

## 1.2 Terms of References (TORs) for EIAs

Once a project or development has gone through the screening and scoping phases, the authority responsible for processing the EIA provides the client with a Terms of Reference (TOR) document. The TOR provides details of all the information required for the EIA review committee to make an informed decision about awarding the Environmental Licence. Depending on the country, TORs may be developed specifically for the project, or they may be a general set of guidelines that apply to all projects in a sector. The following are examples of TORs from several CAFTA countries.

They include:

- Example 1: Overview contents of the TOR (for EIA studies), general information
- Example 2: Terms of Reference for Hydroelectric Energy Projects, categories 2,3,4 in Honduras
- Example 3: Terms of Reference, General, categories A & B1 (high and moderate to high impact) in Guatemala

### Example 1: Contents of the TOR (for EIA studies)

Source: FAO (n.d.). *Environmental impact assessment of irrigation and drainage projects: Chapter 5, preparation of terms of reference*. Online:  
<http://www.fao.org/docrep/v8350e/v8350e0d.htm>

Country/Organization: FAO Corporate Document Repository

Sector: general

Categories: general

The TOR should commence with a brief description of the programme or project. This should include a plan of the area that will be affected either indirectly or directly. Basic data should be given on existing and proposed irrigation and drainage in the area and the catchment characteristics. The institutions that are involved in the proposal should also be given.

An overview of the local environment should follow the general description. This will include socio-economic information, land use, land tenure, water use in the area and any particular aspect of the flora and fauna. If other studies have been completed a list of available reports should be given.

A brief description should be given of the most important institutions, including those responsible for the EIA, the project executing agency and future managers. This should be presented in the form of an organogram.

A description of the work to be undertaken should give a general set of requirements for determining the potential impacts of, and impacts on, the proposed project.

#### **The TOR should require the consultants to cover the following points:**

- Whether a range of proposals should be considered and if so whether they would be less environmentally damaging;
- The main environmental effects of the proposed project, both in the project area and in the surrounding area and the timescale of the impacts;

- The size and extent of the impacts based as much as possible on quantitative data rather than qualitative assessment. In some cases it may be necessary to highlight certain topics (such as waterlogging, resettlement etc as discussed in Chapter 4) when a particular issue is known to be of concern. In most cases, however, it may be preferable not to mention any specific topic and make the consultant responsible for a complete review of all topics;
- Those groups that will benefit and those disadvantaged by the project;
- The impact on any rare species of plant or animal in the area;
- The impact on human health;
- The control and management aspects of the project to determine if they will be effective;
- The need for further baseline data collection or other specialist studies;
- The present policy, institutional and legislative situation and future needs;
- The mitigating measures needed and how they should be incorporated into the project design;
- The monitoring and evaluation activities that are required to ensure that mitigating measures are implemented and future problems are avoided.

The TOR should give an indication of the team considered necessary for the study. Depending on the scope of the study this may include one or several of the following: an irrigation specialist, drainage specialist, rural sociologist, terrestrial ecologist (of various specializations), aquatic ecologist/fisheries expert, hydrologist, agronomist, soil chemist or physicist, economist and epidemiologist. However, as mentioned earlier the team should not be rigidly imposed on the consultant.

#### Example 2: TERMS OF REFERENCE (TOR) FOR HYDROPOWER GENERATION PROJECTS

Source: USAID (2009). *Technical Review Guidelines: Energy Generation and Transmission*. Vol 1, pt 2. P. 29-52

Country: Honduras  
Sector: Energy  
Categories: 2, 3, 4

##### A. OVERVIEW

These terms of reference (TOR) describe the minimum requirements for the development of the Environmental Impact Assessment (EIA) for proposed hydropower generation projects, designed to generate and distribute electrical power. Both the TOR and the cross referenced "EIA Technical Review Guidelines for Energy Power Generation and Transmission Projects" should be used to establish minimally acceptable conditions for satisfying the requirement to submit an EIA. There are four different TORs for energy projects which are designed with a common overview and distinct TORs for different types of energy power generation and transmission. Part A, Overview, is common to all of them but Part B is tailored respectively to: 1. Thermal/Combustion Power Generation Projects, 2. Hydropower Generation Projects, 3. Other Renewable Energy Generation Projects, and 4. Transmission Lines. The four TORs are structured to facilitate mixing and matching as appropriate to the purpose and need for a proposed project and alternatives.

The basic format for the EIA document that should be followed is:

- Table of Contents
- Acronyms and Abbreviations
- Executive Summary
- General Information
- Project and Alternatives Description
- Environmental Setting
- Assessment of Impacts
- Mitigation and Monitoring Measures
- Environmental Management Plan
- Commitment Statement
- Annexes

In general, the EIA must identify and address:

- Applicable environmental standards, norms, and requirements set forth at the international, national, regional and/or local levels including those designed to meet the objectives of resource management and/or land use plans that may be in effect in and around the jurisdiction(s) in which you propose to develop the project and in which the proposed project might have a potential impact. In the absence of such standards, identify a set of benchmarks that can be used in the analysis and the basis for your selection. The guideline identifies standards in use by various countries and international organizations in Appendix C.
- Public/Stakeholder concerns related to impacts in and around the proposed project and alternatives at least for stakeholders within the geographic scope of potential impact. The project proponent should document specific steps taken to engage the public and other stakeholders, and engage these publics as early as possible before undertaking to prepare the EIA. Concerned publics include: local governments, persons living and working in the vicinity of the project, those with interests in resources that may be affected i.e., indigenous peoples, and those concerned about protected areas and prime agricultural lands. A summary of public outreach activities, audience, number of persons, organizations involved, concerns raised, responses to comments and actual copies of written comments received should be included in the Annex.
- All relevant plans related to the proposed energy project, for example, engineering and site preparation plans, operations and decommissioning or closure, environmental management, and mitigation in whatever form these may take.
- All phases of the project from feasibility studies to site preparation to operations to closure and also plans to expand capacity at the current or adjacent sites.
- Alternative approaches to meeting the purpose and need for the proposed energy project include alternative siting, alternative configuration on the site, designing, constructing, operating and decommissioning the project firstly to avoid and prevent, or secondly to reduce or minimize adverse or improve beneficial environmental or socio-economic impacts. The EIA should assess as appropriate the impacts of a range of representative reasonable and technically feasible alternatives as well as the proposed project. The alternatives to the project must

include a “no action” alternative, indicating what would happen in the absence of the proposed project as well as consideration of best practices that may not otherwise have been incorporated in the proposed project. Other alternatives should be developed as needed to address significant issues with the proposal.

- Direct, indirect and cumulative impacts and their significance level.
- Uncertainty and how that uncertainty will be addressed through monitoring and contingency plans as may be needed to reduce risk of adverse impacts in the future.
- Specific commitments, including who is responsible, what will be done, when and how it will be monitored, reported and audited to confirm that commitments are met.

Finally, a key part of the TOR is obtaining a legally binding commitment from the project proponent that the approved EIA will be implemented as presented. Such a commitment adds to the legal enforceability of the outcomes of the EIA process.

## *B. DETAILS FOR HYDROPOWER GENERATION PROJECTS (TOR)*

### *0 Table of Contents*

***A general Table of Contents for the Environmental Impact Assessment (EIA) shall be provided. The Table of Contents shall be organized in such a manner as to facilitate the use of the EIA by reviewers and project implementers. EIAs for larger projects should have a more detailed Table of Contents than those for smaller projects. At a minimum, the Table of Contents shall include the following:***

- Acronyms and Abbreviations
- Executive Summary
- General Information
  - Objectives and Justification
  - Project Proponents
  - Project Team
  - Legal and Regulatory Framework
- Project and Alternatives Description
- Environmental Setting
  - Physical Environment
  - Geologic Resources
  - Soil Resources
  - Water Resources
  - Air and Climate
  - Noise and Vibration
  - Aesthetic Resources
- Biological Environment
  - Vegetation/Flora
  - Aquatic and Terrestrial Wildlife/Fauna
  - Ecosystems: Terrestrial, Wetlands, Aquatic, Marine
  - Endangered or Threatened Species and Habitat
  - Protected Areas
- Social-Economic-Cultural Environment
  - Socio-Economic Conditions
  - Infrastructure
  - Cultural, Archeological, Ceremonial and Historic Resources
  - Land Use
- Assessment of Impacts to resources described in the Environmental Setting

- Mitigation and Monitoring Measures
- Environmental Management Plan
- Overview of Environmental Management Plan Organization and Policy
- Project-wide Mitigation Plan
- Project- wide Monitoring Plan
- Management of Other On- or Off-Site Pollution Controls and Infrastructure
- Contingency Plans
  - Performance-related Contingency Plan
  - Natural Disaster Risk Response Plan
  - Other Risk Response Plans
- Signed Commitment Statement
- Annexes
- Public Consultation
  - Public Consultation Plan
  - Summary of Public Outreach Activities
  - Summary of Responses to Comments
  - Copies of Written Comments
- Technical Supporting Materials
  - Maps and Plans, in the sequence mentioned in the EIA document
  - Charts and Figures
  - Details about predictive modeling used, calculations and assumptions
  - Special Studies
- References

## 1 Acronyms and Abbreviations

**All acronyms and abbreviations used in the EIA must be clearly and succinctly defined and described in this section. This will relieve the reader of the need to search for the first occurrence of a word and the citing of the acronym or abbreviation in the text.**

## 2 Executive Summary

**A general summary of the EIA shall be provided in this section. The summary shall be written using a vocabulary that can be easily understood by the public. It shall include at least the following information about the project from the EIA:**

- Objectives and Justification
- Location
- Project Proponents
- Project Description
- Other Project Alternatives
- Environmental Setting
- Evaluation of Impacts
- Mitigation and Monitoring Measures
- Environmental Management Plan
- Issues raised by stakeholders and any outstanding issues

## 3 General Information

### 3.1 Objectives of and Justification for the Proposed Project

**3.1.1 Objectives:** A statement of the general and specific objectives (purpose) of the proposed project, including whether it is a new project, an expansion of an existing project (e.g., increase in land area or increase in annual production) or modernization of an existing operation.

**3.1.2 Justification for the Project:** Provide a justification for the proposed project (need) highlighting the benefits to surrounding communities and economic development of the region and country.

