40</b>
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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 Increased Erosion Processes (-)

STAGE/ACTIVITY		CONSTRUCTION STAGE							
IMPACTED MEDIUM		Excavation, Cutting and Shaping of Filling / Exploitation and transport of material from borrow pits							
IMPACTED FACTOR		Physical							
POTENTIAL IMPACT		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)								
<b>Chosen Value</b>									
2	1	4	2	4	1	1	1	2	4

<b>Importance I</b>	<b>27</b>
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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 Loss of Vegetation Cover (-) – 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		Biotic							
POTENTIAL IMPACT		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)								
<b>Chosen Value</b>									
4	4	4	4	2	1	1	4	2	4

<b>Importance I</b>	<b>42</b>
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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 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)								
<b>Chosen Value</b>									
4	2	4	1	1	1	1	4	1	1

<b>Importance I</b>	<b>30</b>
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<b>Points</b>	<b>Type</b>
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< 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 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 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)								
<b>Chosen Value</b>									
2	2	4	2	1	1	1	4	2	1

<b>Importance I</b>	<b>26</b>
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<b>Points</b>	<b>Type</b>
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< 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 (-) – 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)								
<b>Chosen Value</b>									
4	1	4	2	1	1	1	4	2	1

<b>Importance I</b>	<b>30</b>
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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 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)								
<b>Chosen Value</b>									
4	8	4	4	2	1	1	4	4	2

<b>Importance I</b>	<b>50</b>
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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 (+) – 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		Socioeconomic							
		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)								
<b>Chosen Value</b>									
4	8	4	2	1	1	1	4	4	1

<b>Importance I</b>	<b>46</b>
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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 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)								
<b>Chosen Value</b>									
2	2	4	2	1	1	1	4	2	1

<b>Importance I</b>	<b>26</b>
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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 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)								
<b>Chosen Value</b>									
4	1	4	1	1	1	1	4	1	1

<b>Importance I</b>	<b>28</b>
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<b>Points</b>	<b>Type</b>
< 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 (+) – Construction Activities**

<b>STAGE/ACTIVITY</b>		<b>CONSTRUCTION STAGE</b>							
<b>IMPACTED MEDIUM</b>		Construction Activities							
<b>IMPACTED FACTOR</b>		Socioeconomic							
<b>POTENTIAL IMPACT</b>		Socioeconomic							
<b>POTENTIAL IMPACT</b>		Employment Generation (+)							
<b>Intensity</b>	<b>Extension</b>	<b>Moment</b>	<b>Persistence</b>	<b>Reversibility</b>	<b>Synergy</b>	<b>Accumulation</b>	<b>Effect</b>	<b>Periodicity</b>	<b>Recoverability</b>
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)								
<b>Chosen Value</b>									
4	8	4	2	1	1	1	4	4	1

<b>Importance I</b>	<b>46</b>
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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 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)								
<b>Chosen Value</b>									

2	4	4	2	1	1	1	4	2	1
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<b>Importance I</b>	<b>30</b>
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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 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)								
<b>Chosen Value</b>									

4	2	4	2	1	1	1	4	2	1
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<b>Importance I</b>	<b>32</b>
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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 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)								
<b>Chosen Value</b>									

4	2	4	4	4	1	1	4	4	4
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<b>Importance I</b>	<b>42</b>
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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 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

<b>Importance I</b>	<b>50</b>
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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 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)								
<b>Chosen Value</b>									
4	4	4	4	2	1	1	4	4	2

<b>Importance I</b>	<b>42</b>
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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 6.38. MIA Altered Landscape and Aesthetics of the Environment (-) – 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		Landscape Related							
IMPACTED FACTOR		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)								
<b>Chosen Value</b>									
2	4	4	4	1	1	1	4	4	4

<b>Importance I</b>	<b>37</b>
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<b>Points</b>	<b>Type</b>
< 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 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 Table 6.4). 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 6.5.

#### 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 6.6 and Table 6.7.

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 6.8. 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 6.9), 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 6.10. 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 6.11.

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

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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 6.15

#### **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 6.18

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 6.19, 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 6.39. Noise Levels in dBA Produced by Construction Equipment**

<i>Origin</i>	<i>Intensity(approximate)</i>
<b>Truck</b>	83-93 dBA
<b>Tractor</b>	73-93 dBA
<b>Loader</b>	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 6.20

The affected areas must be recovered at the end of the project through a Reforestation Plan established in the Environmental Management Plan.

#### **12.8.1.1 Quality 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 6.21, 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 6.22.

#### **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 6.23

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 6.24.

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 6.25

#### **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 6.26

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 6.27

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 6.28.

#### **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 6.29



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 6.30.

#### **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 6.31

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 Employment Generation**

This impact has been valued of moderate importance (I=46 – See Table 6.32) 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 6.33.

#### **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 6.34, 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 6.35.

#### **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 6.36.

#### **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 6.37), 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 6.38.

