

CHAPTER 8

ENVIRONMENTAL FOLLOW-UP PLAN

8.1 GENERAL BACKGROUND

The Environmental Follow-up Plan for the Alto Maipo Hydroelectric Project adjusts to the contents of Title VI, Paragraph 2nd of the Environmental Impact Assessment System (EIAS), and its purpose is to assure compliance with the following conditions at all times:

- Verify that environmental management measures (mitigation, repair and/or compensation) are appropriate and sufficient,
- Demonstrate that the condition of the elements in the environment will evolve as established in the respective assessment, and
- Prove compliance with the environmental standards that were applicable thereto, as well as appropriate implementation of the environmental management measures.

On the basis of the environmental components and in view of the types of impacts identified, the Follow-up Programs applicable to the PHAM by environmental component are identified in the following sections.

The activities involving expert supervision and execution of new field studies of relevant environmental variables are not included in this Chapter because, although they respond to an objective of environmental follow-up, they have been described in the preceding chapters 6 and 7 as measures of mitigation or environmental risk prevention. This is the case for archeological follow-up in sensitive areas, monitoring of species of fauna of interest for conservation, and follow-up of reforestation and revegetation programs, among others.

8.2 DESCRIPTION OF THE ENVIRONMENTAL FOLLOW-UP PLAN

This plan is composed of the monitoring and/or follow-up programs that will oversee the performance of the environmental components and variables, established for the types of impacts identified in this EIA (see Chapter 6).

The information created by the monitoring and follow-up programs shall be compiled in a Consolidated Report, which shall serve as a basis for the proposal of alternative solutions if unforeseen impacts are detected in the EIA, or modification of the Environmental Follow-up Plan if it is detected that the specific measures established in those plans do not comply with its purposes or that the condition of the elements in the environment did not evolve as established in the EIA. In those cases, duly justified, the Project Owner shall readapt the environmental management strategy and submit it to the Metropolitan CONAMA for approval.

On the other hand, the Consolidated Report shall be issued to the Metropolitan CONAMA and the appropriate departments every six months according to the duration of the monitoring programs. Notwithstanding the foregoing, specific monitoring reports or records shall be available to the pertinent authorities, when required.

The environmental follow-up plan proposed for the construction and operation stages of the PHAM is summarized below on Table 8.2.1.

**Table 8.2.1
Summary of Environmental Follow-up or Monitoring Plan of the Project**

Component	Element or Variable	Action	Stage of the Project	
			Construction	Operation
Air and noise	Air quality	Verification of implementation of control actions that are contractors' responsibility	X	
	Noise and vibrations	Verification of effectiveness of proposed control measures and compliance with legal regulations	X	
Water Resources	Water quality	Monitoring of water quality	X	
	Discharge of waste water	Monitoring of discharged water	X	
	Aquatic biota	Monitoring of limnological aspects		X
	Flow	Monitoring of ecological flow		X
Roads	Improvement measures and increase in traffic flow	Evaluate effectiveness of control measures for road impact and compliance with the regulations.	X	
Vegetation	Vegetation in La Engorda summer pasture	Monitoring of vegetation in La Engorda summer pasture	X	X

If monitoring shows negative results or important differences in values compared with previous measurement, the following actions shall be taken:

- Internal investigation of activities and/or processes carried out by Contractors that might constitute the direct or indirect cause of the results obtained.
- Design of concrete actions that reinforce environmental control measures.
- Notification of Environmental Authorities and proposal of immediate and long-term control actions.

The monitoring programs that GENER has considered pertinent according to the environmental impact analyses are indicated below.

8.2.1 Program for Air Quality Monitoring in Construction Stage

As the project is located in the Metropolitan Region, an area saturated by atmospheric pollutants according to DS 58 which reformulates and updates the Prevention and Atmospheric Decontamination Plan for the Metropolitan Region (PPDA), especially for particulate material, the monitoring effort shall be focused on the follow-up of commitments assumed by the Owner regarding the minimization of emissions into the air.

