

II. EXECUTIVE SUMMARY

This report summarizes the results of the Environmental Impact Assessment of the project "Construction of the Bypass in the City of San Miguel", which involves the construction of a four-lane highway that surrounds the city of San Miguel, joining the four main roads converging at this city, to avoid going through the city when moving in the eastern part of the country. Currently, driving through the city takes more than 30 minutes that will be reduced to 17 minutes, resulting in less congestion of light and heavy vehicles within the city. The project is part of the objectives of the Puebla-Panama Plan and the Government's five-year National Plan for Territorial Development (PNODT).

The Project

The project comprises 25,022 km and starts with a 3.66 km extension of a section of the Pan American Highway CA1 from the detour to Moncagua to km 131.91, which starts the Road Construction Section or section that connects the roads alternating tangents and curves: Military Road (RN18), Pan-American Highway (CA1) to La Union and Road to El Delirio (RN17), and other streets and roads in the area, using traffic circles and level crossings.

The project crosses the municipalities of Moncagua, Quelepa and San Miguel, all from the Department of San Miguel.

Four Bridges will be built at River Crossings: Bridges at rivers Taishihuat, Papalon and (2 bridges) will be built at Rio Grande de San Miguel; existing watercourses will not be diverted, and passage works will be built on all bridges as well as livestock pathways. The project also includes the construction of a Michinoeki (rest or break station). Cut and fill slopes will be produced and managed by means of geogrids, or hexagonal meshes or protection coverage, with adequate drainage, for proper stability.

The Resettlement Action Plan (PAR) for the project was completed. This document includes the basic guidelines governing the processes of land acquisition, compensation to owners/holders/occupants, population resettlement, restitution of economic units, communications, environmental management for all properties to be used as resettlement areas, as well as monitoring, follow up and evaluation processes. Three public consultations have been carried out under this project.

Project construction has been planned for 30 months at an estimated cost of U.S.\$ 238,878,839.15, covering an area of 1,590,275.84 m², including the road itself, traffic circles, embankments and a protection zone.

The Environment in the Catchment Area

The entire route of the project is between 79 and 286 m over sea level, flat to undulating areas in 60% of the route, with slopes of less than 15%; in the rest of the way. It is crossed by slopes of hills located mainly north of the City of San Miguel. Soils along the route are of relatively recent materials, including Latosols, Clayey soils, reddish Grumosols and alluvials, with mainly class III soils, although we found soils ranging from class II to class VIII soils.

The entire project is located in the Rio Grande de San Miguel basin, featuring flat areas with poor drainage areas that flood occasionally. The water table is very shallow, between 8 and 30 m deep. The whole area has poor water quality, according to the Water Quality Index General (ICA). The area that covers the project is mostly arable land, grassland or unused land, whose natural vegetation has been removed; several semi urban lots located along the areas of intersection with the main road are crossed. At the expansion section, the area that covers the project is mostly arable land, grassland or unused land, whose natural vegetation has been removed; several semi urban lots located along the areas of intersection with the main road are crossed. This area is characterized by increased activity and the presence of institutions, businesses and scattered homes; There is one school and several churches that will not be affected, only a footbridge will be reconstructed. The expansion stretch also includes a potential Protected Natural Area consisting of lava from the volcano of San Miguel, which could be slightly affected¹.

¹ In relation to a request sent to the Ministry of Environment and Natural Resources consulting on the status of the existing lava flow within the project area, the note ref. MARN-DDGA-GANP-CB-0720/2012 dated May 17, 2012 was received by which a resolution is issued that identifies the property as having "potential to become integrated into the System of Protected Natural Areas."

Riparian forests are found along river and stream crossings, and a secondary forest at the Road Construction Section; there are an average of 20 trees / ha and an index of plant diversity (SHANNON-WIENER) of 2.84, considered intermediate. We found four species of flora, three trees and a bush, threatened or endangered MARN (2009) and IUCN (2011) distributed over the course of the Project. According to MARN (2009), three fauna species are under the endangered category, a mammalian *Cuniculus paca nelsoni* reported in the secondary forest, at the beginning of the Road Construction Section, and three birds, and: *Mycteria americana*, *Burhinus bistrriatus* and *Aratinga strenua*, reported at the intersection of Rio Grande de San Miguel, at the end of the project.

The main development center is located in San Miguel. Along the project, despite being largely rural, there are areas with high urban development pressure, mainly at intersections of major roads where semi urban lots are located and also at the expansion stretch of the existing road. An estimated 588 land plots are crossed, which totally or partially affect about 66 primary structures: 53 homes, 12 galleys and 4 warehouses. There will be a temporary impact on power lines and water pipes and drains during construction.

We found a young population, where 55% are younger than 25 years of age and an income average that can be categorized as insufficient income to meet basic needs of the population, mainly rural.

In relation to the landscape areas of a recognized scenic value or importance are not impacted. Paleontological and archaeological sites were identified along the route where certain parts will be rescued

Impacts and Environmental Measures

The project's average ENVIRONMENTAL IMPACT VALUE was determined at (4.95), which is explained by the degree of anthropogenic intervention in the area, according to the "Methodology of Relevant Integrated Criteria" by Panama and Yanez, 1993.

The main potential negative impacts identifies in order of relevance are: Impact on properties and structures, reduction of infiltration by logging, air emissions by transport, earthmoving and excavations, crop and agricultural areas reduction , natural relief modification and changes in soil quality: Top Soil. In addition, there are positive impacts such as economic development, improved transport, traffic reduction, and therefore noise, dust and smoke in the city, employment generation, among others.

Environmental measures are proposed for significant negative environmental impacts, that have been divided into two sections, for purposes of this project: Section 1: CA1 to CA1 (To La Unión): at a cost of \$ 1,736,910.10 in environmental measures, \$ 1,419,016.88 in construction and \$ 317,893.22 in execution, and Section 2: CA1 (To La Unión) to RN17: \$370,122.80, in environmental measures, \$254,302.90 in construction and \$115,819.90 in execution. For a total of \$ 2,107,032.90 in environmental measures, \$ 1,673,319.78 in construction, \$433,713.12 in execution for the entire project.

The tables below show the environmental management program (EMP) for each section and includes: Management, monitoring and program schedule, by stages of construction and execution. Tables explain: Project activities that cause an impact, their description, proposed action and its description and type: prevention, mitigation or compensation, location, implementation agency, cost and expected outcome.