### 3.2 Project Proponents

- 3.2.1 Names, addresses, telephone numbers, and applicable legal documentation of proponents (including developers, major equipment suppliers if part of project team, shareholders and providers of financing, and representatives).
- 3.2.2 Names and contact information for responsible parties within the organization.
- 3.2.3 Financial viability of the company (including a certified banking statement indicating that the company is financially stable and reputable).
- 3.2.4 Bonding requirements and proof of ability to meet bonding requirements sufficient to cover the anticipated costs of environmental management during all phases, as well as the costs, by a third party, of decommissioning and long-term post-closure liabilities associated with the project.

### **3.3 Project Team**

*This section shall provide information on the multidisciplinary team that prepares the EIA. The types of professionals included in the team shall be appropriate to the type of project and the type of environment in which the project is located and may include (but not be limited to) engineers, architects, biologists, geologists, hydrologists, air quality experts, archeologists, anthropologists, sociologists and economists. The information provided for each member of the EIA project team includes the following:*

- 3.3.1 Names, addresses and registry numbers of contractors.
- 3.3.2 Names, contact information, qualifications and registry numbers of key personnel involved in the study; as well as an affidavit indicating their area of participation.
- 3.3.3 List of professionals/experts participating in the EIA, their areas of expertise, degrees, experience, professional registrations and stamps, seals and signatures.

### **3.4 Legal and Regulatory Framework**

*This section of the EIA shall define the legal framework under which the EIA is being completed listing and summarizing requirements or alternatives used as benchmarks, and evidence of non-applicability or compliance, including:*

- 3.4.1 Information that demonstrates rights and access:
  - 3.4.1.1 Ownership with written authorization
  - 3.4.1.2 Governmental authorization (if required)
  - 3.4.1.3 Period of lease/permit
  - 3.4.1.4 Maps showing the lease/permit area
- 3.4.2 Applicable environmental standards, norms and requirements set forth at the international, national, regional and/or local levels
  - 3.4.2.1 In the absence of such standards, identify a set of benchmarks used in the analysis
- 3.4.3 Required regulatory approvals and/or permits for all stages and their status
- 3.4.4 Applicable land use requirements (demonstrate conformity and compliance with applicable plans)
- 3.4.5 Applicable natural resource management or protected area management plans and responsible agency(ies) (demonstrate conformity and compliance with all applicable plans)

## **4 Project and Alternatives Description**

*The project proponent shall submit a full description and location of the proposed project and reasonable alternatives including ancillary facilities and operations such as the camp/housing for construction and operation phases, borrow and disposal areas, sanitary services, waste disposal and transportation infrastructure, etc. as addressed through 4.1 to 4.3 below. It shall include at a minimum:*

### **4.1 Location**

*The general location of the project and associated activities in terms of:*

- 4.1.1 Political-administrative location (region, district, town or other relevant political-administrative units) with accompanying location map
- 4.1.2 Means of site access – i.e., by air, river, road, train or vehicle
- 4.1.3 Latitude and longitude of project area
- 4.1.4 Maps of project area at a scale of no less than 1:50,000 or as required by the regulatory agency
  - 4.1.4.1 Project plat plan and location on a fold-out 11" X 17" page.
  - 4.1.4.2 Indicate the project area and the direct and indirect areas of influence for the physical, biological and social-economic-cultural impacts

4.1.4.3 All drawings should present scale and key coordinates or benchmarks as latitude/longitude, Universal Transverse Mercator (UTM) coordinates, or local survey plate that can be cross-referenced to latitude/longitude or UTM coordinates

## 4.2 Summary of Proposed Project and Alternatives

*All project alternatives that are reasonable and feasible and meet the purpose and need for the proposed project shall be identified, summarized in this section, and evaluated in the EIA as appropriate. In addition to the proposed project, such alternatives include alternative locations, alternative fuels, alternative site configuration of elements of the project, alternative size and output capacity, and alternative plans for construction, operation and decommissioning of the power plant including best practices that may avoid and/or reduce the adverse impacts to the physical, biological or social-economic-cultural environments.*

*If the project area or the buffer zone of the project area for an alternative is in an ecologically fragile area, the description of the alternative must include a clear justification for not opting for another site. Identify which alternatives will be carried through the analysis in the EIA and the basis for that decision.*

## 4.3 Project and Alternatives Details

*The EIA shall provide specific project details for the proposed project and each alternative as identified in subsections 4.3.1 through 4.3.5. The level of detail presented shall be the same for the proposed project and each alternative evaluated. The following project details shall be provided:*

### 4.3.1 Project facilities

#### 4.3.1.1 Type and nature of the hydropower project

- Type (conventional, pump storage, dam/reservoir, diversion, run-of-river, marine, hydrokinetic, etc.)
- Capacity: maximum, minimum and average power output as MW, and as MWhrs by month and season

#### 4.3.1.2 Project operations

- Description of how the project would operate (seasonally, monthly, daily, hourly, as appropriate)
- Mode of operation (peaking, base load, run-of-river, storage)

#### 4.3.1.3 Design and engineering features of the main hydropower plant

Describe the composition, dimensions, and configuration of each of the following:

- Intake

Describe the water point of intake in terms of:

- Peak level in m above mean sea level (AMSL)
- Length in m
- Operation mechanisms such as grids, gates, useful volume, dead volume etc.

- Dam (if applicable)

- Type
- Height, height of crown and length in m
- Type and number of gates

- Reservoir (if applicable)

- Surface area
- Maximum and minimum operational pool level in m AMSL
- Total volume in m<sup>3</sup>
- Operational volume in m<sup>3</sup>
- Information on reservoir strata and limnology
- Sediment storage in m<sup>3</sup>
- Retention time
- Height-volume curve
- Lining (if applicable)

- Power house

- Number and type of turbines
- Minimum and maximum hydraulic capacity of turbines
- Cooling system
- Generators
- Other special equipment

- Tunnels and canals

- Lengths in km
  - Cross sections indicating size in m and construction materials
- Penstocks and pipelines
  - Lengths in km
  - Cross sections indicating size in m and construction materials
- Transmission lines (any connections and new lines associated with the
- hydropower project)
  - Plans to connect to existing transmission lines
  - New transmission lines (making following bullets a lower order)
    - Line voltage
    - Total length of line in km
    - Minimum height of conductors over ground level
    - Width of the right of way in meters
    - Source
    - Destination
    - Number and types of towers
    - Height of towers
    - Number of circuits, stations and transformer yards
    - Points of interconnection between existing and new
- Other works  
Describe additional works such as spillways, gates, fishways, oscillation tanks or balance shafts, flow protection works, infrastructure and flow metering equipment, water and power quality.
- For hydrokinetic projects, the description does not need to include any items listed above that are not pertinent, but should include the physical composition, dimension, and general configuration of the power generation facility, and any anchoring, mooring, transmission line, or other structures

#### 4.3.1.4 Design Drawings for Project Facilities

- Plan (overhead view)
- Elevations (front view)
- Profiles (side view)
- Sections

#### 4.3.1.5 Onsite Support Facilities

Location and design information – composition, dimensions, and configuration including site drawing (digitized) showing project layout of all project components and their relationship to each other for the following:

- Offices and onsite housing
- Laboratories
- Power generation
- Storage
- Repair shops
- Fuel stations
- Sanitary Facilities
- Water supply
  - Requirements (m<sup>3</sup>/day)
  - Rights
  - Sources
  - Distribution
- Waste handling and disposal
- Fencing

### 4.3.2 Access

#### 4.3.2.1 Roads

- Identify all new and existing roads to be used (including closed roads that will be reopened, if applicable)

Traffic volume, operating speeds and trip times

Closed roads that will be reopened

- Detailed information on any roads to be constructed or upgraded
  - Location
  - Timing of construction
  - Road surface and shoulder width and barriers
  - Grade
  - Construction methods including clearing and grubbing
  - Construction materials
  - Compaction
  - Stream crossings and associated designs
  - Animal crossings
  - Sedimentation and erosion prevention and control structures and practices
  - Stabilization methods for cuts and fills
  - Typical elevations for each type and situation of road displaying construction materials, levels of compaction and erosion and sedimentation features
  - Location and size (area and volume of material) of borrow pits
  - Operation
  - Closure plan
  - Traffic volume, operating speeds and trip times
- Dust control for construction and operation
- Maintenance
- Roster for construction and maintenance equipment, specifying type and quantity by size, motor size, and fuel requirements

4.3.2.2 Other transport systems (if applicable)

- Rail transport – Same as for Roads with the addition of:
  - Tightest curves
  - Track construction materials
  - Turnouts and sidings
  - Railroad communications and signaling
- Waterways
  - Location, design, construction and operation of loading docks
  - Rosters of boats used to move barges, specifying type and quantity by: size, motor size, and fuel requirements
  - Maintenance
- Overland conveyors
  - Location, design, construction and operation of conveyors
  - Stream and road crossing designs to prevent falling debris
  - Dust control for construction and operation
  - Maintenance

4.3.3 Construction phase and timetable

4.3.3.1 Schedule for each phase of construction for all project and ancillary facilities including, but not limited to:

- Mobilization
- Road construction and improvements
- Land clearing
- Blasting
- Borrow and spoil disposal
- Erosion and sediment control
- Cofferdam construction and removal
- Dewatering wells
- Excavation and subgrade preparation

- Foundation preparation
- Concrete work
- Construction or installation of each project facility
- Embankment earthwork
- Stabilization of disturbed areas

4.3.3.2 A GANTT or critical path management chart for the entire project, from start to finish

4.3.3.3 Equipment

- Equipment Roster specifying type and quantity by size, weight, motor size, and fuel requirements for each piece of equipment or machinery used in each activity
- Transportation mobilization and mobilization frequency
- Machinery and equipment mobilization routes to be used, as well as the features of the ways on which they will be transported, including a map of routes, as applicable, and mobilization.