## **5 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 5.1:

Table 5.1. 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"> <li>Extraction activities must be done in adequate and specific sites not along the river bed.</li> <li>Enforce a Surveillance and Control Program, to avoid damaging other areas.</li> <li>Proper water usage in accordance to the Water Usage Permit</li> </ul>	<ul style="list-style-type: none"> <li>Daily field verification</li> <li>Record worker's training on environmental issues</li> </ul>	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"> <li>Enforce a Surveillance and Control Program, to avoid damaging other areas.</li> <li>Proper water usage in accordance to the Water Usage Permit</li> <li>Follow the technical guidelines of INHGEOMIN for floodplain soils.</li> </ul>	<ul style="list-style-type: none"> <li>Daily field verification</li> <li>Keep water consumption records</li> </ul>	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"> <li>Management Program for Liquid and Solid Wastes</li> <li>Contingency program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Daily field supervision</li> <li>Separation of wastes at source, deposit placement.</li> <li>Final waste disposal record</li> <li>Record of the amount of substances disposed of in authorized containers.</li> <li>Record of worker's training on water contamination issues.</li> </ul>	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"> <li>Construction Equipment and Vehicles Preventive Maintenance Plan</li> <li>Vehicular Emissions Compliance Control Program</li> </ul>	<ul style="list-style-type: none"> <li>Monthly maintenance record</li> <li>Vehicular Emissions Maintenance Record (opacity %)</li> <li>Workers training record on air contamination.</li> </ul>	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"> <li>Dust and Foul Odor Emission control Program</li> </ul>	<ul style="list-style-type: none"> <li>Daily water sprinkling on the road</li> <li>Photographic record of activities</li> <li>Cleaning of the street if necessary</li> <li>Inspection of canvas tarps for cargo trucks</li> <li>Disposal of wastes in designated areas</li> </ul>	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"> <li>Preventive Maintenance Program for vehicles and construction equipment</li> <li>Work Schedule: avoid as much as possible work during night hours or rest periods; if unavoidable notify affected populations in advance</li> <li>Provide auditory protection equipment for workers exposed to levels higher than 80 dBA.</li> </ul>	<ul style="list-style-type: none"> <li>Record of monthly maintenance</li> <li>Compliance to work schedules established in the work plan.</li> <li>EPP review and measurement of noise and vibration levels workers are exposed to.</li> </ul>	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"> <li>• Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily field supervision</li> <li>• Worker's training records on environmental issues.</li> <li>• Identification of areas compacted by the transit of heavy machinery and/or temporary facilities and their readequation.</li> </ul>	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"> <li>• Contingency Program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.)</li> <li>• Liquid and Solid Wastes Management Program</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly record of incidents or spills in project area.</li> <li>• Waste separation at source, storage in tanks</li> <li>• Final waste disposal record</li> <li>• Record of amounts of waste disposed of in authorized sites</li> <li>• Worker's training record on soil compacting issues</li> <li>• Daily field supervision</li> </ul>	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"> <li>• Daily field supervision</li> <li>• Execute exploitation activities within the area stipulated by the concession</li> <li>• Request Environmental and Concession License</li> <li>• For new exploitation of borrow pits request corresponding permit to the SOPTRAVI Environmental Management Unit in INHGEOMIN</li> <li>• Follow the technical guidelines of INHGEOMIN for floodplain soils.</li> </ul>	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"> <li>Daily field supervision</li> <li>Compliance with construction specifications</li> <li>Execute cutting and shaping of filling activities in dry seasons.</li> <li>Protect bare soil at the end of activities.</li> </ul>	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"> <li>Daily field supervision</li> <li>Worker's training record on flora and fauna issues</li> </ul>	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"> <li>Daily field supervision</li> <li>Worker's training record on flora and fauna issues</li> </ul>	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"> <li>Work Schedule: execute installation of road signals as planned in the Traffic Management Program</li> <li>Coordinate with the National Transit direction for the permanent Information Campaign: Inform communities of planned activities</li> </ul>	<ul style="list-style-type: none"> <li>Regulation of speeds, daily field supervision</li> <li>Necessary road signals required for activities</li> <li>Record of worker's training on transit regulations</li> <li>Presence of flagmen and safety cones when lanes are closed</li> </ul>	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"> <li>Health and Hygiene Program for the Prevention of Diseases</li> </ul>	<ul style="list-style-type: none"> <li>Hold health fairs and vaccination campaigns</li> <li>Record of worker's training on contagious diseases</li> </ul>	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"> <li>Risk and Accident Prevention Program</li> <li>Keep first aid kits and ambulance services available</li> </ul>	<ul style="list-style-type: none"> <li>Maintain PPE inventory</li> <li>Field inspections by the security supervisor</li> <li>Record of worker's training on accident prevention measures and hazardous material management</li> <li>Have first-aid kits, extinguishers, and necessary emergency equipment.</li> </ul>	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"> <li>Liquid and Solid Waste Management Program</li> </ul>	<ul style="list-style-type: none"> <li>Separate wastes at source, installation of tanks</li> <li>Final disposal waste record</li> <li>Worker's training records on waste management issues.</li> </ul>	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"> <li>Work plan: establish a work Schedule to avoid disturbing nearby communities</li> <li>Permanent Information Campaign: Inform communities of planned activities</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with established work schedules</li> <li>Communication evidence (meetings, flyers, radio)</li> <li>Periodic supervision and implementation evidence for plans and programs</li> </ul>	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"> <li>Revise the El Progreso Territorial Ordinance Plan</li> <li>Request change in the use of soil to the municipality</li> </ul>	<ul style="list-style-type: none"> <li>Develop activities planned in the Territorial Ordinance Plan</li> </ul>	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"> <li>Work Schedule: Execute the installation of road signals</li> </ul> Surveillance And Control Program: Delimit the area of influence to avoid damage to other areas.	<ul style="list-style-type: none"> <li>Daily field supervision</li> <li>Necessary road signals for the Selective Rehabilitation and improvement for the road operation phase.</li> </ul>	See Section 10 Environmental Management Program Implementation Costs	Concessionaire Environmental Specialist	Permanent Selective Rehabilitation and improvement Stage Construction Operation

Source: The Consultant

Each program proposed as a mitigation measure is detailed as follows.

## **5.1 Activities to Comply to Each Mitigation Measure**

### **5.1.1 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.

#### **5.1.2 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.
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- 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 on 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.

#### **5.1.3 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.

#### **5.1.4 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 phase 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 phase 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.

#### **5.1.5 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.

#### **5.1.6 Traffic Management Program**

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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 phase 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.

#### **5.1.7 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 phase) 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.

#### **5.1.8 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.

#### **5.1.9 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 phase 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 phase 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.

**5.1.10 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.

**5.1.11 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
<b>1.Introduction</b>	
<b>2. Project or Plan Objective:</b>	

CONTENT	OBSERVATIONS
<b>3. Area :</b>	<ul style="list-style-type: none"> <li>• Location (Municipality, Department).</li> <li>• Total project surface and yearly reforestation breakdown.</li> <li>• Legal status of the area to be reforested (possessory rights number and property inscription number).</li> <li>• Climate, hydrography, soils, vegetation classification (wildlife area)</li> </ul>
<b>4. Administrative Responsibility and Project Techniques.</b>	
<b>5. Reforestation Planning.</b>	<ul style="list-style-type: none"> <li>• Species selection: environmental requirements, plantation shift.</li> <li>• Plantation Establishment: terrain preparation, marking, hole-digging, planting, fertilization, replanting.</li> <li>• Maintenance: maintenance cleaning, fertilization.</li> <li>• Forestry management: seed plant removal, pruning, and thinning.</li> <li>• Forest protection: plague, disease and fire prevention and control.</li> <li>• Use of the Forest: marking, delimiting, cubing, selection, arrangement, major and minor transport.</li> <li>• Administration: technical support, administrative expenses, infrastructure.</li> </ul>
<b>6. • Expected income from Thinning and Final Cut per Hectare</b>	<ul style="list-style-type: none"> <li>• Settling costs, management and use per hectare.</li> <li>• Expected income from thinning and final cut, financial analysis (VAN, RBC, and TIR).</li> </ul>
<b>7. Financial Aspects</b>	
<b>8. Physical Timetable for the Reforestation Plan/Project</b>	
<b>9. Input Chart</b>	<ul style="list-style-type: none"> <li>• Present a chart including the equipment and material needed for settling, managing, and use of a forest plantation.</li> </ul>
<b>10. Bibliography</b>	
<b>11. Annexes. The following tables must be included:</b>	<ul style="list-style-type: none"> <li>• Plantation characteristics and programming</li> <li>• Thinning and final cut programming per hectare and species.</li> <li>• Estimated yield and profit per species, for thinning and final cut, per hectare, and project total.</li> <li>• Plantation cost for the duration of the project per hectare and per project total.</li> </ul>

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

- **Initial 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.