According to the characteristics of the Project, emissions of particulate material will be associated with earth movements for construction of the surface works and traffic of vehicles on the work fronts and their transit to and from muck disposals and camps. In addition, emissions of particulate material, combustion gases and others produced by the operation of motors, whose impact is considered insignificant, shall be created.

The follow-up of commitments assumed shall be structured as follows:

- i) Technical Works Inspection (ITO) shall establish a program to check the requirements on the reduction of emissions into the air, by sector and period of implementation.
- ii) Work fronts shall be inspected periodically, every week, to corroborate compliance with emission control measures.
- iii) Inspections of Contractors in the field shall be supported by a photographic record that may later be included in reports.
- iv) If non-conformities are detected regarding the Emission Control Program (See Appendix 5), management of the respective Contractor shall be informed in writing, with a copy to the representative of Project Management.
- v) The ITO shall prepare a quarterly report that shall be presented to the CONAMA RM and the Health Department, relating the activities and results of the monitoring period.

The following table shows the follow-up measures to be carried out for measures to compensate emissions.

**Table 8.2.1.1
Monitoring and Follow-up of Measures to Compensate for
Emissions in Construction Stage**

Measure	Follow-up	Frequency
Re-laying Granular Paving	Visual verification in road improvement sections, following the Measurement Protocol for dust designed by DICTUC of the Pontificia Universidad Católica de Chile, which will make it possible to quantify dust emissions objectively by means of DustMate equipment and consequently the performance of dust suppressor treatments.	March – April every year
Annual irrigation of bischofite		August – September every year
Installation of road signs	Visual verification of the existence and condition of road signs installed in sections of roads under improvement	April – May every year
Installation of road defenses	Visual verification of the condition of road defenses installed in sectors on curves, with no visibility and with risk of vehicles falling from great heights.	April – May every year
Installation of corrugated tube-type engineering work	Visual verification of condition of work in sectors where granular paving is being re-laid on Route G-25 and Km 6 of Route G-455.	April – May every year
Construction of gutters	Visual verification of condition of gutters at Km 18 on Route G-455	April – May every year
Construction of minor masonry wall	Visual verification of the condition of the wall at km 3.6-4.2 and 17.8 to 18.8 on Route G-455	April – May every year
Lengthening of sewer pipes	Visual verification of the condition of the sewer pipes on Route G-455	April – May every year

8.2.2 Monitoring Program for Noise and Vibrations in the Construction Stage

According to the results of the noise assessment described in Chapter 6, emission sources will be generated mainly by the works and activities carried out during the construction stage on the different work fronts. In this regard, the central objective of the monitoring shall be to verify the effectiveness of the mitigation measures specified in this EIA for the whole construction stage. This monitoring shall be carried out by means of measurements of the noise level according to the procedure established by D.S. No. 146/97 of the MINSEGPRES to verify compliance with the maximum limits permitted for sound pressure level.

Table 8.2.2.1 summarizes the conditions that the Noise Emission Monitoring Program shall fulfill.

**Table 8.2.2.1
Summary of the Noise Monitoring Program in the Construction Stage**

Noise Monitoring	
Measurement Places	<p>Measurements shall be taken at the sensitive points identified in the environmental assessment process of the project (section 6.4.1.2) corresponding to:</p> <ul style="list-style-type: none"> • Point 1: Alfalfal Sector • Point 2: Quebrada El Torrejón • Point 3: Quebrada El Trescientos • Point 4: Maitenes Sector • Point 5: El Sauce Sector • Point 6: El Yeso Sector • Point 7: Alfalfal Sector • Point 8: Las Lajas Sector <p>The most unfavorable condition on the assessed property shall be considered for measurements. If it is not possible to take measurements on the affected properties, the levels measured at the closest points to the source shall be projected to obtain the Corrected Sound Pressure Level NPC in the receivers to be assessed by using a propagation model based on international norm ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors- Part 2 General method of calculation.</p> <p>If new sensitive points are detected during the follow-up, they shall be assessed, following the same assessment methodology indicated in Chapter 6 of this EIA.</p> <p>The AID of all the sources of noise, blasting, and vibrations declared for this stage shall be included, such as: traffic flow, concrete plants, dumps, muck disposal, movement of machinery, loading and unloading material, blasting, etc.</p>
Measurement frequency and procedure	<p>Noise measurements shall be taken for 4 consecutive days, the first 2 months after the works have been initiated in each one of the compromised sectors. Afterwards, they shall be taken every 6 months, during the whole construction stage of the works located in the sector of the Alfalfal and the housing in the sector of the Sauce and the points defined on routes G-25 and G-455 (see Appendix 30 and Appendix 2). The timetable to be chosen and the works executed during each measurement shall be representative of the phase corresponding to the construction stage of the project.</p>