4.3.3.4 Labor during construction

- Number and type of employees (by local hire and non-local hire) by field of expertise
  - Days per week
  - Hours per day
  - Shifts per day

4.3.3.5 Raw materials to be used for construction

- Give a complete list of the raw materials and construction materials to be used, indicating the amounts per day, month, and the storage means
- Include an inventory of chemical, toxic or hazardous substances, active elements, sites and storage means, safety aspects regarding transportation and handling and any other relevant information

4.3.3.6 Construction camp (if applicable)

Description of the camp including but not limited to:

- A map showing all facilities at a legible scale appropriate to the size of the project
  - Buildings by type (use) and size
  - Roads
  - Electrical transmission lines and/or substation
  - Drainage
- Water supply and distribution
  - Distribution system
  - Use (m<sup>3</sup>/day)
  - Rights
  - Sources
- Waste handling and disposal components
  - Sewers
  - Wastewater treatment
  - Solid waste facilities
- Energy generation and use requirements
- Closure or transition from construction camp to final onsite housing

4.3.4 Operation phase

4.3.4.1 Pre-operation Phase: reservoir filling plan (if appropriate) including, but not limited to:

- Proposed filling rate with definite hold periods for observation
- Options to control filling
- Schedule for inspection and evaluation of structures and instrumentation

4.3.4.2 Operation information

- Roster of equipment and machinery to be used during operation, specifying type and quantity by size, weight, motor size, and fuel requirements for each activity
- Labor during operation
  - Number and type of employees (by local hire and non-local hire) by field of expertise

- Days per week
- Hours per day
- Shifts per day
- Overall energy requirements and sources
- Raw materials to be used for operation
  - List of the raw materials to be used, indicating the amounts per day, month, and the storage means
  - Inventory of chemical, toxic or hazardous substances, active elements, sites and storage means, safety aspects regarding transportation and handling and any other relevant information

#### 4.3.5 Closure and decommissioning plan

If it becomes clear that closure will be required, or when the project nears the end of its service life, the project operator shall contact the proper regulatory agency(ies) to obtain the environmental guidelines to carry out the closure or decommissioning.

4.3.5.1 The project description shall include at least a general Restoration and Closure Plan, recognizing that terms of closure may be very different when this phase approaches.

4.3.5.2 The description of restoration measures should include the size of the area to be restored as well as concurrent, temporary and final restoration measures to be used and their schedules. For each measure include:

- Area to be addressed
- Timing and schedule for executing measures
- Equipment and structure removal or conversion
- Remedial measures, including success indicators and contingency measures if initial efforts are unsuccessful

## 5 Environmental Setting

***Based on information available from the literature, government and special studies or other sources, the EIA shall provide information on environmental setting for the different types of physical, biological and social-economic-cultural environments for the current situation, important trends and predicted situation in the absence of the proposed project. All sources of data must be cited in the EIA when and where they are used. Indicate the direct and indirect and cumulative impact areas of influence for physical, biological, and social-economic-cultural impacts and basis for defining area. This section shall include at a minimum, the following information:***

### Physical Environment

#### 5.1 Geologic Resources and Hazards

##### 5.1.1 Cross sections of the geology including soil horizons

5.1.1.1 Geologic characteristics at all project facility locations and in the area of influence.

5.1.1.2 Geological map of the project area and area of influence at a scale of 1:10,000.

Submit a map of the area displaying all characteristics described.

Include geological profiles and cuts, as well as stratigraphic columns.

##### 5.1.2 Topography and slope conditions and geomorphology

##### 5.1.3 Seismicity and stability characteristics

5.1.3.1 Indicate the general seismic and tectonic features of the surrounding areas:

- Seismic sources close to the project area
- Seismic history
- Maximum expected magnitudes intensity
- Period of seismic repetition
- Outcome of threats based on peak acceleration for the site
- Periods of vibration of the site
- Micro zoning in terms of the geological map

5.1.3.2 Volcanic activity (must be provided by all the projects that are located within a radius of 30 km from an active volcanic emission center)

- Indicate the general volcanic features of the area near the site
  - Historical eruptions
  - Period of recurrence
  - Type of eruptions
  - Affected areas and high risk areas
- 5.1.3.3 Describe project areas susceptible to soil liquefaction; planned, active, and abandoned mines; karst terrain; and areas of potential ground failure, such as subsidence, slumping, and landsliding

## 5.2 Soil Resources

*The EIA shall describe baseline soil resources, and make use of maps, tables and accompanying narrative text to describe the soils upstream, downstream and in the area of the project.*

- 5.2.1 Types, capacity and uses
- 5.2.2 Fertility and potential uses of the land for agriculture
- 5.2.3 Stability and permeability
- 5.2.4 Erosion and sedimentation potential
- 5.2.5 Quantity and quality available for revegetating and restoring the disturbed area at time of closure

## 5.3 Water Resources

- 5.3.1 Surface water
- 5.3.1.1 Names and locations on maps of all permanent and intermittent streams, rivers, wetlands, lakes and reservoirs within the area of influence
- 5.3.1.2 River mile designation or other reference point for the intake and discharge points of the project
- 5.3.1.3 Area covered by the basin to the dam in square kilometers (km<sup>2</sup>)
- 5.3.1.4 Area covered by the basin in km<sup>2</sup> at the discharge area
- 5.3.1.5 Flow
- The monthly minimum, mean and maximum recorded flows in m<sup>3</sup>/s of the river at the diversion point or powerhouse intake (if no diversion), specifying any adjustments needed to account for evaporation, dam leakage, minimum flow releases, or other reductions in available flow
  - A monthly flow duration curve (i.e., flow exceedance curve) indicating the period of record and location of gauging stations where data were gathered to derive the curves
- 5.3.1.6 For any proposed or existing project reservoirs or lakes, surface area, volume, maximum depth, mean depth, flushing rate, shoreline length, substrate composition
- 5.3.1.7 Seasonal fluctuations in area and volume of wetlands, lakes and reservoirs
- 5.3.1.8 Delineation of watersheds and water drainage pattern in the area of influence using cadastral/aerial/remote sensing satellite imageries (map)
- Runoff characteristics of watersheds
- 5.3.1.9 Inventories of consumptive and non-consumptive use, especially those who are in the floodplain between intake and discharge points and downstream of the discharge
- 5.3.1.10 Surface water balance (existing withdrawal of surface water)
- Existing uses by type and volume
  - Capacity
- 5.3.1.11 Riverbed gradient for downstream reaches directly affected by the proposed project, including reaches bypassed by flow diversions
- 5.3.2 Groundwater
- Provide a map and identify and describe aquifers and underground waters adjacent to the project, indicating the depth of the water table along with trend data:
- 5.3.2.1 Hydrogeologic characteristics of the area (vadose zone and aquifers)
- Flow regime
  - Flow direction
  - Influences of geologic structures (faults, contacts, bedrock fracturing, etc) and surface water bodies
- 5.3.2.2 Location and characteristics of all existing springs and wells in the area of influence (on topographic map)

- Flow/yield data for each spring and well (including water levels in wells)
- Depth and construction information for each well
- Existing uses by type and volume
- Capacity available

#### 5.3.2.3 Groundwater recharge data

#### 5.3.2.4 Groundwater potential yield

- Availability
- Water table levels (dry and rainy season)

### 5.3.3 Water quality

#### 5.3.3.1 Existing water quality data

- Locations of all water quality monitoring stations in and around the project area (with direction and distance from the site)
- Water quality data for each station for those parameters likely to be affected by project construction, operation, or maintenance
- Physical, chemical and biological water quality characteristics, including water temperature and dissolved oxygen concentrations
- For any proposed or existing project reservoirs or lakes, water temperature and dissolved oxygen concentrations, including seasonal vertical profiles

#### 5.3.3.2 Supplemental sampling and analysis (if existing data is not adequate to characterize water quality)

Sampling and Analysis Program in annex

- Water quality information upstream of the reservoir, within the reservoir, location of water intake, intermediary points between intake and discharge points, at the point of discharge, and downstream from discharge point
- Proposed locations of representative monitoring stations upstream and downstream of proposed project activities
- Monitoring program design with at least a year of baseline data being collected
  - Parameters (including as appropriate, physical, chemical, heavy metals, radiological and biological)
  - Frequency of collection
  - Analytic methods

#### 5.3.3.3 Surface water and groundwater standards that apply to the project

- Current uses
- Standards for current uses (in the absence of such standards, identify a set of benchmarks used in the analysis)

## 5.4 Air and Climate

***Baseline information for air resources shall be collected for at least one year or as required by the regulatory agency and shall include at a minimum the following:***

### 5.4.1 Climate and meteorology

- 5.4.1.1 Source of data (meteorological station(s) from which climatological data have been obtained)
- 5.4.1.2 Temperature variations
- 5.4.1.3 Relative humidity
- 5.4.1.4 Solar radiation and evaporation rates
- 5.4.1.5 Rainfall (total precipitation, rainfall intensity and duration by month)
- 5.4.1.6 Wind rose (Wind direction and speed, 24 hourly data)
- 5.4.1.7 Statistical analysis of the data

## 5.5 Noise and Vibration

***Present a description of the noise and vibration levels for receptors near where noise generating activities of the project may occur. The EIA shall include:***

- 5.5.1 Location of monitoring stations
- 5.5.2 Daytime and night time noise levels (measured in decibels)
- 5.5.3 Inventory of existing noise sources

## **5.6 Aesthetic and Visual Resources**

- 5.6.1 Photos presenting baseline panoramic views of the facility site from potential receptors
- 5.6.2 Viewsheds or other aesthetic or landscape resources
- 5.6.3 Existing sources of light contamination

### Biological Environment

***The EIA shall provide detailed information on the location and condition of ecosystems in and around the project area in the form of narrative, maps and tables, including the following:***

## **5.7 Vegetation/Flora**

- 5.7.1 Vegetative mapping of terrestrial and wetland habitats (aquatic and marine if appropriate) for project area, including in the area of transmission lines and any downstream area affected by the project
- 5.7.2 Species and structure (abundance, density, status, plant communities, presence of invasive species, etc.)

## **5.8 Aquatic and Terrestrial Wildlife/Fauna**

- 5.8.1 Fish and Aquatic Resources
  - 5.8.1.1 Identification of fish, mussel, macroinvertebrate and other aquatic species
    - Spatial and temporal distribution
    - Species life stage composition
    - Standing crop
    - Age and growth data
    - Spawning run timing
    - Extent and location of spawning, rearing, feeding and wintering habitat
- 5.8.2 Wildlife Resources
  - 5.8.2.1 Species (including status, i.e., endemic, migratory, exotic, endangered, threatened, keystone, etc.), life history, and seasonal use
  - 5.8.2.2 Breeding areas
  - 5.8.2.3 Mating and brooding areas
  - 5.8.2.4 Migratory corridors (if applicable)
  - 5.8.2.5 Important wildlife use areas (roosts, clay licks, etc.)