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- **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 have 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.

#### **5.1.12 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 phase. 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.

#### **5.1.13 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.

#### **5.1.14 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. Water must be sprinkled in all work areas where dust is produced.
6. 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)
7. The entire Project area and the machinery exits must have adequate signals.
8. Any truck that transports material must be covered with a canvas tarp.
9. Adequate maintenance must be given to motor vehicles to reduce emissions and comply with pertinent regulation.
10. 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.
11. 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.
12. In case of oil spills on the ground from machinery, the soil must be given appropriate treatment.
13. The activity execution timeline for extraction and transport of non-metallic mining material must be established in writing.
14. Bimonthly on-site inspections must take place to verify compliance with the recommended measures.
15. Extraction activities should not affect phreatic levels in the area.
16. No mounds must be left in the riverbed.
17. 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.
18. 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.
19. Extraction of sand banks must be done with even and leveled cuts, preventing the formation of ditches that generate stagnant waters.
20. The machinery's engines must never come in contact with the live river channel.
21. During and after extraction, the transport of slope sediment or accumulated material must be prevented, building necessary structures to control sediment transport.

22. All activities must happen during the day shift, extraction and transport are not allowed during the night.
23. Any solid wastes generated by the worker's activities must adequately disposed of as established in guideline 12
24. The company must have an Accident Prevention and Contingency Management Plan.
25. The Company must have portable toilets for waste disposal in the locations authorized by the municipality.
26. 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.
27. 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.
28. 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.

#### **5.1.15 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.

#### 5.1.16 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.

Each seminar-workshop will last for 8 hours and include the following topics:

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 (TRANSPORTATION & CIVIL WORKS SECRETARIAT) and SERNA (NATURAL RESOURCES & ENVIRONMENT SECRETARIAT) 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.

#### **5.1.17 Health and Hygiene Program for the prevention of Contagious Diseases**

The construction phase 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.

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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
3. 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.



## **5.2 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 (El Progreso, El Negrito, Tela).

Table 7.2 lists the institutions responsible of monitoring each mitigation measure to be implemented in the project.

**Table 5.2. Mitigation measures execution and responsibility**

Medium	Impact	Mitigation Measure	Institution Responsible for Execution	Regulating Entity * See note
Aquatic	1a. Hydrological Regime Alteration	<ul style="list-style-type: none"> <li>No extraction activities should be done in the center of the riverbed, only in the sites marked by INHGEOMIN</li> <li>Surveillance and Control Program: delimiting the area of influence to avoid damage to other areas.</li> <li>Avoid the formation of pools and depositing material on the natural water runoff sources and avoid the stacking of materials higher than 2 meters</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	1b. Alteration of phreatic levels	<ul style="list-style-type: none"> <li>Selection of water bodies with enough continuous flow to provide water to the project and not altering the aquifer recharge.</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	1c. Quality deterioration or water contamination	<ul style="list-style-type: none"> <li>Liquid and Solid Waste Management Program</li> <li>Contingency Program: Prevention and Control of contaminating substance spills (oils, fuels, paints, etc.)</li> </ul>	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	<ul style="list-style-type: none"> <li>Preventive vehicle and construction equipment maintenance program (adequate mechanical state is required)</li> <li>Vehicular Emissions Compliance Control Program</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
	2b. Dust and/or foul odor generation	<ul style="list-style-type: none"> <li>Program for dust emission control and foul odor prevention</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT

Medium	Impact	Mitigation Measure	Institution Responsible for Execution	Regulating Entity * See note
	2c. Increase in noise levels	<ul style="list-style-type: none"> <li>Preventive vehicle and construction equipment maintenance program (adequate mechanical state of mufflers is required for machinery)</li> <li>Work Schedule: Avoid, if possible, working during the night or resting periods; if necessary notify the affected population in advance.</li> <li>Provide auditory protection equipment to workers exposed to noise levels over 80 dBA.</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
Terrestrial	3a. Effects on soil due to compacting or leveling	<ul style="list-style-type: none"> <li>Surveillance and Control Program: limiting of the direct area of influence to avoid damages to other areas.</li> <li>If necessary upon project completion, soil compacted by heavy machinery or temporary facilities must be loosened and covered with topsoil for subsequent revegetation.</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	3b. Quality deterioration or soil contamination	<ul style="list-style-type: none"> <li>Contingency Program: avoid, if possible, the accidental spill of contaminating substances on the soil.</li> <li>Contingency Program: Prevention and Control of contaminating substance spill (oils, fuels, paints, etc.)</li> <li>Liquid and Solid Waste Management Program</li> </ul>	The concessionaire and the Environmental Specialist	
	3c. Extraction or loss of soil	<ul style="list-style-type: none"> <li>Surveillance And Control Program: delimiting the area of influence to avoid damage to other areas</li> </ul>	The concessionaire and the Environmental Specialist	
	3d. Increase in erosion processes	<ul style="list-style-type: none"> <li>Erosion control and slope stability measures</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision

Medium	Impact	Mitigation Measure	Institution Responsible for Execution	Regulating Entity * See note
	3e. Reduction in fertility and suitability of soil	<ul style="list-style-type: none"> <li>Reforestation, arborization, and revegetation plan</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ICF
<b>Biotic</b>	4a. Loss of vegetation cover	<ul style="list-style-type: none"> <li>Surveillance and Control Program: delimiting the area of direct influence to avoid damage to other areas</li> </ul>	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"> <li>Surveillance and Control Program: Avoid poaching and/or species habitat disturbance.</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ICF
	4c. Increased risk of running over wildlife	<ul style="list-style-type: none"> <li>Place animal crossing signs</li> <li>Regulate speeds in road tranches</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT
<b>Socioeconomic</b>	5b. Modification to local traffic	<ul style="list-style-type: none"> <li>Work Schedule: Execute planned installation of road signals in the Traffic Management Program</li> <li>Coordinate activities with the National Transit Direction</li> <li>Permanent disclosure campaign: Inform the communities about programmed activities</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT

Medium	Impact	Mitigation Measure	Institution Responsible for Execution	Regulating Entity * See note
	5e. Increased risk of spreading disease	<ul style="list-style-type: none"> <li>Health and Hygiene program for the prevention of contagious diseases</li> </ul>	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	<ul style="list-style-type: none"> <li>Risk and Accident Prevention Program</li> <li>Maintaining first-aid kits and ambulance services</li> <li>Records of worker's training on first-aid and emergency measures</li> </ul>	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	<ul style="list-style-type: none"> <li>Solid residue collection and disposal program</li> <li>Portable toilets must be installed for workers; the responsible company must clean the toilets at least twice a week</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat
	5i. Disturbances to surrounding communities due to project activities	<ul style="list-style-type: none"> <li>Work Plan: Establish a work schedule that avoids affecting daily community activities</li> <li>Work Schedule: Execute installation of road signals proposed in Transit Management Program</li> <li>Coordinate activities with the National Transit Direction DNT</li> <li>Dissemination and Communication Plan: maintain a permanent disclosure campaign with the affected communities</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/Public Health Secretariat /National Transit Direction DNT

Medium	Impact	Mitigation Measure	Institution Responsible for Execution	Regulating Entity * See note
	5j. Changes in the use of soil	<ul style="list-style-type: none"> <li>• Territorial ordinance plan review</li> <li>• Request a change in the use of soil to the El Progreso Municipality</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision
	5k. Alteration of public services	<ul style="list-style-type: none"> <li>• Public services relocation program</li> </ul>	The concessionaire and the Environmental Specialist	Environmental Management Units/SOPTRAVI / Tourism Corridor Supervision/ENEE/SANAA
<b>Landscape related</b>	7a. Alteration or changes to the landscape and environment aesthetics	<ul style="list-style-type: none"> <li>• Work Schedule: Execute planned installation of road signals in the Traffic Control Program</li> <li>• Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas.</li> </ul>	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 to the municipalities, the process of environmental evaluation for the execution of projects, industrial facilities and any other private or public activity that is meant to be developed within their territory, as well as the control and follow-up of mitigation measures for the environmental impacts subject to licensing. This evaluation process will be concurrent with the application for Construction and Operation permits, Article 68 of this law establishes exclusions to this delegation. Municipal Corporations will assume these responsibilities by issuing a Municipal Agreement that notifies SERNA about its intention and operating capacity, and therefore, assume responsibility of actions derived from delegated functions.

The municipalities of Distrito Central, San Pedro Sula, Juticalpa, La Ceiba, Puerto Cortes, Roatán, Guanaja and El Progreso are able to do this immediately. The other municipalities must submit to an evaluation and accreditation process by SERNA, who will issue a resolution in a period no greater than sixty (60) days upon presenting the request.



## 6 SPECIFIC MANAGEMENT PLANS

### 6.1 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 6.1. Non-hazardous Residues**

Material Waste Flow	Description	Main Source	Management and Disposal Options	Observations / Important Considerations
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Material Waste Flow	Description	Main Source	Management and Disposal Options	Observations / Important Considerations
<b>Domestic/ General</b>	Non-organic: Food	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
	Food containers, plastic water bottles, paper, carton, glass ( bottles, cans, windows), polystyrene, aluminum (containers)			
	Organic: food leftovers	Cooking and eating areas and worksite	Disposal	Diverting organic waste from disposal can reduce leachate
<b>Construction Debris</b>	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.
<b>Scrap metal</b>	Metal cuttings, electric cabling, pipes, etc.	Construction areas	Reuse /Rec-cycle /Disposal	Donate to the community
<b>Wood</b>	Wood, pallets, plywood, wood chips, wood scraps, etc.	Packaging material	Reuse /Rec-cycle /Disposal	Reuse or donate to community for cooking or construction
<b>Paper, carton</b>	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.
<b>Polystyrene</b>	Polystyrene	Packaging material	Recycle / Disposal	Recycling

Material Waste Flow	Description	Main Source	Management and Disposal Options	Observations / Important Considerations
<b>Plastics</b>	Plastic wrappers, PET resin bottles, HDPE, scrap, etc.	Construction Area	Recycle/ Disposal	Recycling
<b>Tires</b>	Worn-out, damaged tires	Construction and operations equipment	Reuse /Rec-cycle /Disposal	Tires must be used for ground stabilization, and embankments (crushed)
<b>Welding wastes</b>	Soldering rods or millstones	Maintenance or construction related activities	Recycling / Packaging in drums and disposal	
<b>Non-greasy fabrics</b>	Non-greasy fabrics (rags, gloves, clothes, etc.)	Temporary 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 phase 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
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 6.1. Solid Waste Containers**



Fuente: 504832-0000-4EPA-1007 "Plan de Gestión de Residuos".

Los contenedores codificados por colores serán provistos dentro del SITIO DE OBRA (WORKSITE), lo que permitirá la separación de materiales, residuos reusables, reciclables y combustibles, para su eliminación. Los contenedores deben ser de material rígido, resistentes a perforaciones. Se deberán mantener en buen estado, debidamente rotulados, con tapas,

guarecidos de la lluvia, en una superficie plana y estable. El area donde se instalen deberá ser accesible y estar señalizada. Ver Figure 6.2:

**Figure 6.2. 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.

## **6.2 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 phase, 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 6.2. 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.
Lead-containing products	Batteries, soldering, electric devices, cables  Sheet accessories, brass or bronze, balanced weights	Vehicle maintenance and equipment  Construction activities	Off-site elimination or recycling	Treat as hazardous material. Consolidate and store to send for final disposal by an authorized company.
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.

### **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)**

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.

## **6.3 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 6.3. Hazardous Liquid Residues and Management**

Material Waste Flow	Description	Main Source	Elimination Options	Considerations/ Important Observations
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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	
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.

## **6.4 Risk Prevention Plans**

### **6.4.1 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 phases 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:

#### **6.4.1.1 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 place 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.

#### **6.4.1.2 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

#### **6.4.1.3 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.

#### **6.4.2 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.

##### **6.4.2.1 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 to 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 to 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.

##### **6.4.2.2 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.

##### **6.4.2.3 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 phases 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.

## **6.5 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 6.4. 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

### 6.5.1 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

#### **6.5.2 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

#### **6.5.3 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 loos, 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.

#### **6.5.4 Action 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.

##### **6.5.4.1 General Plan**

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 situation can be resolved with internal resources, he proceeds to activate the Action Plan for the specific situation.
4. 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.

#### **6.5.4.2 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.
  - d. The Security 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.

#### **6.5.4.3 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 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.

#### **6.5.4.4 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.
  - b. 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.

#### **6.5.4.5 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.

#### **6.5.4.6 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.

#### **6.5.5 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 phases 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.

## **6.6 Citizen Participation Plan**

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 phase.

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.

### **6.6.1 STAGE I: Citizen Participation during the Drafting of the Technical Environmental Documents for Tranche El Progreso - Tela**

The communities considered for the development of the Citizen Participation Plan during this stage, are concentrated in the cities of El Progreso y Tela.