II.1.1 Section 1: CAI TO CAI (A La Unión)

II.1.1.1 Summary of Environmental Management Program

TABLE No. II.1. ENVIRONMENTAL MANAGEMENT PROGRAM FOR SM BYPASS ROAD 2012, CONSTRUCTION STAGE

STAGE	PROJECT ACTIVITY	DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL MEASURE	DESCRIPTION OF PROPOSED ENVIRONMENTAL MEASURE	LOCATION OF ENVIRONMENTAL MEASURE	PERSONNEL RESPONSIBLE FOR ITS IMPLEMENTATION	CALCULATED COST OF ENVIRONMENTAL MEASURE	TIME OF IMPLEMENTATION	EXPECTED RESULT
SITE PREP.	Cutting down trees and shrubs	Reduction of infiltration due to felling of riparian and secondary forest: trees, shrubs and wildlife Felling of trees, shrubs and grass during site preparation	Offsetting 1.1. Revegetation to offset for felling	Planting of 16,780 trees and 5,013 shrubs	Base of cut and / or fill slopes of Road Construction Section 15.105; roundabouts and triangles 907; and 5,013 shrubs between trees in project sites	Project owner	\$90,017.52	Last year of construction	Improved vegetation cover in the project area, compared to conditions before the project.
SITE PREP.	Clearing, cleaning and grubbing.	Reduction of crops and agricultural areas	1.2 Training for improving crops, soil and agroforestry	Hiring of a promoter for two and a half months for providing technical advice to farmers and distributing leaflets	Sections: 0+00-0+500, 1+000-3+000, 4+000-8+500, 9+000-12+000, 12+500-13+500, 14+000-20+000, 21+000-21+500, 22+000-23+500.	Project owner	\$ 2,261.00	Site preparation stage	Minimizing impacts from reduction of agricultural areas. Proper handling of crops.
SITE PREP.	Acquisition of rights of way	Impact on social amenities	Prevention 1.3 Pedestrian crossings and road safety	Construction of overpasses, speed bumps, sidewalks and road safety talks	San José School, from Road to Agua Zarca to Riverside Bridge, Military Route Road (RN19), Road to Apacunque, La Union Road Junction (CA1)	Project owner	\$205,840.00	Site preparation stage	Prevent project from impacting on the area of influence of social amenities, facilitate the movement of people, and provide benefits to the population from the construction, rather than making them feel concerned about their safety.
SITE PREP.	Clearing and grubbing and installation of work camp	Transport of sediment to rivers and streams	Prevention 1.4. Temporary drainage during site preparation	Installing temporary gutters and canals to prevent sediment from being swept down high sloping sections	Sections of stations 9+180 to 11+240, 11+240 to 11+600, 13+580 to 13+740, 13+740 to 14+600, 14+020 to 16,440, 16+600 to 16,760+ 16+840 to 17,000.	Project owner	\$18,060.00	Site preparation stage	Prevent sediment transport, erosion and inappropriate runoff management during site preparation stage.

ENVIRONMENTAL IMPACT ASSESSMENT
Construction of Bypass Road in the City of San Miguel

SITE PREP	Felling of trees and shrubs, clearing, cleaning and grubbing.	Impact on proposed protected area	Mitigation 1.5 Minimize impact on proposed protected area.	Almost vertical slope with hexagonal mesh to reduce impact on area and signage to restrict access	Protected area in expansion section Station 0+880 to 0+960	Project owner	\$ 33,400	Site preparation stage	Least possible impact on proposed protected area
SITE PREP.	Acquisition of rights of way, cutting trees and shrubs, clearing, cleaning and grubbing.	Reduction or division of agricultural land	Attenuation 1.6 Signage for cattle crossings	Placing signs to inform people of the location of cattle crossings.	Road to La Union, old road to Quelepa. Road to Canton Agua Zarca. Road to Plan de las Mesas. Road to Canton Las Delicias. Road to El Papalon.	Project owner	\$ 550.00	Site preparation stage	Minimizing impacts from the reduction or division of agricultural land.
SITE PREP.	Demolition of structures and others	Temporary impact on infrastructure: power poles, drinking water, drainages	1.7 Project social and environmental management	Establish an environmental management office to provide social assistance to the population, verify measures, carry out communication campaigns, etc.	Project walkthrough	Project owner	\$72,234.00	Site preparation stage	Prevent social conflicts and maintain good relations with neighbors of project Prevent inconveniences to the population, problems of access, property damage, accidents, etc. Provide accurate and timely information about the Project
SITE PREP.	Felling of trees and shrubs, clearing, cleaning and grubbing.	Possible impact on wildlife during site preparation	1.8 Measures to protect wildlife during site preparation.	Signage and staff training on respect for wildlife, and rescue wildlife found during walkthrough	Secondary forest sections, stations 3+500 to 4+100; and riparian forest sections, stations 8+900,13+000, 13+800, and areas with higher tree density.	Project owner	\$ 950.00	Site Preparation Stage	Minimizing impacts on wildlife.
SITE PREP.	Acquisition of rights of way, demolition of structures	Impact on commercial activities	Compensation 1.9 Supporting small businesses	Mark and provide free passage to customers of businesses located on the expansion section	Station 0+00 to 3+000, expansion section.	Project owner	\$2,400.00	Site preparation stage	Minimization of impacts on commercial activity.
SITE PREP.	Demolition of structures, setting up camp, felling, filling wells, quarry management and setting up camp	Possible contamination of soil and water by effluents, waste and residues from site preparation	Prevention 1.10. Effluent, waste and residue management during site preparation and filling of existing wells.	Waste, residue and effluent management, installation of 22 portable toilets and 22 waste bins for 500 employees in this stage, filling of existing wells.	Project camp and work fronts.	Project owner	\$10,980.00	During demolition of structures	Preventing contamination of soil and water as well as the proliferation of vectors in the workspace of the project that may affect the local population or the workers themselves.

SITE PREP.	Demolition of existing structure. Felling of trees and shrubs, clearing, cleaning and grubbing, setting up camp	Health risk due to outsiders	1.11 Prevention of health impacts during site preparation.	Campaigns for the prevention of HIV-AIDS, including workshops and testing	Area of indirect influence along the path of the project where we find greater presence of residences or businesses.	Project owner	\$ 1,641.00	Site preparation stage	Reduced risk of damage to population's health.
SITE PREP.	Demolition of existing structures, cutting of trees and shrubs, clearing, cleaning and grubbing, installation of work camp.	Occupational hazards to employees during site preparation	1.12 Occupational Safety measures during site preparation	Adaptation of prevention plan, fire extinguishers, signage and training	Project layout	Project owner	\$3,270.00	Site preparation stage	Reduced risk of damage to health of employees.
CONSTRUCTION	Application of asphalt concrete paving, miscellaneous: sidewalks, barriers and others, construction of waystation	Reduction of infiltration from impermeabilization of areas	2.1 Offsetting for impermeabilization and felling of areas	Offsetting for reduced infiltration and felling with fencing at El Socorro ANP	Fencing with sprouting fence posts and maintenance thereof at El Socorro ANP.	Project owner	\$ 110,718.64	Construction Stage, during the last year	Promoting infiltration through revegetation.
CONSTRUCTION	Supply of materials, earthworks, construction of tunnels, bridges and at-level crossings, slope treatment.	Emissions to air from transportation, earthworks and excavation	2.2 Dust control.	Covering truck hoppers, maintenance of machinery and equipment, regular watering at least three times a day in areas with the largest population and roads being used temporarily	Unpaved sections of the project layout and access roads used for supplying materials: Old road to Quelepa, station 5+260, neighborhood streets in Hato Nuevo: Housing Development at Las Margaritas, Joselyn, Alas Campos, San Francisco and Altos de Hato Nuevo, between station 12+450 and station 13+540. Road to Canton Las Delicias	Project owner	\$145,565.20	Construction stage	Reducing dust emissions
CONSTRUCTION	Construction of tunnels, bridges and at-grade crossings, slope treatment.	Modification of the natural relief, Soil instability from cut and fill slopes, Possible erosion processes	2.3 Slope management	Management of cut slopes: geogrid or hexagonal grid with berms, gutters and earth and filling walls: 2H/1V slope, protective cover, berms, earth walls and gutters.	Sections with cut and fill slopes, all throughout the project path.	Project owner	\$388,740.30	Construction Stage	Prevent instability caused by cuts and fills and erosion processes
CONSTRUCTION	Earthworks	Change in soil quality: topsoil	Prevention 2.4 Collection and reuse of topsoil	Separation, collection and reuse of topsoil.	Rural plots along the project walkthrough.	Project owner	\$52,080.00	Construction Stage	Prevention of pollution or alteration of topsoil.