## **5.9 Ecosystems: Terrestrial, Wetlands, Aquatic, Marine**

***Much if not all that will be needed to address the environmental setting for terrestrial, wetlands, aquatic and/or marine ecosystems will have been covered in Sections 5.7 and 5.8. This section is not intended to duplicate that information; rather, it should integrate the information to ensure that the structure and function of each ecosystem is adequately presented.***

## **5.10 Endangered or Threatened Species and Habitats**

***Sections 5.7 and 5.8 should identify all species in the project area. This section should highlight all endangered and threatened species and critical habitat that potentially occur in the vicinity of the project.***

## **5.11 Protected Areas**

***Identify on maps the specific locations and boundaries of relevant national parks, sanctuaries, reserves, etc., as well as any areas proposed for protection. Provide a brief narrative description of each area.***

### Social-Economic-Cultural Environment

## **5.12 Socio-Economic Conditions**

***Identify nearby human settlements including the following information for each settlement:***

- 5.12.1 Population (size, gender and age distribution)
- 5.12.2 Cultural characteristics (religion, ethnic composition, languages spoken, etc.)
- 5.12.3 Economic activities (employers, employment and incomes)
- 5.12.4 Tax base

5.12.5 Crime rates

5.12.6 Literacy rates

5.12.7 Community organizations

5.12.8 Public Health and Safety

5.12.8.1 Diseases in the project area (including the sources of data and the methodology used to collect and analyze the data)

5.12.8.2 Level of emergency services and access to clinics, doctors and hospitals

5.12.8.3 Existing practice for assessment of occupational health

5.12.8.4 Existing electromagnetic fields

5.12.9 Skills, services and goods availability in the communities

### **5.13 Infrastructure**

*For each human settlement identified in subsection 5.12, describe the infrastructure in or serving the settlement, including the following information:*

5.13.1 Transportation infrastructure

5.13.1.1 Roads

This section of the EIA addresses baseline conditions of transportation and traffic patterns on existing roads. The EIA shall provide information on following:

- Location and condition of all existing roads
  - Surface materials
  - Erosion and sediment control
  - Maintenance programs (what, when and whom)
- Description of anticipated third-party improvements (government or entity other than the proponent)
- Traffic patterns and densities on roads within affected project vicinity
- Safety levels and current circulation issues, and capacity

5.13.1.2 Airports or airstrips, and their capacity and trends in use

5.13.1.3 Other transportation infrastructure as applicable such as rail, pipelines, harbors etc.

5.13.2 Public health infrastructure

5.13.2.1 Drinking water supplies and treatment

5.13.2.2 Wastewater treatment and management

5.13.2.3 Solid and hazardous waste management and treatment

5.13.3 Communications Infrastructure

5.13.3.1 Types of communications systems

5.13.3.2 Types of transmission (wired or wireless)

5.13.3.3 Locations of transmission lines (if applicable)

5.13.3.4 Locations of microwave towers and/or antennae (if applicable)

5.13.4 Energy Infrastructure

5.13.4.1 Types of energy

5.13.4.2 Sources including location and description of generating facilities in the area of influence

5.13.4.3 Transmission lines and/or pipelines

5.13.4.4 Fuel storage facilities

### **5.14 Cultural, Archeological, Ceremonial and Historic Resources**

*Identify all cultural, archaeological, ceremonial and historic resources within the area of influence, including the following information:*

5.14.1 Data and maps relating to archeological, cultural, ceremonial, and historic sites in the direct vicinity of the project

5.14.2 Information on indigenous people or other traditional cultures, if any

### **5.15 Land Use**

***Actual and potential showing location, size and proximity within and surrounding the project area, including land use maps, and to extent possible, integrated into one map.***

- 5.15.1 Population centers, including information and locations of
  - 5.15.1.1 Schools
  - 5.15.1.2 Cemeteries
  - 5.15.1.3 Churches
  - 5.15.1.4 Other public buildings
  - 5.15.1.5 Housing (including housing density)
  - 5.15.1.6 Commercial areas
- 5.15.2 Agricultural lands
- 5.15.3 Forested lands
- 5.15.4 Protected areas (including but not limited to)
  - 5.15.4.1 National parks
  - 5.15.4.2 Wildlife refuges
- 5.15.5 Wetlands and Mangroves
- 5.15.6 Other environmentally sensitive areas
- 5.15.7 Tourism and recreation areas
  - 5.15.7.1 Recreation facilities
  - 5.15.7.2 Eco-cultural-tourist locations
- 5.15.8 Culturally sensitive areas
- 5.15.9 Flood plains and water bodies
- 5.15.10 Coastal zones
- 5.15.11 Other land uses as appropriate

## 6 Assessment of Impacts

***The EIA shall provide information on potential impacts (direct, indirect and cumulative) and the magnitude and frequency of potential impacts on physical, biological, social-economic-cultural resources resulting from construction, operation and closure of the proposed project and alternatives.***

***The assessment shall use standardized predictive methods, such as models, to determine the specific range of impacts on environmental and socio-economic resources. The EIA shall identify which impacts are significant and the criteria used to make this judgment. Critical data input from project description and environmental setting analysis projecting the conditions in the environmental setting in the absence of the proposed project shall be used as the baseline upon which potential impacts are forecast. The EIA shall also identify sources of data used in the analysis and the uncertainties associated with the outputs of each method used.***

### Physical Impacts

#### **6.1 Geologic Resources and Hazards**

***Potential impacts to geologic resources and potential effects on facility shall be described including but not limited to the following:***

- 6.1.1 Geologic hazards and potential effects on facility
- 6.1.2 Dam failure
- 6.1.3 Impacts on mineral resources (current/future mining)
- 6.1.4 Changes in topography and drainage patterns
- 6.1.5 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

#### **6.2 Soil Resources**

***Potential impacts to soil resources shall be described including but not limited to the following:***

- 6.2.1 Erosion, slope alteration, vegetation removal and drainage patterns
  - 6.2.1.1 Models for soil erosion should be included using methods like USLE, defining the areas with high erosion potential
  - 6.2.1.2 Sediment accumulation and transport
  - 6.2.1.3 Sediment and hazardous waste removal and disposal
- 6.2.2 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.3 Water Resources**

*Potential impacts to surface water and groundwater shall be described including but not limited to the following:*

### 6.3.1 Geomorphology

- 6.3.1.1 Location of all stream or wetland crossings by right-of-ways and access roads.
- 6.3.1.2 Modification/diversion in the existing drainage pattern
- 6.3.1.3 Downstream scouring and upstream head cutting
- 6.3.1.4 Bank erosion (surface water discharges, stream crossings and dredging)
- 6.3.1.5 Potential for increased flash flooding

### 6.3.2 Quantity

- 6.3.2.1 Water bodies likely to be created or dewatered (e.g., bypass stretches)
- 6.3.2.2 Impact of water diversion on surface water and groundwater, including specific uses
  - Model results
  - Water table levels
  - Well production
  - Spring and stream flows
- 6.3.2.3 Effects of dams on downstream seepage

### 6.3.3 Quality

- 6.3.3.1 Effects of project construction and operation on water quality parameters in the existing or newly formed reservoir, within any bypassed reaches, downstream areas and groundwater, including the results of any water quality modeling
  - Description of effects due to runoff, erosion, and sedimentation from roads, disturbed areas, and stream crossings, including sources, receiving waters, and effects on physical, chemical, and biological parameters
  - Description of impact from wastewater discharges (if applicable)
  - Description of effects of project operations on dissolved oxygen and total dissolved gas concentrations, and other parameters
- 6.3.3.2 Spills and accidents, including hazardous waste and fuel spills
- 6.3.4 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.4 Air and Climate**

*Potential impacts to air resources shall be described including but not limited to the following:*

### 6.4.1 Impacts on ambient air quality

- 6.4.1.1 Sources (e.g., windblown dust and fixed and mobile equipment emissions)
- 6.4.1.2 Concentrations
- 6.4.1.3 Receptors (e.g., communities, schools, water bodies, ecosystems)
- 6.4.1.4 Greenhouse gas generation.

### 6.4.2 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.5 Noise and Vibration**

*Potential impacts from noise shall be described including but not limited to the following:*

### 6.5.1 Noise modeling

- 6.5.1.1 Basis for model selection
- 6.5.1.2 Input requirements
- 6.5.1.3 Modeling results

### 6.5.2 Potential noise levels at different representative sites in the project area and in communities near the project area

### 6.5.3 Potential vibration due to blasting and movement of heavy equipment, and related damage to materials and structures

### 6.5.4 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.6 Aesthetic and Visual Resources**

***Potential impacts to Aesthetic Resources, including light pollution, shall be described including but not limited to the following:***

- 6.6.1 Impacts on visual resources and landscapes
- 6.6.2 Increases in light contamination
- 6.6.3 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## Biologic Impacts

***Potential impacts to biological resources shall be described including but not limited to the following:***

### **6.7 Vegetation/Flora and Associated Ecosystems**

***Describe and quantify alterations in vegetative cover due to:***

- 6.7.1 Deforestation or wetlands destruction
- 6.7.2 Inundation of vegetated areas by reservoirs (if applicable)
- 6.7.3 Other vegetative type conversions
  - 6.7.3.1 Direct vegetative removal
  - 6.7.3.2 Indirect (e.g., poisoning by dust and air contaminants)
- 6.7.4 Operational effects on plant communities (reservoir fluctuations and changes in flow regime)
- 6.7.5 Wildfires
- 6.7.6 Increased road access in remote areas leading to destruction of existing vegetative cover (land use changes)
- 6.7.7 Spread of noxious or invasive species
- 6.7.8 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

### **6.8 Aquatic and Terrestrial Wildlife/Fauna and Associated Ecosystems**

***Describe and quantify alterations in aquatic and terrestrial wildlife populations due to:***

- 6.8.1 Fish and Aquatic Resources
  - 6.8.1.1 Loss or gains in habitat (e.g., spawning, rearing, juvenile, or adult habitats) from changes in flow releases, reservoir storage, and flow diversions, including the effects of any associated changes in water temperature and dissolved gas and dissolved oxygen concentrations
  - 6.8.1.2 Disturbance of aquatic resources during construction, operations, or maintenance activities, including equipment noise, erosion and sedimentation, vehicular movements, or blasting
  - 6.8.1.3 Entrainment and turbine mortality effects on fish populations in the project area
  - 6.8.1.4 Entrapment of large woody debris and stream gravel in reservoirs and associated effects on downstream fish habitats
  - 6.8.1.5 Effects of project-induced recreational activities on fish habitats and fish populations
  - Competing flows (i.e., flows for recreation versus flows for fish habitat)
  - Disturbance of spawning of spawning and other habitats (noise, vibration, direct contact of habitat from wading and other in-water activities, etc.)
- 6.8.2 Wildlife Resources
  - 6.8.2.1 Loss of habitat, migratory routes/corridors, and breeding areas due to changes in vegetative cover/wetlands loss, reservoir fluctuations, and changes in flow regime
  - 6.8.2.2 Disturbance of habitat, migratory routes/corridors and breeding areas due to project construction, operation, and maintenance, recreational use, and human settlement associated with the project (e.g., noise, vibration, illumination, vehicular movement)
  - 6.8.2.3 Loss or contamination of drinking water for wildlife species
  - 6.8.2.4 Poisoning (e.g., air emissions, direct contact with toxic water/substances)
  - 6.8.2.5 Animals attracted to garbage and food waste at construction camps or onsite facilities
  - 6.8.2.6 Electrocution of large birds
  - 6.8.2.7 Increased hunting
- 6.8.3 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.9 Endangered or Threatened Species or Habitats**