Noise Monitoring	
Content of Monitoring Reports	<p>Monitoring reports shall contain the following items:</p> <ul style="list-style-type: none"> • Characteristics of the equipment used in measurements: brand, model, current calibration certificate, technical specifications. • Schedule of the construction stage of the project, to justify the choice of days and times of measurements. All works and machinery included shall be indicated for each phase of the construction stage of the project. • Works carried out and machinery used in measurements, so it is consistent with the works and machinery indicated in the preceding point (schedule). Also, any noise source outside the construction activity of the project (background noise) shall be indicated, if relevant. <p>– Noise measurement and assessment sheets provided in the manual for application of the current regulations, which shall contain the following data:</p> <ol style="list-style-type: none"> a) Date and time of measurement. b) Identification of type of noise, both spatial and temporal (machinery, vehicular traffic, etc.) c) Identification of other noise sources outside the ones assessed that influence the measurement, specifying their origin and characteristics. d) Leq values obtained for the noise source, complemented by other appropriate descriptors, such as minimum levels (Lmin), maximum level (Lmax), percentiles (Ln), etc. e) Leq values shall be obtained, if necessary, for background noise in order to make corrections. f) Current certification of instruments used. g) Data on person responsible for measurements. h) Sketch of the place, indicating the different emission sources, measurement points, and respective distances between those sources and points. <p>Monitoring reports shall be prepared according to the frequency of measurements committed and maintained in the place of the project, available at the request of supervising personnel and sent if the authorities so request of the owner.</p> <p>Monitoring reports shall be included in a Consolidated Report, which shall be presented to the Regional Health Department and CONAMA every six months.</p>
Compliance parameter	<p>To assess emissions generated by the Project, the inmission levels in situation with Project shall be contrasted with the maximums permitted by DS 146/97 and the reference standard for mobile sources. Reference standard FHWA¹ shall be used for mobile sources.</p>
Unforeseen Impact	<p>When D.S. 146 and the reference levels assumed for mobile sources are exceeded and this excess is detected in monitoring, the accredited specialist who is performing the monitoring shall immediately recommend additional mitigation measures that minimize noise emissions, which shall be described and assessed in the respective monitoring report for the period.</p>

¹ Federal Highway Administration, "Procedures for Abatement of Highway Traffic Noise and Construction Noise", 23 C.F.R., Part 772, Federal Register, vol. 47, pp. 29653-29657, July 8, 1982.

Regarding noise and vibrations caused by blasting, measurements shall be taken at the construction works while they are perceptible from the affected properties. These measurements shall be taken in accordance with the procedures established in the reference standard: "Title 30: Mineral Resources; Part 816—Permanent Program Performance Standards—Surface Mining Activities; § 816.67 Use of explosives: Control of adverse effects".