CONSTRUCTION	Vehicular traffic during the operating stage of the project.	Estimated increases of up to 10dB(A)	2.5 Noise reduction measures	installation of hedgerows or walls for noise attenuation near homes or forested areas	Station 3+740, 3+900, 5+360, 8+260, 12+460 y 13+140.	Project owner	\$16,180.00	Construction Stage	Noise levels should not increase by more than 5 dB (A) near existing homes along the path of the project
CONSTRUCTION	Earthworks	Modification of drainage patterns during construction	Prevention 2.6 Maintenance of temporary drainage during construction.	Maintenance of temporary gutters and canals to prevent the transport of sediment in high sloping sections	Sections of stations 9+180 to 11+240, 11+240 to 11+600, 13+580 to 13+740, 13+740 to 14+600, 14+020 to 16,440, 16+600 to 16,760+ 16+840 to 17 000	Project owner	\$4,012.00	Construction Stage	Reduction of impacts generated by modification of surface drainage.
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalted concrete pavements, misc.; sidewalks, barriers, etc.	Possible impact on cultural-interest sites	2.7 Monitoring, rescue and / or recovery of cultural-interest sites	Perform rescue, recovery or additional walkthroughs at potential archaeological-interest sites	Location of archeological-interest sites: 4+100, 5+020, 5+500, 6+000, 7+700, 9+310, 9+700, 9+750, 17+200, 19+750	Project owner	\$ 16,600.00	Construction Stage	Protection of cultural-interest sites.
CONSTRUCTION	Supply of materials, earthworks, construction of tunnels, bridges and at-grade crossings, slopes treatment, most construction activities.	Noise caused by supplying and general construction activities	2.8 Setting up schedules, signage and training in populated areas	Set hours of 6 am to 6 pm and other noise reduction measures. Conduct signage and training	Throughout the project path and area of indirect influence at a distance of 100 m from the edge of the area of direct influence, where there are more people residing or conducting commercial activities.	Project owner	\$ 1,802.72	Construction Stage	Noise emission reduction
CONSTRUCTION	Earthworks, construction of tunnels, bridges and at-grade crossings, slope treatment.	Possible impact on forests and / or trees and proposed protected area	2.9 Measures to protect forests, soils and proposed protected area.	Demarcate working areas, protection of existing vegetation and fauna, and wildlife rescue	Indirect influence area of the project, with a high proportion of trees and sections of secondary forest, stations: 3+500 to 4+100; and riparian forest sections, stations: 8+900, 13+000, 13+800, and areas with higher tree density	Project owner	\$ 2,000.00	Construction Stage	Reducing impacts on forested areas.
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Health risk due to outsiders during construction	2.10 Prevention of health impacts during construction	Campaigns for the prevention of HIV-AIDS, including workshops and testing	Area of direct influence along the path of the project where we find greater presence of residences or businesses	Project owner	\$ 14,877.00	Construction Stage	Preventing the spread of disease
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Impact on roads and access routes for residents	2.11 Maintenance of temporary roads	Provide maintenance to roads to be used for the storage of materials.	Roads to be used: Old road to Quelepa, road to Hacienda El Refugio, Housing Development of Hato Nuevo, road to Canton Las Delicias,	Project owner	\$29,907.50	Construction Stage	Reducing impacts on temporary roads.

CONSTRUCTION	Supply of materials, earthworks, construction of tunnels, bridges and at-level crossings, slope treatment.	Possible contamination of soil and water by effluents, waste and residues from construction	2.12 Waste, residue and effluent management during construction	Waste and residue management and disposal, purchase of garbage bins and installation of 80 portable toilets	Project camp and work fronts.	Project owner	\$140,450.00	Construction Stage	Preventing contamination of soil and water through proper management of waste and residues.	
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Occupational hazards to employees during construction	2.13 Occupational safety measures during construction	Adaptation of prevention plan, fire extinguishers, signage and training	Project layout	Project owner	\$ 2,880,00	Construction Stage	Reducing risk of injury to employees.	
CONSTRUCTION	Project Construction.	Hazard of floods, landslides, volcanic activity and fires	2.14 Risk prevention plan	Removal of loose rocks, construction of earth walls for small landslides	Risk areas identified: station 3+700. 9+500, 15+800 to 16+300 y 6+500 to 7+100.	Project owner	\$51,600.00	Construction Stage	Prevent damage to areas prone to flooding, landslides, volcanic eruption and fires.	
TOTAL FOR PROPOSED ENVIRONMENTAL MEASURES SECTION 1, CONSTRUCTION STAGE								\$1,419,016.88		

TABLE No. II.2. ENVIRONMENTAL MANAGEMENT PROGRAM FOR SM BYPASS ROAD, OPERATING STAGE

STAGE	PROJECT ACTIVITY	DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMEN-TAL MEASURE	DESCRIPTION OF PROPOSED ENVIRONMENTAL MEASURE	LOCATION OF ENVIRONMENTAL MEASURE	PERSONNEL RESPONSIBLE FOR ITS IMPLEMENTATION	CALCULATED COST OF ENVIRONMENTAL MEASURE	TIME OF IMPLEMENTATION	EXPECTED RESULT
OPERATING	Cutting down trees and shrubs	Reduced infiltration due to felling, reduction of riparian and secondary forests: trees, shrubs and wildlife Felling of trees, shrubs and grass during site preparation	3.1 Maintenance of planted trees and shrubs	16,012 Maintenance of 16,012 planted trees and 4,154 shrubs	Base of cut and/or fill slopes in Road Construction Section: 15.105 trees; roundabouts and triangles: 907 trees and 4.154 shrubs.	Project owner	\$91,667.04	Two years during operation	Improved vegetation cover in the project area, compared to conditions before the project.
OPERATING	Maintenance of right of way	Continuous replacement of succession species and a higher probability of invasive species becoming established.	3.2 Integrated vegetation management	An integrated management of vegetation should be implemented including the use of larger species to provide habitats for plants and animals. Planting native species and removing invasive species. Avoid the use of chemical herbicides. Maintenance and vetiver grass on slopes	Secondary forest sections, Station 3+500 to 4+100 and riparian forest sections 8+900, 13+000, 13+800, and areas with higher tree density. All slopes with grass and / or vetiver	Project owner	\$162,156.18	Operating stage	Reduce the fringe effect and protect the semi-natural habitats found.
OPERATING	Road maintenance	Occupational hazards to employees during maintenance works	3.3 Occupational safety and waste and residue management during maintenance	Adaptation of prevention plan, fire extinguishers, signage and training	Project layout	Project owner	\$ 320.00	Operating stage	Prevent soil and water pollution and accident prevention among project workers
OPERATING.	Road Maintenance	Deterioration of protective walls in waterways, drainages and embankments.	3.4 Review and periodic maintenance of protection walls in waterways, drainages and embankments.	Inspection and possible maintenance of protection walls in watercourses every 6 months.	Throughout the project	Project owner (FOVIAL)	\$63,750.00	Operating stage.	Reduce possible risks to waterways where protection works have been built
TOTAL OF PROPOSED ENVIRONMENTAL MEASURES – SECTION 1, OPERATING STAGE							\$317,893.22		