*Describe and quantify impacts to endangered or threatened species or habitats*

- 6.9.1 Biodiversity
- 6.9.2 Individual species (with special emphasis on endemic, rare, threatened and endangered species)
- 6.9.3 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.10 Protected Areas**

### **Social-Economic-Cultural Impacts**

*The EIA shall assess potential positive and negative impacts to social-economic- cultural resources including but not limited to the following:*

### **6.11 Socio-Economic Conditions**

- 6.11.1 Increased individual incomes
  - 6.11.1.1 Direct employment at the project
  - 6.11.1.2 Indirect employment generated by project activities
  - 6.11.1.3 Increased purchases from local businesses
  - 6.11.1.4 Other economic activities stimulated in the community as a result of the project
- 6.11.2 Employment opportunities for local residents
- 6.11.3 Increased tax base
- 6.11.4 Displacement and relocation of current settlements, residents or community resources
- 6.11.5 Displacement or disruption of people's livelihoods (e.g., fishing, hunting, grazing, farming, forestry and tourism)
- 6.11.6 Public finance requirements – will more infrastructure need to be built and maintained to meet the demands of increased population in the areas of public education and public service (water, sanitation, roads, emergency services, etc.)
- 6.11.7 Reduction in quality of life for residents from visual and noise impacts
- 6.11.8 Change in crime rate (drugs, alcohol, prostitution, etc.)
- 6.11.9 Change in population (temporary or permanent)
- 6.11.10 Change in character of community
- 6.11.11 Potential hazard to the public from facility components resulting from accidents or natural catastrophes and how these events will affect reliability
- 6.11.12 Hazards, environmental impact and service interruptions which could reasonably ensue from failure of proposed facilities
- 6.11.13 Change in religious, ethnic or cultural makeup of community
- 6.11.14 Impacts on public health
  - 6.11.14.1 Creation of new electromagnetic fields near residences, including their strength and extent
  - 6.11.14.2 Water-related vector diseases (malaria, dengue, etc.)
  - 6.11.14.3 Health impacts of pesticide and fertilizer use
- 6.11.15 Impacts on worker health and safety
  - 6.11.15.1 Identification of hazardous jobs and number of workers exposed with duration of exposure
  - 6.11.15.2 Occupational diseases due to exposure to dust and other project related activities such as handling of explosives, solvents, petroleum products, etc.
  - 6.11.15.3 Identification of physical risks and safety aspects
- 6.11.16 Potential for fires
- 6.11.17 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

## **6.12 Infrastructure**

#### 6.12.1 Transportation infrastructure

***This section of the EIA addresses impacts of transportation and traffic patterns on existing roads.***

***The impacts of new and existing roads on water quality, biological resources and land use should be addressed in those respective sections. The EIA shall assess potential impacts to transportation systems including but not limited to the following:***

##### 6.12.1.1 Potential changes to traffic patterns, densities, and traffic safety issues in area affected by project

- A determination of vehicular traffic density in the project area (before, during, and after the proposed activities)
- Potential for traffic accidents
- Congestion
- Noise

##### 6.12.1.2 Potential impacts to previously inaccessible areas from improvement of roads

#### 6.12.2 Public health infrastructure

##### 6.12.2.1 Increased need for public health infrastructure

##### 6.12.2.2 Alterations to public health infrastructure

#### 6.12.3 Communications infrastructure

##### 6.12.3.1 Increased need for communications infrastructure

##### 6.12.3.2 Alterations to communications infrastructure

#### 6.12.4 Energy infrastructure

##### 6.12.4.1 Increased need for energy infrastructure

##### 6.12.4.2 Alterations to energy infrastructure

#### 6.12.5 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

### **6.13 Cultural, Archeological, Ceremonial and Historic and Resources**

#### 6.13.1 Destruction during construction

#### 6.13.2 Damage and alteration

#### 6.13.3 Removal from historic location

#### 6.13.4 Introduction of visual or audible elements that diminish integrity

#### 6.13.5 Neglect that causes deterioration

#### 6.13.6 Loss of medicinal plants

#### 6.13.7 Loss of access to traditional use areas

#### 6.13.8 Impacts to previously inaccessible resources from development/improvement of roads

#### 6.13.9 Overall assessment of significance of direct, indirect and cumulative impacts for all phases of the proposed project based upon analysis of magnitude, frequency, scope and duration in context

### **6.14 Land Use**

#### 6.14.1 Changes in land use by both area and location

## **7 Mitigation and Monitoring Measures**

***This section of the EIA must include measures designed to mitigate potential adverse impacts to physical, biological and social-economic-cultural resources from construction, operation and closure of the proposed project and alternatives.***

***These shall include measures to avoid and prevent, and if needed, to reduce or minimize adverse impacts. The project proponent must include measures considered to be "best practices" in the design of all alternatives.***

***Here and/or in the Environmental Management Plan section, proposed mitigation shall be described in auditable terms and at a level of detail sufficient to demonstrate its effectiveness in addressing the concern or performance criterion, including its anticipated level of effectiveness and/or measurable performance, and design specifications.***

***The monitoring plan must include monitoring throughout the life of the project for each potential mitigation to confirm the effectiveness of the measure and support contingency plans to provide assurance that the project, at the site preparation, construction, operation, expansion, and closure stages will meet applicable environmental requirements/standards by law, and fall within the limits of impacts deemed acceptable upon approval of the EIA. Some important items to address in the mitigation plan and associated monitoring plans include, but are not limited to the following:***

### **Physical Impacts**

#### **7.1 Geologic Resources and Hazards**

- 7.1.1 Pre-excavation, onsite geological inspection and geotechnical study protocols to determine slope stability and landslide risks
- 7.1.2 Slopes built and maintained to avoid landslides and favor revegetation and soils formation
- 7.1.3 Slope stabilization by constructing retaining walls, using vegetation, geotextile membranes, or other mechanical methods
- 7.1.4 Blasting Plan, if applicable (summary of relevant measures with full document in Annex)
- 7.1.5 Use of signage to mark areas where slopes are not stable as a preventive measure in the event of a landslide
- 7.1.6 Mitigation measures unique to specific alternatives

## **7.2 Soil Resources**

- 7.2.1 Topsoil management measures including specifically future use for agriculture
- 7.2.2 Erosion and sediment temporary and permanent control measures including when each will be installed or implemented, how often it will be checked and the process for and timing of removal of temporary measures
- 7.2.3 Spoil and disposal measures
- 7.2.4 Best management practices to minimize soil disturbance
- 7.2.5 Decommissioning/Rehabilitation Plan-if needed (summary of relevant measures with full document in Annex)
- 7.2.6 Mitigation measures unique to specific alternatives

## **7.3 Water Resources**

- 7.3.1 Quality
  - 7.3.1.1 Water Quality Management Plan (summary of relevant measures with full document in Annex)
    - Project operation measures including minimum flows, aeration, flow energy dissipation, or modification of the intake withdrawal depth
    - Sewage and domestic wastewater
    - Nonpoint sources – runoff, erosion and sediment control prevention measures
  - 7.3.1.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)
  - 7.3.1.3 Solid Waste Management Plan (summary of relevant measures with full document in Annex)
  - 7.3.1.4 Hazardous Waste Management Plan (summary of relevant measures with full document in Annex)
  - 7.3.1.5 Transport system construction and maintenance to avoid erosion and sedimentation including:
    - Elevation or rerouting
    - Design for proper run-off control and catchment
    - Provision of culverts to allow flow that might otherwise be impeded by roadways or other rights of way
    - Appropriate traffic control
  - 7.3.1.6 Off-road vehicle use restrictions
  - 7.3.1.7 Waste minimization practices
- 7.3.2 Quantity
  - 7.3.2.1 Operational measures, such minimum flows or reservoir level fluctuation limits, to protect important species
  - 7.3.2.2 Use of guaranteed stream maintenance flow device to guarantee release of minimum agreed upon flow
  - 7.3.2.3 Flow gauging to monitor water quantity
- 7.3.3 Mitigation measures unique to specific alternatives

## **7.4 Air and Climate Resources**

- 7.4.1 Dust control measures
- 7.4.2 Emissions control measures
  - 7.4.2.1 Emissions reduction equipment
  - 7.4.2.2 Maintenance and inspection of equipment and vehicles using combustion engines to reduce emissions
- 7.4.3 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)

- 7.4.4 Hazardous Materials Management Plan (summary of relevant measures with full document in Annex)
- 7.4.5 Mitigation measures unique to specific alternatives

## **7.5 Noise and Vibration**

- 7.5.1 Noise control measures
  - 7.5.1.1 Noise reduction technologies (suppression equipment, sound-absorbing structures, vibration dampening devices, berms, noise barriers, etc.)
  - 7.5.1.2 Re-routing of traffic and other infrastructure related activities to minimize impacts of noise and vibration
  - 7.5.1.3 Time of day limitations on blasting and movement of heavy equipment when in close proximity to houses not being operated during evening hours
- 7.5.2 Blasting Plan, if applicable (summary of relevant measures with full document in Annex)
- 7.5.3 Mitigation measures unique to specific alternatives

## **7.6 Aesthetic and Visual Resources**

- 7.6.1 Relocation of facilities to another site
- 7.6.2 Redesign of placement of facilities on site
- 7.6.3 Redesign height and location of structures blocking view or light
- 7.6.4 Lighting minimization
- 7.6.5 Visual/Landscape Management Plan (summary of relevant measures with full document in Annex)
- 7.6.6 Mitigation measures unique to specific alternatives