**Table 8.2.2.2
Program for Monitoring of Blasting Noise in the Construction Stage**

Monitoring of Blasting Noise	
Measurement Places	Follow-up shall be carried out at the 8 points sensitive to blasting noise identified and set forth in section 6.4.1.3. Any house located less than 300 m from the blasting site shall be inventoried before the test blasting.
Frequency and measurement procedure	<p>Monitoring shall take place every fifteen days during the first 100 m of progress of the initial opening works (most critical period). The timetable chosen for each measurement shall be representative of the phase corresponding to the construction stage of the project.</p> <p>Measurements shall consist of continuous records of sound pressure level L_p with weight curve C and slow response speed every 1 second to obtain a histogram that makes it possible to identify the moment of the blasting and thus assess its level associated with the maximum permitted by the standard.</p>
Content of Monitoring Reports	<p>As well as the results, the monitoring reports shall contain at least:</p> <ul style="list-style-type: none"> - Characteristics of the equipment used in measurements: type of instrument, brand, model, sensitivity, calibration sign or annual calibration certification, and technical specifications. - Schedule of the construction stage of the project to justify the choice of days and timetables of measurements. - Exact location of the instrument, date, time, and distance of the explosion. - Name and signature of the person who takes the measurement as well as the person in charge of the monitoring analysis and report. - Emission and noise assessment sheets provided in the manual for application of the current standard, similar to the ones mentioned in table 8.2.2.1., shall be prepared. <p>Reports shall be prepared according to the frequency of measurements committed and maintained in the place of the project, available at the request of the supervising personnel and sent if the authorities so request of the owner together with the rest of the follow-up information of the Project.</p> <p>Monitoring reports shall be included in a Consolidated Report that shall be presented to the Regional Health Department and CONAMA, every six months.</p>
Compliance parameter	To assess the noise caused by blasting, the noise levels in situation with Project shall be contrasted with the maximums permitted by the reference standard ("Title 30: Mineral Resources; Part 816—Permanent Program Performance Standards—Surface Mining Activities; § 816.67 Use of explosives: Control of adverse effects").

Monitoring of Blasting Noise	
Unforeseen Impact	When the referential standard is exceeded and this excess is detected in monitoring, the accredited specialist who is performing the monitoring shall immediately recommend additional mitigation measures that minimize noise emissions, which shall be described and assessed in the respective monitoring report for the period.

**Table 8.2.2.3
Monitoring Program for Blasting Vibrations in Construction Stage**

Monitoring of Blasting Vibrations	
Measurement Places	Follow-up shall be carried out at the 8 points sensitive to blasting noise identified and set forth in section 6.4.1.3. Any house located less than 300 m from the blasting site shall be inventoried before the test blasting. An inventory shall be made of conditions/structural and cosmetic damage of facilities potentially submitted to perceptible vibrations (vibrations above 0.5 mm/s).
Frequency and measurement procedure	It is estimated that the sensitive period will delay the opening of the first 30 to 40 m of tunnel (initial critical period), so monitoring is proposed every fifteen days during the first 100 m of progress of the initial opening works. The timetable chosen during each measurement shall be representative of the respective phase of the construction stage of the project. In this period, blasting shall adjust to the initial blast diagram determined empirically, and it shall assure compliance with the standard considered as reference.
Content of Monitoring Reports	The contents of the monitoring report shall be similar to the ones mentioned in table 8.2.2.2. Monitoring reports shall be prepared according to the frequency of measurements committed and maintained in the place of the project, available at the request of supervising personnel and sent if the authorities so request of the owner together with the rest of the follow-up information on the Project. Monitoring reports shall be included in a Consolidated Report that shall be presented to the Regional Health Department and CONAMA, every six months.
Compliance parameter	To assess the vibrations caused by blasting, the vibration levels in situation with Project shall be contrasted with the maximums permitted by the reference standard ("Title 30: Mineral Resources; Part 816—Permanent Program Performance Standards—Surface Mining Activities; § 816.67 Use of explosives: Control of adverse effects".).
Unforeseen Impact	When the referential standard is exceeded and this excess is detected in monitoring, the accredited specialist who is performing the monitoring shall immediately recommend additional mitigation measures that minimize noise emissions, which shall be described and assessed in the respective monitoring report for the period.

8.2.3 Monitoring Program for Water Quality in the Construction Stage

During the construction stage, the physical-chemical quality of the water in some waterways may be altered by works involving construction of water intakes, fluvial defenses, and siphons. The objective of the water quality monitoring program is to verify the effectiveness of environmental control measures regarding the construction of those works and tending to minimize their effects.