II.1.1.2 Environmental Management Program execution schedule

We present the implementation schedule of the environmental measures for each environmental measure of prevention, mitigation and compensation proposed for the construction and operation stages separately. It includes a schedule for each of the project activities and environmental measures identified in the Environmental Management Program, according to each of the stages to be developed in accordance with planned time periods.

II.1.1.3 Monitoring description and implementation summary chart

Monitoring will be applied at each stage of the project to ensure the efficiency and effectiveness of the measures and controls implemented, and the corrective actions needed to implement them, as a result of periodic evaluations. The frequency of monitoring is determined by the nature of the project.

The awarded firm will be responsible for monitoring , and may do so through the technicians charged with this duty or by an accredited laboratory that the consultant will propose, the same as the standards used. This is presented separately for each of the project CONSTRUCTION AND OPERATION stages.

TABLE No. II.5. MONITORING MEASURES ENFORCEMENT SUMMARY TABLE FOR SM BYPASS ROAD, CONSTRUCTION STAGE

Stage	Environmental Measure	Parameters to consider	Place or point of monitoring	Frequency of monitoring	Method to use	Personnel responsible for monitoring	Interpretation of results	Feed-back	Text Reference
SITE PREP.	1.1 Revegetation to offset for felling	Number of individuals and species	Revegetation sites: project areas	Semiannual	Visual inspection and recording the number of trees in poor condition or lost	Project owner	Trees and shrubs in good condition and settled in	Maintenance of vegetation and replacement of individuals	IX-7
SITE PREP.	Attenuation 1.2 Training for improved crops, soil and agroforestry,	Improved crop management in terms of performance, additional income	Sections: 0+00-0+500, 1+000-3+000, 4+000-8+500, 9+000-12+000, 12+500-13+500, 14+000-20+000, 21+000-21+500.	Semiannual	Survey to beneficiaries	Project owner	Check for improvement in vegetation cover, yields and income to beneficiaries of the measure	Enhance training with people who have yet to achieve the objectives	IX-19
SITE PREP.	Prevention 1.3 Pedestrian crossings and road safety	Use of crossings and accident log	Location of crossings	Daily during construction	Survey to beneficiary population	Project owner	Minimize accidents and improve road safety knowledge	Enhance road safety talks	IX-20
SITE PREP.	Prevention 1.4 Temporary drainages during site preparation	Presence or erosion processes or gullies, poor drainage	The entire path of the project from station 4+000 to station 21+800	Monthly	Visual inspection and photographic record	Project owner	No presence of gullies or erosion processes	Cleaning and maintenance of drainages or installing new gutters or canals	IX-23
SITE PREP.	Mitigation 1.5 Minimize impact on proposed protected area.	State of proposed protected area	Station 0+880 to 0+960	Quarterly	Visual inspection and photographic report based on vegetation inventory	Project owner	Check for impacts to the area	Enhance training to workers regarding protection of the area	IX-25
SITE PREP.	Attenuation 1.6 Signage for cattle crossings	Awareness of cattle crossings and their use by beneficiaries	Sections with cattle pastures and crossings proposed	On completion of construction of cattle crossings	Survey to beneficiary population	Project owner	Verify the use of the proposed crossings	Inform the public of existing crossings to promote their use	IX-26
SITE PREP.	1.7 Project social and environmental management	Corroborate information provided by the population about the project and conflicts arising thereof	Walkthrough of the project and area of influence	Semiannual	Survey to population and evaluation and resolution of complaints	Project owner	Verify that information on the project and conflict resolution has been provided	Improve the means of informing the public and handling complaints	IX-28
SITE PREP.	1.8 Measures to protect wildlife during site preparation.	Presence of wildlife to protect in the area	Secondary forest sections: station 3+500 to 4+100; and riparian forest sections: 8+900, 13+000, 13+800 and areas with higher tree density	Semiannual	Sampling of wildlife at affected area, surveying of wildlife plots	Project owner	Check for the presence of wildlife species	Enhanced training to project workers on wildlife protection and establish barriers in sensitive areas	IX-33
SITE PREP.	Compensation 1.9 Supporting small businesses	Keeping businesses in operation	Station 0+00 to 3+000, extension section, and station 8+700.	Monthly, during works in this section	Survey to owners or managers of businesses	Project owner	Minimization of impacts on commercial activity.	Collaborate with other measures to keep businesses in operation	IX-36