## **Biological Impacts**

### **7.7 Vegetation/Flora and Associated Ecosystems**

- 7.7.1 Control of noxious and invasive weeds
- 7.7.2 Surface water diversion limitations to maintain in-stream values
- 7.7.3 Measures to compensate for loss or damage of forests, wetlands or other critical ecosystems, including establishment of new protected areas
- 7.7.4 Restoration/Rehabilitation Plan for disturbed areas (summary of relevant measures with full document in Annex)
- 7.7.5 Mitigation measures unique to specific alternatives

### **7.8 Aquatic and Terrestrial Wildlife/Fauna and Associated Ecosystems**

- 7.8.1 Fish and Aquatic Resources
  - 7.8.1.1 Control of instream flows, powerhouse discharge rates (i.e., ramping rates), and reservoir levels
  - 7.8.1.2 Fish passage, intake screening, tailrace screens
  - 7.8.1.3 Artificial propagation of fish and other aquatic species
  - 7.8.1.4 Large woody debris or gravel management
  - 7.8.1.5 Habitat enhancement (e.g., creation of pools)
  - 7.8.1.6 Relocation of sensitive, threatened or endangered species
  - 7.8.1.7 Scheduling construction to avoid critical or important fish life history periods (e.g., spawning)
  - 7.8.1.8 Flow gauging and water quality monitoring
  - 7.8.1.9 Recreation use and associated fish monitoring (e.g., evaluate the effects of boating releases on fish spawning)
  - 7.8.1.10 Blasting Plan, if applicable (summary of relevant measures with full document in Annex)
  - 7.8.1.11 Mitigation measures unique to specific alternatives
- 7.8.2 Wildlife Resources
  - 7.8.2.1 Controls on hunting within the project area
  - 7.8.2.2 Modify facility and activity locations and timing to avoid critical ecosystems, migratory routes and breeding areas

- 7.8.2.3 Scheduling construction to avoid critical or important wildlife history periods (e.g., breeding, nesting)
- 7.8.2.4 Transmission line design to minimize or avoid electrocution of raptors and other large birds
- 7.8.2.5 Relocation of sensitive, threatened or endangered species
- 7.8.2.6 Blasting plan, if applicable (summary of relevant measures with full document in Annex)
- 7.8.2.7 Mitigation measures unique to specific alternatives

## **Social-Economic-Cultural Impacts**

### **7.9 Socio-Economic Conditions**

- 7.9.1 Selection of an alternate site for the project, and if not possible then adhering to requirements of an internationally recognized Resettlement Action Plan (RAP)
- 7.9.2 Rehabilitation Program for people displaced by the project (summary of relevant measures with full document in Annex)
- 7.9.3 Training local residents for employment in the project
- 7.9.4 Development of a “Code of Conduct” (with associated training program) for workers to show respect to the local populations and their culture and social rules
- 7.9.5 Measures proposed to protect public from failure of proposed facilities
- 7.9.6 Design and operational measures to avoid or reduce risk
- 7.9.7 Measures to exclude public from hazardous areas
- 7.9.8 Public Health Program to protect local population from potential health problems caused by the project operation (summary of relevant measures with full document in Annex)
- 7.9.9 Development of an Occupational Health, Industrial Safety and Accidents Prevention Program with appropriate accident prevention program, reporting and periodic review (summary of relevant measures with full document in Annex) including provision of routine training and testing, and proper safety equipment such as hearing protection, hardhats, steel-toed shoes, safety railings, fall arrestors, sensors for notification on reaching of warning and action limits for exposure to hazardous gases and liquids or impending catastrophic failures.
- 7.9.10 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)
- 7.9.11 Hazardous Materials Management Plan (summary of relevant measures with full document in Annex)
- 7.9.12 Mitigation measures unique to specific alternatives

### **7.10 Infrastructure**

- 7.10.1 Transportation infrastructure
 

This section of the EIA addresses mitigation measures for transportation and traffic patterns on existing roads. Mitigation of impacts of new and existing roads on water quality and biological resources and land use should be addressed in those respective sections.

  - 7.10.1.1 Transportation Plan (summary of relevant measures with full document in Annex)
    - Placement of traffic signals
    - Establishing, posting and enforcing speed limits for the vehicles that transport material
    - Training employees, contractors and subcontractors on measures to reduce or avoid potential accidents
    - Hiring and training security personnel devoted exclusively to preventing accidents in the access road and controlling the speed of the vehicles transporting project material
- 7.10.2 Public health infrastructure
- 7.10.3 Communications infrastructure
- 7.10.4 Energy Infrastructure
- 7.10.5 Mitigation measures unique to specific alternatives

### **7.11 Cultural, Archeological, Ceremonial and Historic and Resources**

- 7.11.1 Modify facility and activity locations to avoid significant archeological, cultural, ceremonial and historic sites
- 7.11.2 If avoidance is not possible, conduct appropriate resource recovery operations before disturbing the sites

- 7.11.3 Clearly delineate boundaries and post signs identifying existing archeological, cultural and historic sites on roadsides and within the project area boundaries so that they are easily recognized by the machinery operators and other workers
- 7.11.4 Development of a training program so that staff recognize and respect culturally and archeological sensitive areas
- 7.11.5 Development protocols for use during construction and operation stages for identifying and responding to archeological, cultural, ceremonial and historic sites not identified during the preliminary surveys
  - 7.11.5.1 In the event that such a site is found, they will stop activities at the site and report to the government relocation of cultural or historical resources, for their physical protection.
- 7.11.6 Mitigation measures unique to specific alternatives

## **7.12 Land Use**

- 7.12.1 Criteria and method for calculating compensation for loss of land and crops
- 7.12.2 Compensation to farmers and ranchers for crop or forage losses and restore lost agricultural lands at the end of the project.
- 7.12.3 Compensation to property owners for relocation of their homes in the event the relocation is unavoidable.
- 7.12.4 Mitigation measures unique to specific alternatives

## **8 Environmental Management Plan**

*The EIA shall include an Environmental Management Plan to prevent, mitigate and monitor each impact identified in the EIA. Plans will describe actions to be taken in sufficient detail to provide a basis for subsequent auditing of compliance with commitments made in the EIA process including who is responsible, how and when it will be implemented, what will be done and what results will be achieved, why it is being done, and how to know whether it is effective in addressing the underlying concerns. The Environmental Management Plan shall have the following elements:*

### **8.1 Overview of Environmental Management Plan Organization and Policy**

- 8.1.1 Describe the project management and how environmental management and organization relates to overall project responsibility. Describe the personnel and performance accountability system for design, operation, maintenance and closure for implementation of mitigation and monitoring measures
- 8.1.2 Describe the environmental policy that will govern the Project throughout its implementation, including at least the objectives, scope, commitment to continuous improvement, control and environmental monitoring and good relationship with neighboring populations and countries, as well as the commitment to internal controls such as compliance and environmental monitoring and routine audits
- 8.1.3 Identify the persons responsible for the implementation of mitigation measures, in each phase

### **8.2 Project-wide Mitigation Plan including an implementation schedule. It has two elements:**

- 8.2.1 Environmental resource mitigation (such as air, water)
- 8.2.2 Socio-economic-cultural mitigation (relocation, etc.)

### **8.3 Project-Wide Monitoring Plan (usually specific to monitoring of surface and ground water)**

- 8.3.1 Short-term and long-term monitoring of resource condition, including but not limited to:
  - 8.3.1.1 Slope stability
  - 8.3.1.2 Water Quality Monitoring Program
    - Where, how and when monitoring shall be conducted
    - Parameters to be monitored
    - Monitoring frequencies
    - Sampling and analytical protocols to be used
  - 8.3.1.3 Air Quality Monitoring Program
    - Where, how and when monitoring shall be conducted
    - The Parameters to be monitored
    - The monitoring frequencies

- The sampling and analytical protocols to be used
- 8.3.1.4 Noise and Vibration
- 8.3.1.5 Cultural, ceremonial archeological and historic resources in the vicinity of the mine
- 8.3.2 Short-term and long-term monitoring to ensure that the mitigation measures are functioning as predicted and that rehabilitation is working

## **8.4 Management of Other On- or Off-Site Environmental Pollution Control and Infrastructure**

*This section should address management of critical elements of pollution control and infrastructure that are not otherwise included in the mitigation plan because they were considered an essential part of the proposed project.*

## **8.5 Contingency Plans**

*Contingency plans shall be prepared and described to address a) failure to meet specific performance criteria established by law or necessary for the project to meet its commitments in the EIA and b) respond to natural and other risks previously identified and mitigated in the EIA in the event reasonable and feasible mitigation measures to address the risks are inadequate.*

- 8.5.1 Performance-related Contingency Plans, indicating the steps that will be taken should monitoring indicate that:
- 8.5.1.1 Environmental standards are not being met
  - 8.5.1.2 Impacts are greater than predicted
  - 8.5.1.3 The mitigation measures and/or rehabilitation are not performing as predicted
- 8.5.2 Natural Disaster Risk Response Plan (assumes that risk identification and risk reduction have been addressed in other parts of the EIA)
- 8.5.3 Other Risks Response Plans (assumes that risk identification and risk reduction have been addressed in other parts of the EIA)
- 8.5.4 Contingency plans for maintaining service or reducing downtime in the event of accidents or natural catastrophes that disrupt facility operation

## **9 Signed Commitment Statement**

*The EIA shall contain a legally binding signed letter of commitment to meeting the terms of the EIA.*

*The statement must be signed by the authorized representative of the proponent company with assurance that all financial surety measures as required by the regulatory agency have been met.*

## **10 Annexes**

*These shall be numbered and duly referenced in the text.*

### **10.1 Public Consultation**

- 10.1.1 Public consultation plan
- 10.1.2 A summary of public outreach activities including: audience, number of persons, organizations involved, concerns raised, responses to comments
- 10.1.3 Summary of response to comments
- 10.1.4 Actual copies of written comments

### **10.2 Technical Supporting Documents**

- 10.2.1 Include maps, plans, charts and figures in the sequence mentioned in the EIA document
- 10.2.2 Zoning maps with resources and results of impacts
- 10.2.3 Special Studies if relevant but not readily accessible
- 10.2.4 Detailed materials on predictive tools/models and assumptions used for the assessment but too detailed for the body of the EIA

### **10.3 References**

**Submit a list of all references, (books, articles, technical reports and other information sources) cited in the various chapters of the EIA study with full biographic references, and the following conventional procedures cited in the literature: author, year, title, source, number of pages, and city of publication or issuance.**