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.

## Results of Phase I

### Socialization meeting held in the El Progreso Municipality

This meeting took place on June 27<sup>th</sup> 2013, in the El Progreso Municipality meeting room. Municipal representatives participated in the meeting. (See attendance list- Annex 4)

- City Council Members from El Progreso: Oscar Armando Rubí
- Head of Public Works: Rommel Cano
- Head of the Municipal Environmental Department: Ana Zulay Rivas
- Intern: Alejandra Gallo
- Legal Advisor: Maynor López
- Head of Urban Planning: 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.

The following is a summary of their opinions:

- 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.
- As negative impacts they mentioned: the possible import of labor, an increase in traffic, increase in noise due to traffic, increase in atmospheric emissions and the cutting of trees.
- In regards to the bypass intersection of the city of El Progreso, they mentioned that even though the area had not been previously intervened, the project will provide traffic relief. With regards to the environmental aspect they commented that this bypass intersection is located in Natural Preservation Zones (ZPN-1), corresponds to highly productive aquifers and the Protection Belt in the right border of the Ulúa River, in which case the company must request authorization from the municipality for the projects development, this process has already been initiated by SOPTRAVI and Coalianza.

- 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.



### **Socialization Meeting at the Tela Municipality**



This meeting took place on July 1st 2013 in the Tela Municipality meeting hall and included the participation of honorable Mayor David Zaccaro and City Council Representative Eva Ruth Vanegas on behalf of the Tela Municipality. There was also a representative from the Honduran Institute of Anthropology and History, Mr. Melvin; Engineer Carlos Rivas Autopistas del Atlantico 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.

The Mayor of Tela, expressed he was in favor of the Project, however his recommendation to the Project developer include considering a bypass intersection in the urban Tela sector that is in agreement with the territorial ordinance and urban planning plans, to minimize traffic accidents and improve vehicular traffic.

He also considers that the project will not generate negative environmental impacts since the activities will be executed on a previously impacted area. The perceived positive impacts include the improvement of road safety conditions and a reduction of transport costs between Tela and San Pedro Sula.

Individual interviews were also conducted with staff from the Tela Municipal Environmental Unit, including Deputy Director (Rafael Milla) and Director (Miguel Ordoñez)

The comments expressed by these officials include:

- Both expressed being in favor of the Project.
- Mentioned negative impacts include: the cutting of trees and effects to local fauna.
- The positive impacts they perceive include: increased number of tourists in the city, greater economic development in the city and villages located along the road.
- Their recommendations include: adequate installation of road signals and lighting, the use of wildlife crossings whenever necessary. They also mention observing the guidelines established by SERNA and local environmental authorities.

Annexed to this Environmental Management Plan, are the interviews with the participants at the Tela Municipality. Annex 6.

#### **6.6.2 Phase II: Citizen Participation during Construction Stage**

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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, El Negrito and Tela), the developer SOPTRAVI, SERNA, environmental management units and the concessionaire (project executive).

- SERNA (Natural Resources & Environment Secretariat) 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.

#### **6.6.2.1 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.

#### **6.6.2.2 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 phases and facilitate their job of monitoring and follow-up.

#### **6.6.2.3 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 6.5. Citizen Participation Plan Evaluation Elements**

No	Element	Measures
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

## 6.7 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 phases, 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.

## **6.8 Monitoring and internal evaluation of the Environmental Management Plan and Individual Management Plans**

### **6.8.1 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.

### **6.8.2 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 6.6. Project Monitoring Plan

N°	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"> <li>Management Program for Liquid and Solid Wastes</li> <li>Contingency program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Surface water quality monitoring in main waterways during the construction of every bridge upstream and downstream of the worksite.</li> <li>Monitoring will take place through direct field measurements and lab analysis of sediment and water samples.</li> <li>The water analysis includes parameters for pH<sup>5</sup>, biochemical oxygen demand, dissolved oxygen, suspended solids, fecal matter, greases and oils and hydrocarbons.</li> </ul>	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><b>Water Quality<sup>5</sup></b></p> <ul style="list-style-type: none"> <li>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"> <li><b>Medium Risk:</b> 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.</li> </ul> </li> <li>Project draft that dictates environmental quality regulations for natural waters. <ul style="list-style-type: none"> <li><b>2 C Class Waters: Waters for:</b> <ol style="list-style-type: none"> <li>Human consumption with conventional treatment (coagulation, flocculation, sedimentation, filtering and disinfection)</li> <li>Risk of contamination of vegetables consumed by humans after processing or parks, gardens and fields and sports when there is direct contact.</li> <li>Artisan fishing</li> <li>Risk recreation according to norms.</li> <li>Cattle watering.</li> </ol> </li> </ul> </li> <li>World Bank recommended standards</li> </ul> <table border="1"> <thead> <tr> <th rowspan="2">PARAMETER</th> <th colspan="3">Limit Values for Natural Water</th> </tr> <tr> <th>D.E 75 DE 2008 Mean Risk</th> <th>Class 2 C</th> <th>Limit BM - IFC</th> </tr> </thead> <tbody> <tr> <td>PH</td> <td>6.5-8.5</td> <td>6.0 – 9.0</td> <td>-</td> </tr> <tr> <td>Suspended Solids (mg/L)</td> <td>&lt;50</td> <td>-</td> <td>50</td> </tr> <tr> <td>Turbidity (NTU)</td> <td>50-100</td> <td>&lt;100</td> <td>-</td> </tr> <tr> <td>Dissolved oxygen (mg/L)</td> <td>6-7</td> <td>&gt;5</td> <td>-</td> </tr> <tr> <td>Biochemical oxygen demand (mg/L)</td> <td>3-5</td> <td>&lt;5</td> <td>&lt;50</td> </tr> <tr> <td>Greases and oils (mg/L)</td> <td>&lt;10</td> <td>&lt;10</td> <td>10</td> </tr> <tr> <td>Hydrocarbons(mg/L)</td> <td>0.05-2.0</td> <td>&lt;50 µg/L</td> <td>-</td> </tr> <tr> <td>Fecal matters (UFC1/100 mL)</td> <td>251-450</td> <td>&lt;1000</td> <td>-</td> </tr> </tbody> </table>	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	-	The Concessionaire Environmental specialist Tourism Corridor Supervision
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<sup>5</sup> 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.