TABLE No. II.5. MONITORING MEASURES ENFORCEMENT SUMMARY TABLE FOR SM BYPASS ROAD, CONSTRUCTION STAGE

Stage	Environmental Measure	Parameters to consider	Place or point of monitoring	Frequency of monitoring	Method to use	Personnel responsible for monitoring	Interpretation of results	Feed-back	Text Reference
SITE PREP.	1.1 Revegetation to offset for felling	Number of individuals and species	Revegetation sites: project areas	Semiannual	Visual inspection and recording the number of trees in poor condition or lost	Project owner	Trees and shrubs in good condition and settled in	Maintenance of vegetation and replacement of individuals	IX-7
SITE PREP.	Attenuation 1.2 Training for improved crops, soil and agroforestry,	Improved crop management in terms of performance, additional income	Sections: 0+00-0+500, 1+000-3+000, 4+000-8+500, 9+000-12+000, 12+500-13+500, 14+000-20+000, 21+000-21+500.	Semiannual	Survey to beneficiaries	Project owner	Check for improvement in vegetation cover, yields and income to beneficiaries of the measure	Enhance training with people who have yet to achieve the objectives	IX-19
SITE PREP.	Prevention 1.3 Pedestrian crossings and road safety	Use of crossings and accident log	Location of crossings	Daily during construction	Survey to beneficiary population	Project owner	Minimize accidents and improve road safety knowledge	Enhance road safety talks	IX-20
SITE PREP.	Prevention 1.4 Temporary drainages during site preparation	Presence or erosion processes or gullies, poor drainage	The entire path of the project from station 4+000 to station 21+800	Monthly	Visual inspection and photographic record	Project owner	No presence of gullies or erosion processes	Cleaning and maintenance of drainages or installing new gutters or canals	IX-23
SITE PREP.	Mitigation 1.5 Minimize impact on proposed protected area.	State of proposed protected area	Station 0+880 to 0+960	Quarterly	Visual inspection and photographic report based on vegetation inventory	Project owner	Check for impacts to the area	Enhance training to workers regarding protection of the area	IX-25
SITE PREP.	Attenuation 1.6 Signage for cattle crossings	Awareness of cattle crossings and their use by beneficiaries	Sections with cattle pastures and crossings proposed	On completion of construction of cattle crossings	Survey to beneficiary population	Project owner	Verify the use of the proposed crossings	Inform the public of existing crossings to promote their use	IX-26
SITE PREP.	1.7 Project social and environmental management	Corroborate information provided by the population about the project and conflicts arising thereof	Walkthrough of the project and area of influence	Semiannual	Survey to population and evaluation and resolution of complaints	Project owner	Verify that information on the project and conflict resolution has been provided	Improve the means of informing the public and handling complaints	IX-28
SITE PREP.	1.8 Measures to protect wildlife during site preparation.	Presence of wildlife to protect in the area	Secondary forest sections: station 3+500 to 4+100; and riparian forest sections: 8+900, 13+000, 13+800 and areas with higher tree density	Semiannual	Sampling of wildlife at affected area, surveying of wildlife plots	Project owner	Check for the presence of wildlife species	Enhanced training to project workers on wildlife protection and establish barriers in sensitive areas	IX-33
SITE PREP.	Compensation 1.9 Supporting small businesses	Keeping businesses in operation	Station 0+00 to 3+000, extension section, and station 8+700.	Monthly, during works in this section	Survey to owners or managers of businesses	Project owner	Minimization of impacts on commercial activity.	Collaborate with other measures to keep businesses in operation	IX-36

CONST.	2.8 Setting up schedules, signage and training in populated areas	Inconveniences to the population	Alongside the entire path of the project and the area of indirect influence at a distance of 100 m from the edge of the area of direct influence.	Quarterly	Survey to residents	Project owner	Prevent major inconveniences due to noise emissions and vibrations	Increase the measures proposed	IX-62
CONST.	2.9 Measures to protect forests, soils and proposed protected area.	State of vegetation, wildlife and soil	Forest and proposed protected area	Semiannual	Visual inspection and survey of wildlife plots	Project owner	Unaffected forest areas and proposed protected area	Enhanced protection measures	IX-64
CONST.	2.10 Prevention of health impacts during construction	Increase of disease among resident population and project workers	Area of indirect influence along the path of the project where we find greater presence of residences or businesses.	Semiannual	Log of diseases reported by workers and patient visits to area clinics	Project owner	Check for increase in foreign diseases	Enhanced training in prevention measures	IX-66
CONST.	2.11 Maintenance of temporary roads	Condition of temporary roads	Roads to be used: Old road to Quelepa, road to Hacienda El Refugio, Housing Development of Hato Nuevo, road to Canton Las Delicias.	Quarterly	Keep a log of visual inspections with photographs	Project owner	Roads in good condition	Improve with pothole repair, reconstruction of gutters and other measures	IX-69
CONST.	2.12 Waste, residue and effluent management	Proper waste management and evacuation to authorized sites or sale to companies for reuse	Project camp and work fronts.	Monthly	Visual inspection and photographic record of waste outlets	Project owner	Preventing contamination of soil and water through proper management of waste	Enhance employee training and site housekeeping	IX-70
CONST.	2.13 Occupational safety measures during construction	Log of accidents and incidents	Project layout	Monthly	Log	Project owner	Reduced risk of damage to health of employees.	Purchasing protective equipment and improving workers' awareness	IX-72
CONST.	2.14 Risk prevention plan	Event Log	The entire path of the project	Monthly	Log of landslides, floods and other events	Project owner	Prevent harm to workers and the general population	Apply risk minimization measures, as appropriate.	IX-75

TABLE No. II.6. MONITORING MEASURES ENFORCEMENT SUMMARY TABLE FOR SM BYPASS ROAD, OPERATING STAGE MEASURES

Stage	Environmental Measure	Parameters to consider	Place or point of monitoring	Frequency of monitoring	Method to use	Personnel responsible for monitoring	Interpretation of results	Feedback	Text Reference
SITE PREP. AND OPERAT.	3.1 Maintenance of planted trees and shrubs, related to Offsetting Measure 1.1.	Number of individuals and species	Revegetation sites: project areas	Semiannual	Visual inspection and recording the number of trees in poor condition or lost	Project owner	Trees and shrubs in good condition and settled in	Maintenance of vegetation and replacement of individuals	IX-78
OPERATING	Prevention 3.2 Integrated vegetation management	State of vegetation, wildlife and soil	Secondary forest sections, Station 3+500 to 4+100 and riparian forest sections 8+900, 13+000, 13+800, 22+000 and areas with higher tree density.	Monthly during road maintenance	Visual inspection and survey of wildlife plots	Project owner	Unaffected forest areas and proposed protected area	Enhanced protection measures	IX-79
OPERATING	3.3 Occupational safety and waste and residue management during maintenance	Log of accidents and incidents	Project layout	Monthly	Log	Project owner	Reduced risk of damage to health of employees.	Purchasing of protective equipment and improving workers' awareness	IX-81
OPERATING	3.4 Review and periodic maintenance of protection walls in waterways, drainages and embankments.	Maintenance and assessments records	Project layout	Semiannual	Supervision and enforcement of maintenance	Project owner.	Decrease in deterioration of walls, drainages and embankments and accident prevention.	Care and maintenance of walls, slopes and drainages.	IX-83