The Monitoring Program is proposed in table 8.2.3.1, which shall extend the period of time for the construction of works in each sector.

**Table 8.2.3.1
Summary of the Monitoring Program for Water Quality in the Construction Stage**

Monitoring of Water Quality	
Measurement Places	Works in waterways: measurements shall be taken 100 m upstream and 100 m downstream from the areas of construction of works, in the Colina, La Engorda, El Morado, and Las Placas streams and in the Yeso River and the Las Lajas discharge.
Measurement frequency and procedure	Measurements of water quality shall be taken during the whole period that construction lasts in each one of the waterways monthly from the beginning of activities.
Parameters to be Measured	<p>Parameters to be measured in the waterways are:</p> <ul style="list-style-type: none"> – Temperature – pH – Specific conductivity – Dissolved oxygen – Nitrite (N-NO₂) – Nitrate (N-NO₃) – Ammonia (N-NH₄) – Total organic nitrogen (N-Ntotal) – Orthophosphate (P-PO₄) – Total phosphorus (P-Ptotal) – Dissolved total solids – Suspended total solids – Phenolphthalein alkalinity – Total alkalinity – Sulphate – Biochemical oxygen demand (DBO₅) – Metallic elements <p>The parameters of hydrocarbons, oils and fats are included.</p>
Content of reports	<ul style="list-style-type: none"> – Methodology of measurement, indicating date and measurement procedure for each parameter. – Characteristics of the equipment used for measurement of each parameter, indicating brand, model, etc. – Location of the measurement sites with their coordinates and a general location sketch. – Analysis of results based on measured parameters, like column of water and sediment. – Conclusions and recommendations.

Monitoring of Water Quality	
	The results of these analyses shall be included in a technical report presented to the General Water Board and CONAMA RM every six months.
Verifier of Compliance	For construction activities that shall be executed in waterways, the values of the indicated quality parameters obtained upstream and downstream from the area of execution of the works shall be contrasted.
Unforeseen impact	If any important differences are detected between contrasted values, the environmental control measures shall be reinforced.

8.2.4 Monitoring Program for Water Discharge in the Construction Stage

Discharges from the sewage and Liquid Industrial Residues treatment plants shall be monitored to verify that they comply with the water quality stipulated in the standard.

The Monitoring Program is proposed in the following table, which shall extend the period of time that construction of works takes in each sector.

**Table 8.2.4.1
Summary of Monitoring Program for Discharge of Waste Water in the Construction Stage**

Monitoring of Discharge of Waste Water	
Measurement Places	Discharge of treated liquid residues: <ul style="list-style-type: none"> - Discharge of treated liquid industrial residues: <ul style="list-style-type: none"> • El Volcán Sector: El Morado Stream • El Yeso Sector: Yeso River • Aucayes Alto Sector: Aucayes Stream (Downstream from existing potable water catchment in locality of Maitenes) • Aucayes Bajo Sector: Canal 1 Maitenes • Km. 10 of Route G-345 Sector, Colorado River • Caballo Muerto Sector: Colorado River • Maipo River discharge Sector: Maipo River - Discharge of treated sewage: <ul style="list-style-type: none"> • El Volcán Sector: El Morado Stream • El Yeso Sector: Yeso River • Aucayes Alto Sector: Aucayes Stream (Downstream from existing potable water catchment in locality of Maitenes) • Aucayes Bajo Sector: Colorado River • Km. 10 Route G-345 Sector, Colorado River
Measurement frequency and procedure	Permanent monitoring of water discharges from treatment of Liquid Industrial Residues and from the sewage treatment plant shall only be done in the winter because the rest of the year they shall be used as part of the construction process.
Parameters to be measured	The parameters indicated in D.S. 90 shall be measured for discharges.
Content of	- Measurement methodology, indicating measurement date and procedure for