N°	Impact	Medium	Mitigation Measures	Monitoring Activities	Periodicity	Regulation	Responsible																				
2	Deterioration of quality or air contamination Foul odor and dust generation	At	<ul style="list-style-type: none"> <li>Preventive vehicle and construction equipment maintenance program (adequate mechanical state is required)</li> <li>Vehicular Emissions Compliance Control Program</li> <li>Dust and Foul Odor Emission control Program</li> </ul>	<ul style="list-style-type: none"> <li>Air quality monitoring must be done every six months in 4 control points located in the tranche (sensitive receivers)</li> <li>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.</li> <li>Adequate maintenance of heavy equipment</li> <li>Maintenance Record</li> </ul>	<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><b>Air:</b> 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 NO<sub>2</sub>, SO<sub>2</sub> y PM<sub>10</sub>, 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">NO<sub>2</sub> – World Bank 2007.</td> <td>Annual</td> <td>40 µg/m<sup>3</sup></td> </tr> <tr> <td>1 hour</td> <td>200 µg/m<sup>3</sup></td> </tr> <tr> <td rowspan="2">SO<sub>2</sub> – World Bank 2007.</td> <td>24 hours (guide value)</td> <td>20 µg/m<sup>3</sup></td> </tr> <tr> <td>10 minutes <sup>6</sup></td> <td>500 µg/m<sup>3</sup></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/m<sup>3</sup></td> </tr> <tr> <td>PM 10 – World Bank 2007.</td> <td>24 hours</td> <td>50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Regulation for Control of Contaminating Gases and Smoke Emissions from motor vehicles</p>	PARAMETER	PERIOD	MAX LIMIT	NO <sub>2</sub> – World Bank 2007.	Annual	40 µg/m <sup>3</sup>	1 hour	200 µg/m <sup>3</sup>	SO <sub>2</sub> – World Bank 2007.	24 hours (guide value)	20 µg/m <sup>3</sup>	10 minutes <sup>6</sup>	500 µg/m <sup>3</sup>	CO - EPA 2003. National Ambient Air Quality Standards.	1 hour	9 ppm	10 mg/m <sup>3</sup>	PM 10 – World Bank 2007.	24 hours	50 µg/m <sup>3</sup>	The Concessionaire Environmental specialist Tourism Corridor Supervision
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3	Impact to worker's health	SE	<ul style="list-style-type: none"> <li>Dust and Foul Odor Emission control Program</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of breathable particles</li> </ul>	Depending on the number of workers and exposure Every six months	<p><b>Total Breathable Particles</b> Occupational Safety and Health Administration" (OSHA/ USA, max value is 5 mg/m<sup>3</sup>)</p>	The Concessionaire Environmental specialist Tourism Corridor Supervision)																				

<sup>6</sup> Según estudio de la OMS, se recomienda que no se supere una concentración de SO<sub>2</sub> de 500 µg/m<sup>3</sup> durante periodos con una duración media de 10 minutos.

N°	Impact	Medium	Mitigation Measures	Monitoring Activities	Periodicity	Regulation	Responsible															
4	Increase in noise levels	At	<ul style="list-style-type: none"> <li>Preventive vehicle and construction equipment maintenance program</li> </ul> <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"> <li>Field supervision of applied measures</li> <li>Records of Personal Protective equipment</li> <li>Photographic record of staff wearing protective equipment</li> <li>Noise monitoring plan in 4 control points where the most sensitive receivers are located in the tranche.</li> </ul>	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 <sup>1</sup></th> </tr> <tr> <th colspan="3">ONE HOUR L<sub>AQ</sub> (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, educational<sup>2</sup></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 <sup>1</sup>			ONE HOUR L <sub>AQ</sub> (DBA)			RECEIVER	Daytime 07:00 – 22:00	Nighttime 2:00 – 07:00	Residential, Institutional, educational <sup>2</sup>	55	45	Industrial, Commercial	70	70	The Concessionaire Environmental specialist Tourism Corridor Supervision
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5	Impact to worker's health	SE	<ul style="list-style-type: none"> <li>Provide auditory protection equipment for workers exposed to levels higher than 80 dBA.</li> </ul>	Occupational Monitoring <ul style="list-style-type: none"> <li>Noise and control measuring</li> </ul>	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><b>Maximum Level: 85dB maximum exposure</b></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"> <li>Liquid and Solid Waste Management Program</li> <li>Contingency Program</li> </ul>	<ul style="list-style-type: none"> <li>Draft of the report</li> <li>Photographic record of spills and cleanup activities See Section 8.5.4.2.</li> <li>Application of vehicle and oils and grease best practices established by law</li> </ul>	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"> <li>Liquid and Solid Waste Management Program</li> </ul>	<ul style="list-style-type: none"> <li>Record of monthly disposal payments to the municipality</li> <li>Record of waste disposal activities and amount of disposed material</li> <li>Record of toilet cleaning</li> </ul>	Permanent during Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Health Code – Decree N°65 – 1991</li> <li>Environmental Health Regulation – Agreement N° 0094-1997</li> <li>Agreement for Solid Waste Management – Agreement N°378-2001</li> </ul>	The Concessionaire Environmental specialist Tourism Corridor Supervision															

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Medium: Ac. = Aquatic (Water); At. = Atmosphere (Air); T/S = Terrestrial or Soil; Bio = Biologic (Flora and Fauna); SE = Socioeconomic y C = Cultural.

Source: The consultant



## **6.9 Implementation and Evaluation Timeline**

Dates must be assigned for the mitigation measures that must be executed during each project phase. Some of these measures have specific dates and others continue throughout all project phases. The implementation timetable can be visualized in Table 8.7:

Table 6.7. 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"> <li>Under no circumstance shall the extraction activities endanger the freshwater conduction systems or the terrains adjacent to the project.</li> <li>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</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Municipal Environmental Units</li> <li>SOPTRAVI Environmental Management Units</li> <li>SERNA</li> <li>Health Secretariat</li> </ul>
	1b. Phreatic Level alteration	<ul style="list-style-type: none"> <li>Surveillance and Control Program: delimit the area of direct influence to avoid damage to other areas. Follow the technical guidelines of INHGEOMIN for floodplain soils.</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Municipal Environmental Units</li> <li>SOPTRAVI Environmental Management Units</li> <li>SERNA</li> <li>Health Secretariat</li> </ul>
	1c. Deterioration of quality or air contamination	<ul style="list-style-type: none"> <li>Liquid and Solid Wastes Management Program Contingency Program: Prevention and Control of Hazardous Substance Spills (oils, fuels, paints, etc.)</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Municipal Environmental Units</li> <li>SOPTRAVI Environmental Management Units</li> <li>SERNA</li> <li>Health Secretariat</li> </ul>
Atmospheric	2a. Deterioration of quality or air contamination	<ul style="list-style-type: none"> <li>Construction Equipment and Vehicles Preventive Maintenance Plan</li> <li>Vehicular Emissions Compliance Program</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>DNT</li> </ul>
		<ul style="list-style-type: none"> <li>Air quality monitoring plan in 4 control points where the most sensitive receivers are located in the tranche.</li> </ul>	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"> <li>Dust and Foul Odor Emission control Program</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	
	2c. Increase in noise levels	<ul style="list-style-type: none"> <li>Construction Equipment and Vehicles Preventive Maintenance Plan</li> <li>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.</li> </ul>	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"> <li>Noise Monitoring Program</li> </ul>	The Concessionaire Environmental specialist Security supervisor	Every six months	Selective Rehabilitation and improvement Construction Operation	
		<ul style="list-style-type: none"> <li>Labor vibrations monitoring plan</li> </ul>	The Concessionaire Environmental specialist Security supervisor	Every six months	Selective Rehabilitation and improvement Construction Operation	
<b>Terrestrial</b>	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"> <li>Municipal Environmental Units</li> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> </ul>
	3b. Quality deterioration or soil contamination	<ul style="list-style-type: none"> <li>Contingency Program: avoid, if possible, the accidental spill of contaminating substances on the soil.</li> <li>Prevention and Control of contaminating substance spills (oils, fuels, paints, etc.) Liquid and Solid Waste Management Program</li> </ul>	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"> <li>Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas.</li> </ul>	The Concessionaire Environmental specialist	Permanent	Construction	
	3d. Increased soil erosion processes	<ul style="list-style-type: none"> <li>Erosion control and slope stability measures</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> </ul>
	3e. Reduction in fertility and use of soil	<ul style="list-style-type: none"> <li>Reforestation, Arborization and Revegetation Plan</li> </ul>	The Concessionaire Environmental specialist		Construction	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> </ul>
<b>Biotic</b>	4a. Loss of vegetation cover	<ul style="list-style-type: none"> <li>Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas.</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Municipal Environmental Units</li> <li>SOPTRAVI Environmental Management Units</li> <li>SERNA</li> <li>ICF</li> </ul>

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"> <li>Surveillance And Control Program: Avoid predation and the alteration of species habitats</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Municipal Environmental Units</li> <li>SOPTRAVI Environmental Management Units</li> <li>SERNA</li> <li>ICF</li> </ul>
	4c. Increased risk of running over local fauna	<ul style="list-style-type: none"> <li>Place animal crossing signs; Speed regulation</li> </ul>	The Concessionaire Environmental specialist	Once	Operation	<ul style="list-style-type: none"> <li>Municipal Environmental Units</li> <li>SOPTRAVI Environmental Management Units</li> <li>SERNA</li> </ul>
<b>Socioeconomic</b>	5b. Modification to local traffic	<ul style="list-style-type: none"> <li>Work Schedule: Execute installation of road signals proposed in Transit Management Program</li> <li>Coordination between DNT and</li> <li>Dissemination And Communication Plan: Maintain a permanent campaign for communication of affected areas</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>DNT</li> </ul>
	5e. Increased risk of contagious diseases	<ul style="list-style-type: none"> <li>Health and Hygiene Program</li> </ul>	The Concessionaire Environmental specialist Security supervisor	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>DNT</li> </ul>
	5f. Increase in the risk of workplace accidents	<ul style="list-style-type: none"> <li>Risk and Accident Prevention Program</li> <li>Maintain first-aid kits and ambulance services</li> <li>Record of worker's training on first aid measures</li> </ul>	The Concessionaire Environmental Specialist Security supervisor	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>Health Secretariat</li> <li>Ministry of Labor</li> </ul>
	5h. Increase in public sanitation issues and the generation of soils and liquid wastes	<ul style="list-style-type: none"> <li>Collection and Disposal of Solid Wastes Program</li> <li>Portable Toilets for Company workers cleaned at least twice a week.</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>Health secretariat</li> </ul>
	5i. Disturbances to surrounding communities	<ul style="list-style-type: none"> <li>Work plan: Establish a work Schedule that avoids affecting daily community activities</li> <li>Work Schedule: Execute installation of road signals proposed in Transit Management Program</li> <li>Coordination between DNT and</li> <li>Dissemination And Communication Plan: Maintain a permanent campaign for communication of affected areas</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>Health secretariat</li> </ul>
	5j. Changes in the use of soil	<ul style="list-style-type: none"> <li>Agreement selection in the El progreso Municipal Zoning Plan</li> <li>Request change in the use of soil by the unicity</li> </ul>	The Concessionaire Environmental specialist	Permanent	Planning	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA</li> <li>Health secretariat</li> </ul>

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"> <li>Execute planned installation of road signals in the Traffic Management Program.</li> <li>Surveillance and Control Program: Delimit the area of direct influence to avoid intervention in other areas.</li> </ul>	The Concessionaire Environmental specialist	Permanent	Selective Rehabilitation and improvement Construction Operation	<ul style="list-style-type: none"> <li>Environmental Management Units</li> <li>SOPTRAVI</li> <li>SERNA Health secretariat</li> </ul>

Source: The consultant

## **7 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 phase 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.

## **8 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 8.1. 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	Planning	S/C *											
2	Compensation or Resettling of affected houses plan	DEVELOPER	Once	Planning	S/C *											
3	Municipal payment for per tree fee	CONCESSIONAIRE	Once	Planning	\$ 43,399		B/. 43,399									
4	Program for Management of Temporary Camps and Facilities	CONCESSIONAIRE	Permanent	Execution	\$ 152,359	\$ 76,179	\$ 76,179									
5	Preventive Vehicle and Construction Equipment Program	CONCESSIONAIRE	Permanent	Execution	\$ 60,943	\$ 30,472	\$ 30,472									
6	Program for Compliance with Vehicular Emissions Regulation	CONCESSIONAIRE	Permanent	Execution	\$ 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	Execution	\$ 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	Execution	\$ 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	Execution	\$ 114,269	\$ 57,134	\$ 57,134									
10	Dissemination And Communication Plan	CONCESSIONAIRE	Permanent	Execution	\$ 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	Execution	\$ 76,179	\$ 38,090	\$ 38,090									
12	Health and Hygiene Program for the Prevention of Contagious Diseases	CONCESSIONAIRE	Permanent	Execution	\$ 99,033	\$ 49,517	\$ 49,517									
13	Traffic Management Program	CONCESSIONAIRE	Permanent	Execution	\$ 83,797	\$ 41,899	\$ 41,899									
14	Surveillance and Control Program	CONCESSIONAIRE	Permanent	Execution	\$ 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	Execution	\$ 137,123	\$ 68,561	\$ 68,561									
16	Environmental Monitoring Plan: Surface Water Quality Monitoring	CONCESSIONAIRE	Every two months <sup>(1)</sup>	Execution	\$ 31,995	\$ 15,998	\$ 15,998									
			Annual	O/M	\$ -											
17	Environmental Monitoring Plan: Air Quality Monitoring (environmental and labor related)	CONCESSIONAIRE	Semestral <sup>(2)</sup>	Execution	\$ 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 <sup>(2)</sup>	Execution	\$ 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 <sup>(2)</sup>	Execution	\$ 15,998	\$ 7,999	\$ 7,999									
			Biannual	O/M	\$ -											
20	Environmental Monitoring Plan: - Soil	CONCESSIONAIRE	Trimestral	Execution	\$ 15,998	\$ 7,999	\$ 7,999									