II.1.2 Section 2: From CA1 (To La Unión) to RN17

II.1.2.1 Summary of Environmental Management Program

TABLE No. II.7. ENVIRONMENTAL MANAGEMENT PROGRAM FOR SM BYPASS ROAD 2012, CONSTRUCTION STAGE

STAGE	PROJECT ACTIVITY	DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL MEASURE	DESCRIPTION OF PROPOSED ENVIRONMENTAL MEASURE	LOCATION OF ENVIRONMENTAL MEASURE	PERSONNEL RESPONSIBLE FOR ITS IMPLEMENTATION	CALCULATED COST OF ENVIRONMENTAL MEASURE	MOMENT OF IMPLEMENTATION	EXPECTED RESULT
SITE PREP.	Cutting down trees and shrubs	Reduction of infiltration due to felling, reduction of riparian and secondary forest; trees, shrubs and wildlife, felling of trees, shrubs and grasses during site preparation	Offsetting 1.1. Revegetation to offset for felling	Planting of 1,765 trees and 859 shrubs	Base of cut and / or fill slopes of Road Construction Section, 1,675 trees; roundabouts and triangles 90 trees and 5,013 shrubs between trees in project sites	Project owner	\$ 10,853.18	Last six months of project construction	Improved vegetation cover in the project area, compared to conditions before the project.
SITE PREP.	Clearing, cleaning and grubbing.	Reduction of crops and agricultural areas	1.2 Training for improving crops, soil and agroforestry	Hiring a promoter for three months to provide technical advice to farmers and distribute leaflets	Section: 21+800-25+022.	Project owner	\$ 439.00	Site preparation stage	Minimizing impacts from reduction of agricultural areas. Proper handling of crops.
SITE PREP.	Demolition of structures and others	Temporary impact on infrastructure: power poles, drinking water, drainages	1.7 Project social and environmental management	Establish an environmental management office to provide social assistance to the population, verify measures, carry out communication campaigns, etc.	Project walkthrough	Project owner	\$11,136.00	Site preparation stage	Prevent social conflicts and maintain good relations with neighbors of project Prevent inconveniences to the population, problems of access, property damage, accidents, etc. Provide accurate and timely information about the Project
SITE PREP.	Felling of trees and shrubs, clearing, cleaning and grubbing.	Possible impact on wildlife during site preparation	1.8 Measures to protect wildlife during site preparation.	Signage and staff training on respect for wildlife, and rescue wildlife found during walkthrough	Riparian forest sections, stations 22+000 and 24+800, and areas with greater tree density	Project owner	\$750.00	Site preparation stage	Minimizing impacts on wildlife.
SITE PREP.	Demolition of structures, setting up the working camp, felling, quarry management and installation of working camp	Possible contamination of soil and water by effluents, waste and residues from site preparation	Prevention 1.10. Effluent, waste and residue management during site preparation	Waste, residue and effluent management, installation of 3 portable toilets and 3 three garbage bins for 75 employees in this stage	Project camp and work fronts.	Project owner	\$1,230.00	During demolition of structures	Preventing contamination of soil and water as well as the proliferation of vectors in the workspace of the project that may affect the local population or the workers themselves.

ENVIRONMENTAL IMPACT ASSESSMENT

Construction of Bypass Road in the City of San Miguel

SITE PREP.	Demolition of existing structures, cutting of trees and shrubs, clearing, cleaning and grubbing, installation of work camp.	Health risk due to outsiders	1.11 Prevention of health impacts during site preparation.	Campaigns for the prevention of HIV-AIDS, including workshops and testing	Area of indirect influence along the path of the project where we find greater presence of residences or businesses.	Project owner	\$259.00	Site preparation stage	Reduced risk of damage to population's health.
SITE PREP.	Demolition of existing structures, cutting of trees and shrubs, clearing, cleaning and grubbing, installation of work camp.	Occupational hazards to employees during site preparation	1.12 Occupational Safety measures during site preparation	Adaptation of prevention plan, fire extinguishers, signage and training	Project layout	Project owner	\$2,730.00	Site preparation stage	Reduced risk of damage to health of employees.
CONSTRUCTION	Application of asphalt concrete paving, miscellaneous: sidewalks, barriers and others, construction of waystation	Reduction of infiltration from impermeabilization of areas	2.1 Offsetting for impermeabilization and felling of areas	Compensate for the reduction of infiltration by planting 150 trees in the same basin	Planting 150 trees on municipal lands	Project owner	\$753.00	Construction Stage	Promoting infiltration through revegetation.
CONSTRUCTION	Supply of materials, earthworks, construction of tunnels, bridges and at-level crossings, slope treatment.	Emissions to air from transportation, earthworks and excavation	2.2 Dust control.	Covering truck hoppers, maintenance of machinery and equipment, regular watering at least three times a day in areas with the largest population and roads being used	Unpaved sections of the project path and access ways used for the supply of materials: Road to Hacienda La Joya	Project owner	\$26,897.20	Construction Stage	Reducing dust emissions
CONSTRUCTION	Earthworks, construction of tunnels, bridges and at-grade crossings, slope treatment.	Modification of the natural relief, Soil instability due to cut and fill slopes	2.3 Slope management	Management of cut slopes: geogrid and with berms, gutters and earth and filling walls: 2H/1V slope, protective cover, berms, earth walls and gutters and vegetation cover under viaduct	Sections with cut and fill slopes, all throughout the project path. Turfed areas under viaduct.	Project owner	\$157,790.90	Construction Stage	Prevent instability caused by cuts and fills and erosion processes
CONSTRUCTION	Earthworks	Change in soil quality: topsoil	Prevention 2.4 Collection and reuse of topsoil	Separation, collection and reuse of topsoil.	Rural plots along the project walkthrough.	Project owner	\$ 537.00	Construction Stage	Prevention of pollution or alteration of topsoil.
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Possible impact on cultural-interest sites	2.7 Monitoring, rescue and / or recovery of cultural-interest sites	Perform rescue, recovery or additional walkthroughs of potential archaeological and paleontological-interest sites	Location of archaeological-interest sites: 24+180, 24+630, 24+870.	Project owner	\$5,200.00	Construction Stage	Protection of cultural-interest sites.

CONSTRUCTION	Supply of materials, earthworks, construction of tunnels, bridges and at-grade crossings, slopes treatment, most construction activities.	Noise caused by supplying and general construction activities	2.8 Setting up schedules, signage and training in populated areas	Set hours of 6 am to 6 pm and other noise reduction measures. Conduct signage and training	Throughout the project path and area of indirect influence at a distance of 100 m from the edge of the area of direct influence, where there are more people residing or conducting commercial activities.	Project owner	\$317.12	Construction Stage	Noise emission reduction
CONSTRUCTION	Earthworks, construction of tunnels, bridges and at-grade crossings. Treatment of slopes.	Possible impact on forests and / or trees and proposed protected area	2.9 Measures to protect forests, soils and proposed protected area.	Demarcate working areas, protection of existing vegetation and fauna, and wildlife rescue	Project indirect influence area with greater proportion of trees, sections of riparian forest, stations 22+000 and 24+800, and areas with higher tree density	Project owner	\$400.00	Construction Stage	Reducing impacts on forested areas.
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Health risk due to outsiders during construction	2.10 Prevention of health impacts during construction	Campaigns for the prevention of HIV-AIDS, including workshops and testing	Area of direct influence along the path of the project where we find greater presence of residences or businesses.	Project owner	\$2,223.00	Construction Stage	Preventing the spread of disease
CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Impact on roads and access routes for residents	2.11 Maintenance of temporary roads	Provide maintenance to roads to be used for the storage of materials.	Road to Canton El Papalon and to Rio Grande near Hacienda La Joya.	Project owner	\$6,257.50	Construction Stage	Reducing impacts on temporary roads.
CONSTRUCTION	Supply of materials, earthworks. Construction of tunnels, bridges and at-grade crossings, slope treatment.	Possible contamination of soil and water by effluents, waste and residues from construction	2.12 Waste, residue and effluent management during construction	Waste and residue management and disposal, purchase of garbage bins and installation of 80 portable toilets	Project camp and work fronts.	Project owner	\$20,050.00	Construction Stage	Preventing contamination of soil and water through proper management of waste and residues.