### Example 3: Terms of Reference Guide for Studies in Environmental Impact Assessments

Source: Gobierno de Guatemala (2004). *Guía de Términos de Referencia para la Elaboración de un estudio de Evaluación de Impacto Ambiental.*

Country: Guatemala

Sector: General

Categories: A, B1 (High impact and moderate to high impact)

Categ.	No.	Theme	Explication
A, B1	1.	<b>Index</b>	Submit the complete contents or index indicating chapters, tables, figures maps, schedules, and other acronyms; noting page numbers.
A, B1	2.	<b>Executive Summary of the Study of Environmental Impact Assessment</b>	The executive summary includes: introduction (objectives, location, ownership entity, justification); Description of project, work or activity (phases, complementary works, etc.); environmental characteristics of the area of influence; impacts of the project, work or activity on the environment and vice versa; remediation or mitigation measures and a summary of environmental management plan summary thereof and environmental commitments.
A, B1	3.	<b>Introduction</b>	Introduction of the Environmental Impact Assessment Study by the professional responsible for the work. The main parts including a) description of the project b) scope, c) objectives, d) methodology e) duration in preparing the study, location and justification.
A, B1	4.	<b>General Information</b>	Submitting requirements included in the requirements sheet.
	4.1	Legal Documentation	Include legal documents according to requirements sheet.
	4.2	Information about the professional team to carry out the EIA	Include list of professional participants involved in the preparation of the EIA study and indicate the specialty of each person, the name of each active referee, name of Registration with the MARN and the respective Affidavit on the theme on which the person participated.
A, B1	5	<b>Project Description</b>	
A, B1	5.1	General project synthesis	Provide a brief description of the project.

A, B1	5.2	Geographical location and area of influence	Present location map of the land where the project will be developed, identifying access points so officials can access the project for the inspection. Include a portion of the map sheet area of influence (DAI), with their UTM coordinates.
A, B1	5.3	Political and administrative Location	Submit political administrative location indicating the city, state, municipality, village, hamlet, and indicate the most convenient way to get the project.
A	5.4	Project technical justification for the work, industry or activity and its alternatives	Description of the preferred alternative and other alternatives that were contemplated as part of the project, work, industry or activity or components. The alternative should be raised at the level of (strategic) solution Project (site) or activity (implementation). At the project level it should be determined by a) description of the issue or problem to be treated, b) analysis of the causes of that problem, c) the way in which the project will solve or reduce the problem d) the results of those steps, that is, their specific objectives.
A, B1	5.5	Estimated project area	Physically define the area of the project, work, industry or activity (PA), specifying in m <sup>2</sup> or km <sup>2</sup> .
A, B1	5.6	Activities in each phases of project development and execution timelines	List the major activities to be carried out on the construction, operation and termination of the project, work, industry or business. Indicate the time of their execution.
A, B1	5.6.1	Flowchart of activities	Develop a flowchart with all the activities undertaken in each of the phases of project development.
A	5.6.2	Construction phase	
A, B1	5.6.2.1	Infrastructure to be developed	Detail all the infrastructure to be built in this phase that will occupy the same area (in m <sup>2</sup> or km <sup>2</sup> ).
A, B1	5.6.2.2	Equipment and machinery used	List of machinery and equipment used in the construction phase, in the above activities
A, B1	5.6.2.3	Mobilization of transportation and frequency of mobilization	Transportation routes of machinery and equipment used, and the characteristics of the ways that they will be mobilized, including a map with the routes when necessary and frequencies of movement.
A	5.6.3	Operation phase	Include a list of equipment and machinery to be used during the operation in the activities mentioned in paragraph 4.4.1.
	5.6.3.1	Infrastructure to be developed	Detail all infrastructure to be built in this phase that will occupy the same area (in m <sup>2</sup> or km <sup>2</sup> ).
A, B1	5.6.3.2	Equipment and machinery used	List of machinery and equipment used in the construction phase, in the above activities.
A, B1	5.6.3.3	Traffic flow and expected frequency of movement	Indicate the routes to be used and frequency of mobilization of vehicles generated by the operation of the Project. Indicate whether emergency routes may be affected.
A, B1	5.7	Basic services	
A, B1	5.7.1	Water supply	Define the type of water supply; amount of water used (m <sup>3</sup> /day or m <sup>3</sup> /month), average flow rate, maximum daily

			and maximum time, the power supply and the use that will be given (industrial, irrigation, potable, other users etc.).
A	5.7.2	Drainage of wastewater and stormwater	Indicate the type of sewage and storm drainage (linear meters, volume or other) and the necessary connections, as well as the disposal of wastewater and rainwater. Explain briefly how the issue of the treatment of wastewater will be solved. Include description of treatment systems and the necessary plans signed by a qualified professional.
A, B1	5.7.3	Electrical energy	Define how much to use (Kw/hour or day or month), power supply and use will be given.
A, B1	5.7.4	Access routes	Detail the access roads to the project, work, industry or activity, and their current condition.
A, B1	5.7.5	Public transportation	Identify the public transport needs to be generated by the project, work, industry or activity and describe existing transport routes.
A, B1	5.7.6	Other services	Mention other services necessary for the project, work, industry or business.
A, B1	5.7.7	Labour	
A, B1	5.7.7.1	During construction	Submit an estimate of the direct employment generation (by specialty) as well as the origin of employees should there not be sufficient local labour.
A, B1	5.7.7.2	During operations	Submit an estimate of direct employment generated (by specialty) as well as the origin of employees should there not be sufficient local labour.
A, B1	5.7.8	Work camps	If the type of project warrants having a temporary camp, detail aspects such as: area to be occupied, number of occupants, services to install, location and others.
A, B1	5.8	Raw materials and materials to be used	
A, B1	5.8.1	Construction and operations stages	Submit a complete list of raw materials and construction materials to be used, indicating amounts per day, month, and methods of storage.
A, B1	5.8.2	Inventory and management of chemical, toxic and hazardous substances	Include an inventory of toxic or hazardous chemical substances, indicating the degree of danger, active elements, place and method of storage, security issues in the transport and handling and other relevant information, according to the project.
A, B1	5.9	Handling and disposal of waste (solid, liquid and gaseous)	
A, B1	5.9.1	Construction phase	
A, B1	5.9.1.1	Solid, liquid and gaseous wastes	Report an estimate of the amount, characteristics and expected quality of solid waste management and disposal.

		(including drainage)	Include estimated amounts of recyclable and/or reusable materials, methods and where they will be processed, including inventory, handling and disposal of hazardous waste generated as a result of the construction of the project, work, industry or business.
A, B1	5.9.1.2	Dangerous toxic waste	Include inventory, handling and disposal of hazardous waste generated as a result of the construction of the project, work, industry or business.
A, B1	5.9.2	Operations phase	(see construction phase)
	5.9.2.1	Solid, liquid and gaseous wastes (including drainage)	
A, B1	5.9.2.2	Dangerous toxic waste	
A, B1	5.10	Accordance with the land use plan	The project, work, industry or proposed activity, should be considered under the existing land-use plan for the area of development, and whether that plan is local (municipality), regional (group of municipalities or watershed) or national. Indicate if there is any development plan for the area.
A, B1	6	Description of the Legal Framework	Describe the legislation (regional, national and municipal) that was considered in the development of the project or applied according to the activity in question and necessary for the use of natural resources.
A, B1	7	<b>Total investment amount</b>	Record expenditures for land purchase, facilities construction, access roads, electrification works, and drinking water, purchase of machinery and equipment, qualified personnel and unskilled labour. This shall be included for the life of the project.
A, B1	8	<b>Description of the physical environment</b>	
A, B1	8.1	Geology	
A	8.1.1	Regional geological aspects	Describe aspects of interest to the regional location, (General description of the project, including geological maps) Present geological maps: a) geotectonic context; b) regional structural and stratigraphic context (the maps must be submitted to a scale of 1:10 000).
A, B1	8.1.2	Local geological aspects	Describe the geological units, including the rocky surface formations. Include basic technical description and fundamental geological attributes as well as levels of alteration and fracture systems.
A, B1	8.1.3	Structural analysis and evaluation	Present an analysis of the geological structure of local units and a basic geotectonic evaluation of the project area

			(geometry units, contacts, dips, faults, lines, folds and others). Present a map to a scale of 1:10 000.
A	8.1.4	Geotechnical characterization	Present a geotechnical characterization of soils and surface formations, depending on the susceptibility to erosion, stability characteristics, bearing capacity and permeability.
A, B1	8.1.5	Geological map of the project area (PA) and direct area of influence (DAI)	Provide a map of the area, indicating the factors mentioned (PA, IIA, DAI). Accompany these with explanatory geological profiles and cuts as well as stratigraphic columns that strengthen and clarify the geological model derived for the field study; also indicate the physical environment geological resources that are being used in the area (collection from springs, wells, pits, quarries and others).
A, B1	8.2	Geomorphology	
A, B1	8.2.1	Geomorphological description	Describe the relief and its dynamics in order to understand the processes of erosion, sedimentation and slope stability. Please indicate whether any relevant landscapes highly sensitive to impact.
A, B1	8.3	Soils	Characterization of soils for recovery and/or rehabilitation of degraded areas, to assess the potential for loss of fertile soil.
A, B1	8.4	Climate	Regional and local description of the climatic characteristics (wind, temperature, relative humidity, cloud cover, rainfall, etc.).
A, B1	8.5	Hydrology	Submit a regional or local hydrological study, according to the project, linked with the area of direct influence (the information will be presented in a hydrological map).
A, B1	8.5.1	Surface and ground waters	Provide a map locating nearby bodies of water that may be potentially affected by the project (water intakes, effluent channels or modification of bank, etc.) and identification and characterization of aquifers surrounding the project (AP) indicating the depth of the water table and the holding conditions.
A, B1	8.5.2	Water quality	Submit a bacteriological and physical-chemical characterization of surface and groundwater, which could be directly affected by the project, considering the parameters that can potentially become altered by the implementation of the project, work, industry or activity, such as: temperature, total electrical conductivity, solids- suspended and dissolved, COD, BOD, dissolved oxygen, oil and grease, heavy metals, nitrogen, sulphates, chlorine, fluorine, total coliforms, and others.
A	8.5.3	Flow (maximum, minimum and average)	Present data flows of water bodies that could be modified by the project activities.
A	8.5.4	Flood levels	Present the historical frequency of flooding in the Project site, based on local experience and reports from the relevant authorities. In case of any flood areas, these areas are presented graphically.