	Contamination Monitoring	E	(3)																									
			Biannual	O/M	\$	-																						
21	Local and regional providers selection	CONCESSIONAIRE	Monthly	Execution	\$	22,854	\$	11,427	\$	11,427																		
22	Environmental education Plan	CONCESSIONAIRE	Permanen t	Execution	\$	259,010	\$	38,090	\$	38,090	\$	19,045	\$	9,522	\$	5,713	\$	5,713	\$	5,713	\$	5,713	\$	5,713	\$	5,713	\$	5,713
23	Contingency and Emergency Plan	CONCESSIONAIRE	Permanen t	Execution	\$	259,010	\$	38,090	\$	38,090	\$	19,045	\$	9,522	\$	5,713	\$	5,713	\$	5,713	\$	5,713	\$	5,713	\$	5,713	\$	5,713
24	Citizen Participation Plan	CONCESSIONAIRE	Permanen t	Execution	\$	53,325	\$	26,663	\$	26,663																		
25	Environmental Recovery and Abandon Plan	CONCESSIONAIRE	Permanen t	Execution	\$	45,708	\$	22,854	\$	22,854																		
26	Environmental Auditing Plan	CONCESSIONAIRE	Semestral (2)	Execution	\$	83,797	\$	41,899	\$	41,899																		
					\$	<b>3,246,890</b>	\$	<b>815,118</b>	\$	<b>858,517</b>	\$	<b>169,880</b>	\$	<b>95,605</b>	\$	<b>55,230</b>	\$	<b>55,230</b>	\$	<b>49,897</b>	\$	<b>48,831</b>	\$	<b>47,764</b>	\$	<b>47,764</b>	\$	<b>47,764</b>

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 El Progreso**

# **Anexo 5. Interviews in the Municipality of El Progreso**

# **Anexo 6. Interviews in the Municipality of Tela**

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



## **b. Environmental Management Plan**

## **c. 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			

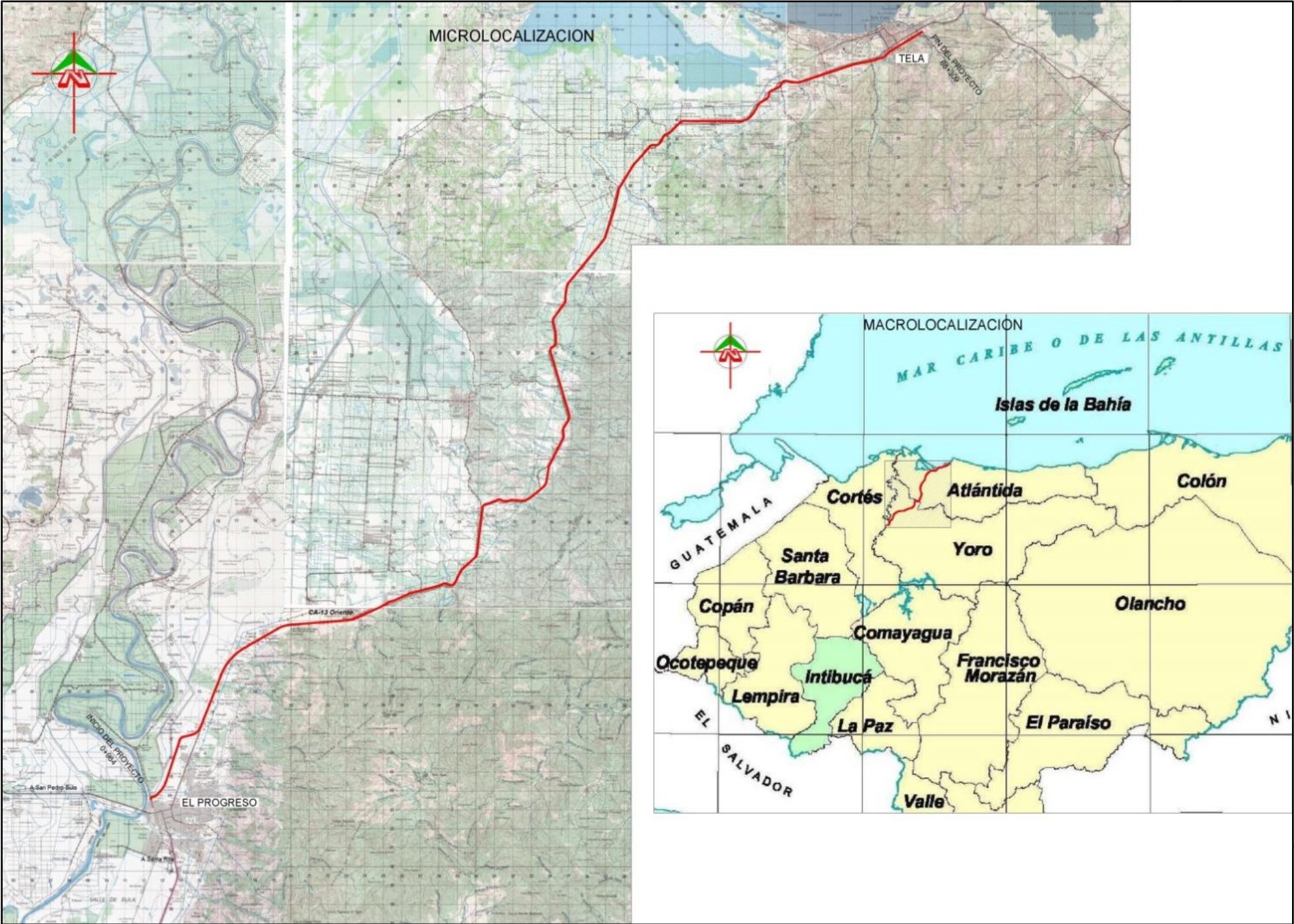




**The basic design of the site, is based on a general plan for the activity, work or project to be developed (N/A)**

**((Include the corresponding plans here,  
and the typical sections and the  
alignment))**

# Copy of the map sheet in which the AP is located



**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 10<sup>th</sup> 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 30<sup>th</sup> of July of 2013.

[SIGNATURE AND SEAL – ROLANDO CANIZALES VIJI

# **M- Request for the change of Use of Land for the BYPASS area**

**((Include certificate from the MUNICIPAL  
COUNCIL here for the change of land))**