Construction of Bypass Road in the City of San Miguel

CONSTRUCTION	Traffic control, supply of materials, earthworks, minor drainage works, major drainage works, slope treatment, application of asphalt concrete pavement, horizontal and vertical signaling, miscellaneous: sidewalks, barriers and others.	Occupational hazards to employees during construction	2.13 Occupational safety measures during construction	Adaptation of prevention plan, fire extinguishers, signage and training	Project layout	Project owner	\$480.00	Construction Stage	Reducing risk of injury to employees.
CONSTRUCTION	Project Construction.	Fire hazard	2.14 Risk prevention plan	coordination with sugarcane farms	Identified risk areas: stations 23+500 to 23+900 and 23+100 to 23+500.	Project owner	\$ 6,000.00	Construction Stage	Prevent damage to areas by burning sugarcane for harvesting
TOTAL FOR PROPOSED ENVIRONMENTAL MEASURES SECTION 2, CONSTRUCTION STAGE							\$254,302.90		

TABLE No. II.8. ENVIRONMENTAL MANAGEMENT PROGRAM FOR SM BYPASS ROAD 2012, OPERATING STAGE

STAGE	PROJECT ACTIVITY	DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL MEASURE	DESCRIPTION OF PROPOSED ENVIRONMENTAL MEASURE	LOCATION OF ENVIRONMENTAL MEASURE	PERSONNEL RESPONSIBLE FOR ITS IMPLEMENTATION	CALCULATED COST OF ENVIRONMENTAL MEASURE	MOMENT OF IMPLEMENTATION	EXPECTED RESULT
OPERATING	Cutting down trees and shrubs	Reduction of infiltration due to felling of riparian and secondary forest: trees, shrubs and wildlife, felling of trees, shrubs and grasses during site preparation	3.1 Maintenance of planted trees and shrubs	Maintenance of 1,765 planted trees and 859 bushes and 150 trees to compensate for the loss of infiltration, during two years	Land proposed for El Socorro ANP, 150 trees; compensation for impermeabilization, base of cut and / or fill slopes in Road Construction Section, 1,6575 trees; roundabouts and triangles, 90 trees; and 859 shrubs between trees in the project sites	Project owner	\$11,163.36	Two years during operation	Improved vegetation cover in the project area, compared to conditions before the project.
OPERATING	Maintenance of right of way	Continuous replacement of succession species and a higher probability of invasive species becoming established.	3.2 Integrated vegetation management	An integrated management of vegetation should be implemented including the use of larger species to provide habitats for plants and animals. Planting native species and removing invasive species. Avoid the use of chemical herbicides. Maintenance of grass and vetiver	Riparian forest sections, stations 22+000 and 24+800 and areas with higher tree density. Areas with vetiver grass along the entire length of the section.	Project owner	\$94,896.54	Operating stage	Reduce the fringe effect and protect the semi-natural habitats found.
OPERATING	Road maintenance	Occupational hazards to employees during maintenance works	3.3 Occupational safety and waste and residue management during maintenance	Adaptation of prevention plan, fire extinguishers, signage and training	Project layout	Project owner	\$ 160.00	Operating stage	Prevent soil and water pollution and accident prevention among project workers

OPERATING	Road Maintenance	Deterioration of protective walls in waterways, drainages and embankments	3.4 Regular checking and maintenance of protective walls on waterways, drainages and embankments.	Inspection and possible maintenance of protection walls in watercourses every 6 months.	Throughout the project	Project owner (FOVIAL)	\$ 9,600.00	Operating stage.	Reduce possible risks to waterways where protection works have been built
TOTAL OF PROPOSED ENVIRONMENTAL MEASURES - SECTION 2 - OPERATING STAGE							\$115,819.90		

ENVIRONMENTAL IMPACT ASSESSMENT
Construction of Bypass Road in the City of San Miguel

STAGE	ENVIRONMENTAL MEASURE	IMPLEMENTATION TIME IN MONTHS																		Amount
		YEAR 1						YEAR 2						YEAR 3						
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	
CONST	2.3 Slope management																			\$157,790.90
CONST	Prevention 2.4 Collection and																			\$537.00
CONST	2.7 Monitoring, rescue and / or recovery of cultural-interest sites																			\$5,200.00
CONST	2.8 Setting up schedules, signage and training in populated areas																			\$317.12
CONST	2.9 Measures to protect forests, soils and proposed protected area.																			\$400.00
CONST	2.10 Prevention of health impacts during construction																			\$2,223.00
CONST	2.11 Maintenance of temporary roads																			\$ 6,257.50
CONST	2.12 Waste, residue and effluent management during construction																			\$20,050.00
CONST	2.13 Occupational safety measures during construction																			\$480.00
CONST	2.14 Risk prevention plan																			\$6,000.00
		TOTAL																		\$254,302.90

TABLE No. 11.10. SCHEDULE OF IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PROGRAM - SM BYPASS ROAD 2012, STAGE:

Stage	Environmental Measure	Implementation Time in Quarters								Amount	
		Year 1				Year 2					
		1	2	3	4	1	2	3	4		
Operation	Offsetting 3.1. Maintenance of planted trees and shrubs										\$11,163.36
Operation	3.2 Integrated vegetation management										\$94,896.54
Operation	Prevention 3.3. Occupational safety and waste and residue management during maintenance										\$160.00
Operation	3.4 Review and periodic maintenance of protection walls in waterways, drainages and embankments.										\$9,600.00
TOTAL										\$115,8195.90	

II.1.2.3 Monitoring description and implementation summary chart

Monitoring will be applied at each stage of the project to ensure the efficiency and effectiveness of the measures and controls implemented, and the corrective actions needed to implement them as a result of periodic evaluations. The frequency of monitoring is determined by the nature of the project.

The awarded firm will be responsible for monitoring , and may do so through the technicians charged with this duty or by an accredited laboratory that the consultant will propose, the same as the standards used. This is presented separately for each of the project CONSTRUCTION AND OPERATION stages.