A	8.5.5	Currents, tides and waves	When the project is located in a coastal zone, it must submit data on the water dynamics of the area, including significant events. The information should be presented in graphical form and maps.
A, B1	8.5.6	Vulnerability to contamination of groundwater	Analyze the susceptibility of groundwater to contamination by project activities.
A, B1	8.6	Air quality	Provide a general characterization of air quality. In the case of urban areas, consider the parameters that can potentially become altered by the execution of the project, work, industry or activity.
A, B1	8.6.1	Noise and vibrations	Present a description of noise and vibration in the study area, compared to urban areas.
A, B1	8.6.2	Odours	Present a description of odours in the study area, characteristics related to wind and other factors.
A, B1	8.6.3	Radiation sources	Identify existing sources of radiation and permits for operation.
A, B1	8.7	Natural threats	
A, B1	8.7.1	Seismic threats	Indicate the generalities of the seismic and tectonic environment: seismic sources close to the project area, historical seismicity, expected maximum magnitudes, expected intensities, seismic recurrence period, a result of the threat based on the peak acceleration for the site, periods site vibration, micro zoning based on the geological map.
A, B1	8.7.2	Volcanic threats	Indicate the generalities of seismic and tectonic environment: seismic sources close to the project area, historical seismicity, expected maximum magnitudes, expected intensities, seismic recurrence period, a result of the threat based on the peak acceleration for the site, periods site vibration, micro zoning based on the geological map. This information shall be provided for all projects that are located within a radius of 30 km away from an active volcanic emission centre.
A, B1	8.7.3	Mass movements	Report chances of gravitational mass movements (landslides, landslides, landslides, creep, etc.). This information must be submitted by all projects, works, industries or activities that take place on land with slopes greater than 15%.
A, B1	8.7.4	Erosion	Indicate the susceptibility of the area to other phenomena of erosion (linear, laminar flow).
A, B1	8.7.5	Floods	Define vulnerability and susceptibility to flooding of coastal areas where hurricanes occur.
A, B1	8.7.6	Other	Report terrain susceptibility to phenomena of liquefaction, and subsidence induced naturally or potentially caused by the project. Report environmentally fragile areas present within the boundaries of the project.

A	8.7.7	Susceptibility	Present a map showing areas susceptible to natural hazards, or risk, including all the factors mentioned above.
A, B1	9	<b>Description of the biotic environment</b>	Present the biological characteristics of the study area based on the type of biological zone.
A, B1	9.1	Flora	Graphically indicate the area of vegetation cover of the site affected by the project, work, industry or activity, e.g., pasture, pasture with scattered trees, secondary forest, primary forest, mangrove swamps, crops and others. Indicate the general state of the plant associations, and attach a forest inventory. You can use the land-use change methodology.
A, B1	9.1.1	At-risk, endemic or endangered species	Present a list of endangered, endemic or endangered species in the project area and area of influence, according to the official species lists (CITES Listing).
A, B1	9.1.2	Indicator species	Propose a number of local species that can serve as indicators for environmental quality monitoring purposes during the operation and closure phases.
A, B1	9.2	Fauna	Refer to sections 9.1, 9.1.1, 9.1.2
A, B1	10	<b>Description of the socioeconomic and cultural environment</b>	
A, B1	10.1	Characteristics of the population	Include data about size, structure, level of education, economic activities, land tenure, employment, health indicators, population census, gender and other aspects of the population near the project area including trends, especially those that can be influenced by the implementation of the Project, construction, industry or activity.
A, B1	10.2	Road safety and traffic flow	Set the current characteristics of the road network, security levels and any ongoing problems with traffic circulation, to present an analysis in terms of the implementation and operation of the Project, construction, industry or activity.
A, B1	10.3	Emergency services	Indicate the existence and availability of emergency services such as fire stations, ambulances, police, hospitals, clinics and others.
A, B1	10.4	Basic services	Indicate the existence and availability of basic services such as potable water, sewage and drainage, electricity, public transportation, garbage collection, schools, and others that relate to the Project.
A, B1	10.5	Local perception of the project	Ask what the perceptions, attitudes and concerns of local residents are about the implementation of the Project, construction, industry or activity, and the transformations that it can generate (using an opinion poll). Report potential conflicts that may arise from implementation and the

			approach of the consulting team on the methodology used to present and discuss the project and its scope with regard to the social environment and in particular on nearby communities. Include the registration of such meetings in the EIA study.
A, B1	10.6	Communal infrastructure	Identify existing community infrastructure (roads, bridges, schools and health, parks, housing, historic sites, etc.), that may be affected by the project, work, industry or business.
A	10.7	Displacement and/or movement of communities	Consider in a specific and detailed way if the project involves the displacement of individuals, families or communities. Conduct an inventory population and their views on the situation posed by the project.
A, B1	10.8	Description of cultural environment; historical, archaeological, anthropological, paleontological and religious value	Identify and characterize all sites in the area of direct influence and analyze the effect of the project, work, industry or activity thereon, in coordination with the relevant parties showing the respective authorization.
A, B1	10.9	Landscape	Make a description of the recreational, aesthetic and artistic values of the area (support with photographs showing the conditions of the area that may be affected by the project, work, industry or business proposal).
A	10.10	Socially sensitive and vulnerable areas	Present sociological data obtained by defining the areas that are socially sensitive and vulnerable to the effects of the Project (this information must be based on appropriate scale maps).
A, B1	11	<b>Selection of Alternatives</b>	
A, B1	11.1	Considered alternatives	Undertake an overview that integrates the alternatives considered as part of the preliminary design and comparison, describing briefly the methodology and steps leading up to the selected alternative.
A, B1	11.2	Selected alternatives	Include a technical description of the selected alternative.
A, B1	12	<b>Identification of environmental impacts and determining mitigation measures</b>	Include a matrix or set of matrices used for identification and quantification of impacts must be included. (Checklist Cause and Effect, etc.)
A, B1	12.1	Identification and evaluation of	Apply a standard methodology to assess project activities, work, industry or activity, with respect to environmental factors that could be affected, and values analyzing the

		environmental impacts	different stages of the project (construction, operation and decommissioning).
A, B1	12.2	Analysys of Impacts	Analyze environmental impacts that could affect : a) air , b) ground c) underground, d) surface water, e) groundwater, f) wildlife g) aquatic and terrestrial biotopes, h) socioeconomic environment, i) cultural and historical resources, j) landscape, k) others. Report the source of the impact (description and analysis), and define the set of preventive, corrective, mitigation, and compensation measures (if the impact is negative), or steps taken to optimize (if positive).
A, B1	12.3	Social Impact Assessment	Undertake an assessment of social impact that considers the social consequences that disrupt the normal rhythm of life of the population and affect their quality of life.
A, B1	12.4	Summary of the Environmental Impact Assessment	Prepare a summary indicating all environmental impacts that the project will produce in its different stages and the outcome of the assessment of the importance of environmental impact, including those that generate cumulative impacts. Include a comparison of the rating of the environmental impacts, in particular the balance between negative and positive impacts; and summarize what project's most important impacts.
A, B1	13	<b>Environmental Management Plan (EMP)</b>	Submit an EMP that includes practices to be implemented to prevent, control or reduce negative environmental impacts and maximize significant positive impacts arising from the project, work or activity. Present a synthesis in an abstract describing the EMP, including: a) affected environmental variables, b) generating source of impact, c) environmental impact itself, d) appointment of environmental regulations related to the subject, e) environmental measures established, f) runtime of these measures, g) costs of measures, h) responsibility for implementing the measures, i) performance indicator set to monitor compliance, j) Synthesis of environmental commitment.
A, B1	13.1	Project organization and execution of mitigation measures	Describe the organization that the Project will have, both during construction and in operation phases, indicating at each phase the persons responsible for the implementation of mitigation measures.
A, B1	13.2	Environmental monitoring and surveillance (monitoring)	As part of the EMP, define the objectives and specific actions of monitoring and environmental monitoring progress under the project's action plan, clearly defining which environmental variables or factors will be tracked (showing methods, types of analysis, and location of sites, sampling points and the sampling frequency, and responsible institutions). Monitoring and follow up should be included at the construction, operation and closure or decommissioning

			stages, depending on the complexity and type of the project and the environmental sensitivity of its proposed location.
A, B1	13.3	Environmental Recovery Plan for abandonment or closure phase	Define the stages of decommissioning or closure, after fulfilling its objectives: present a plan that includes measures to be taken to restore the site of the project area, pinpointing its final state after completion of the operations, so that it can be corroborated.
A, B1	14	<b>Risk analysis and contingency plans</b>	Produce an analysis of the likelihood of exceeding the economic, social and environmental consequences at a particular site. Indicate vulnerability of the exposed elements and the risk may be caused by man or nature.
A, B1	14.1	Contingency plan	Introduce measures to take as contingency or emergency containment resulting from the development of the project, work, industry or activity, and/or natural disasters, if such projects, construction, industries or activities are in fragile areas or which by their nature represent danger to the environment or nearby towns. (Plans against earthquake risk, explosion, fire, flood or any other event.)
	15	<b>Environmental Scenarios modified for the development of the project, work, industry or activity</b>	Present a comprehensive analysis of the environmental situation of the project area prior to the completion of the Project and the area of influence as a result of development.
A, B1	15.1	Forecast of environmental quality of the area of influence	Based on the current environmental situation of the area of influence, an analysis of the environmental quality is required that will influence the area from the implementation of the Project, taking into account the measures to be applied both within the scope of the project, and their cumulative effects.
A, B1	15.2	Synthesis of environmental commitments, mitigation and contingency	Present (in a table) a summary of environmental commitments in the EMP, risk analysis and contingency plan, establishing environmental guidelines that will govern the project in its different phases, depending on environmental factors.
A, B1	15.3	Environmental Policy of the project	As a summary of the proposed mitigation measures, outline the Environmental Policy that will govern the Project throughout its implementation, including (at minimum) its purpose, scope, commitment to continuous improvement, environmental control and monitoring and good relationship with neighboring communities.
A, B1	16	<b>Bibliographical references</b>	Submit a list of all literature (books, articles, technical reports and other information sources) cited in the various chapters of the EIA study (complete, following standard

			procedures for cited references: i.e., author (s), year, title source, number of pages, and city of publication.
A, B1	17	<b>Annexes</b>	The annexes must be numbered and properly referenced in the text.