TABLE No. II.11. MONITORING IMPLEMENTATION SUMMARY TABLE FOR SM BYPASS ROAD – 2012 CONSTRUCTION STAGE MEASURES

Stage	Environmental Measure	Parameters to consider	Place or point of monitoring	Frequency of monitoring	Method to use	Personnel in charge of monitoring	Interpreting the results	Feedback	Text Ref.
SITE PREP.	1.1 Revegetation for offsetting for tree felling	Number of individuals and species	Revegetation sites: project areas and land proposed for revegetation	Semiannual	Visual inspection and recording the number of trees in poor condition or lost	Project owner	Trees and shrubs in good condition and settled in	Maintenance of vegetation and replacement of individuals	IX7
SITE PREP.	Attenuation 1.2 Training for improved crops, soil and agroforestry,	Improved crop management in terms of performance, additional income	Sections: 22+000-23+500, 24+800-25+022.	Semiannual	Survey to beneficiaries	Project owner	Check for improvement in vegetation cover, yields and income to beneficiaries of the measure	Enhance training with people who have yet to achieved the objectives	IX-19
SITE PREP.	1.7 Resettlement action plan	State of the resettlement process	Proposed site for the relocation of persons	Quarterly, until completion of resettlement process	Survey to resettlers	Project owner	Relocation of people in conditions pursuant to PAR	The Project Owner reports to the Project Manager on identified problems in order to solve them	IX-28
SITE PREP.	1.8 Measures to protect wildlife during site preparation.	Presence of wildlife to protect in the area	Riparian forest sections, stations 22+000 and 24+800, and areas with greater tree density	Semiannual	Sampling of wildlife at affected area, surveying of wildlife plots	Project owner	Check for the presence of wildlife species	Enhanced training to project workers on wildlife protection and establish barriers in sensitive areas	IX-33
SITE PREP.	1.10 Measures to protect wildlife during site preparation.	Presence of wildlife to protect in the area	Riparian forest sections: 22+000 and 24+800 and areas with higher tree density	Semiannual	Sampling of wildlife at affected area, surveying of wildlife plots	Project owner	Check for the presence of wildlife species	Enhanced training to project workers on wildlife protection and establish barriers in sensitive areas	IX-38
SITE PREP.	1.11 Prevention of health impacts during site preparation.	Increase of disease among resident population and project workers	Indirect influence area along the path of the project where there is higher population density.	Semiannual	Log of diseases reported by workers and patient visits to area clinics	Project owner	Check for increase in foreign diseases	Enhanced training in prevention measures.	IX-41
SITE PREP.	1.12 Effluent, waste and residue management during site preparation	Proper waste management and evacuation to authorized sites or sale to companies for reuse	Project camp and work fronts.	Monthly	Visual inspection and photographic record of waste outlets	Project owner	Preventing contamination of soil and water through proper management of waste	Enhance employee training and site housekeeping	IX-43
CONST.	2.1 Offsetting for impermeabilization and felling of areas	Number of meters of fencing	Compensation sites: El Socorro ANP, Yayantique, La Union	Semiannual	Visual inspection and record of number of meters of fencing	Project owner	Number of meters of fencing and maintenance thereof	Maintenance of fence by rangers	IX-46

CONST.	2.2 Dust control.	Dust in the area of influence of the project caused by construction works	1 monitoring point where baseline was conducted	Monthly	Analysis of particulate matter in ambient air	Project owner	Particle levels less than 260 µg/m ³ , according to SALVADORAN STANDARD NSO 13.11.01:00	Increasing dust control measures in the affected areas	IX-49
CONST.	2.3 Slope management	Check for slope stability, landslides, tension cracks and presence of erosion processes	Sections with cut and fill slopes.	Quarterly, three years after project completion	Visual inspection and verification using surveying equipment if in doubt	Project owner	Check slopes for good condition	Check for slope stability through analysis	IX-52
CONST.	Prevention 2.4 Collection and reuse of topsoil	Inspection of topsoil management: storage site, mixing of soil horizons, etc.	Rural plots along the project walkthrough.	Monthly	Photographic record of inspection	Project owner	Prevention of pollution or alteration of topsoil.	Enhanced management training with workers	IX-55
CONST.	2.7 Monitoring, rescue and / or recovery of cultural-interest sites	State of identified sites and application of measures	Location of archaeological-interest sites, stations 24+180, 24+630, 24+870.	Semiannual	Register of surveys, rescues and / or walkthroughs made	Project owner	Protection of cultural-interest sites.	Improving protection measures	IX-60
CONST.	2.8 Setting up schedules, signage and training in populated areas	Inconveniences to the population	Alongside the entire path of the project and the area of indirect influence at a distance of 100 m from the edge of the area of direct influence.	Quarterly	Survey to residents	Project owner	Prevent major inconveniences due to noise emissions and vibrations	Increase the measures proposed	IX-62
CONST.	2.9 Measures to protect forests, soils and proposed protected area.	State of vegetation, wildlife and soil	Forests	Semiannual	Visual inspection and survey of wildlife plots	Project owner	Unaffected forest areas and proposed protected area	Enhanced protection measures	IX-64
CONST.	2.10 Prevention of health impacts during construction	Increase of disease among resident population and project workers	Area of indirect influence along the path of the project where we find greater presence of residences or businesses.	Semiannual	Log of diseases reported by workers and patient visits to area clinics	Project owner	Check for increase in foreign diseases	Enhanced training in prevention measures	IX-66
CONST.	2.11 Maintenance of temporary roads	Condition of temporary roads	Roads to interrupt: Road to Hacienda La Joya.	Quarterly	Keep a log of visual inspections with photographs	Project owner	Roads in good condition	Improve with pothole repair, reconstruction of gutters and other measures	IX-69
CONST.	2.12 Waste, residue and effluent management	Proper waste management and evacuation to authorized sites or sale to companies for reuse	Project camp and work fronts.	Monthly	Visual inspection and photographic record of waste outlets	Project owner	Preventing contamination of soil and water through proper management of waste	Enhance employee training and site housekeeping	IX-70
CONST.	2.13 Occupational safety measures during construction	Log of accidents and incidents	Project layout	Monthly	Log	Project owner	Reduced risk of damage to health of employees.	Purchasing of protective equipment and improving workers' awareness	IX-72
CONST.	2.14 Risk prevention plan	Event Log	The entire path of the project	Monthly	Log of landslides, floods and other events	Project owner	Prevent harm to workers and the general population	Apply risk minimization measures, as appropriate.	IX-75

TABLE No. II.12. MONITORING IMPLEMENTATION SUMMARY TABLE FOR SM BYPASS ROAD – 2012 OPERATING STAGE MEASURES

Stage	Environmental Measure	Parameters to consider	Place or point of monitoring	Frequency of monitoring	Method to use	Personnel in charge of monitoring	Interpretation of results	Feedback	Text ref.
OPERATING	3.1 Maintenance of planted trees and shrubs 1.1	Number of individuals and species	Revegetation sites: project areas and land proposed for revegetation.	Semiannual	Visual inspection and recording the number of trees in poor condition or lost	Project owner	Trees and shrubs in good condition and settled in	Maintenance of vegetation and replacement of individuals	IX-78
OPERATING	Prevention 3.2 Integrated vegetation management	State of vegetation, wildlife and soil	Riparian forest sections, stations 22+000 and 24+800 and areas with higher tree density.	Monthly during road maintenance	Visual inspection and survey of wildlife plots	Project owner	Unaffected forest areas and proposed protected area	Enhanced protection measures	IX-79
OPERATING	3.3 Occupational safety and waste and residue management during maintenance	Log of accidents and incidents	Project layout	Monthly	Log	Project owner	Reduced risk of damage to health of employees.	Purchasing of protective equipment and improving workers' awareness	IX-81
OPERATING	3.4 Review and periodic maintenance of protection walls in waterways, drainages and embankments.	Maintenance and assessments records	Project layout	Semiannual	Supervision and enforcement of maintenance	Project owner.	Decrease in deterioration of walls, drainages and embankments and accident prevention.	Care and maintenance of walls, slopes and drainages.	IX-83