Monitoring of Discharge of Waste Water	
reports	<p>each parameter.</p> <ul style="list-style-type: none"> – Characteristics of the equipment used for measurement of each parameter, indicating brand, model, etc. – Location of measurement sites with their coordinates and a general location sketch. – Analysis of results based on parameters measured like column of water and sediment. – Conclusions and recommendations. <p>The results of these analyses shall be included in a technical report presented to the Health Authorities every six months.</p>
Verifier of Compliance	<p>It is confirmed that the project provides for permanent monitoring of discharges of treated water to guarantee or prove obligatory compliance with standard DS No. 90/2001.</p> <p>Part of the treated water may be used for watering roads or other surface areas inside the work sites, while efficiency in the treatment shall guarantee quality parameters below the permissible limits established in NCh 1333. Watering roads or other surface areas inside the work sites shall help decrease emissions of dust or re-suspended particulate material.</p>
Unforeseen impact	If important differences are detected between contrasted values, environmental control measures shall be reinforced.

8.2.5 Limnological Monitoring Program in the Construction Stage

During the operation stage of the project a modification shall be generated in the flow regime of some streams and rivers in the area. In this stage the project shall maintain permanent monitoring of the aquatic biota as indicated in the following table.

**Table 8.2.5.1
Summary of the Limnological Monitoring Program in the Operation Stage**

LIMNOLOGICAL MONITORING	
Measurement Places	<u>Waterways</u> : Downstream of projected works of the Colorado and Yeso rivers and the Aucayes stream.
Measurement frequency and procedure	Monitoring shall be carried out every two months for the first 6 months of full operation of the Project. It shall continue thereafter for one year with quarterly monitoring.
Parameters to be Measured	<p>The aquatic biota parameters to be measured shall be the following:</p> <ul style="list-style-type: none"> – Fauna of benthonic macroinvertebrates – Flora of benthonic microalgae – Fauna of fish – Flora of macrophytes – Chlorophyll – Organic matter – Dissolved oxygen

Content of reports	<p>Reports shall contain the following items:</p> <ul style="list-style-type: none"> – Measurement methodology, indicating measurement date and procedure for each indicator. – Characteristics of equipment used for measurement of each parameter, indicating brand, model, etc. – Location of measurement sites, with their coordinates and a general location sketch. – Analysis of results based on parameters measured and prior records – Conclusions and recommendations <p>The results of these analyses shall be included in a technical report presented to the Undersecretariat for Fisheries, the National Fisheries Service, and CONAMA every six months.</p>
Verifier of compliance	Monitoring results shall be contrasted with the baseline records included in this EIA.
Unforeseen Impact	If important differences are detected between contrasted values, environmental control measures shall be reinforced.

8.2.6 Ecological Flow Monitoring Program in the Operation Stage

Maintenance of the ecological flow is the condition that mitigates the impact on local flora and fauna so its follow-up shall take place according to the monitoring program that is presented in the following table.

**Table 8.2.6.1
Summary of Ecological Flow Monitoring Program in the Operation Stage**

ECOLOGICAL FLOW MONITORING	
Measurement Places	Flow-gauge stations shall be established on the Yeso River at the projected bridge and on the La Engorda Stream where it flows into the Volcán River.
Measurement frequency and procedure	<p>Monitoring shall be carried out, based on measurement of the flow at the 2 flow-gauge stations.</p> <p>The flow shall be measured monthly for a period of 12 months, after the respective flow-gauge station has been put into operation.</p>
Parameters to be Measured	Flow (m ³ /s)
Content of reports	<p>The reports shall contain the following items:</p> <ul style="list-style-type: none"> – Measurement place, indicating date, time, and procedure of flow measurement. – Characteristics of equipment used in flow measurement and its certification. – Analysis of results based on parameters measured and prior records. – Conclusions and recommendations. <p>The results of these analyses shall be included in a technical report presented to the General Water Board and the CONAMA every two months for the first 6 months of full operation of the Project. After that time, monitoring shall continue for one year on a quarterly basis.</p>

Verifier of compliance	Results of the monitoring shall be contrasted with the baseline records included in this EIA.
Unforeseen Impact	If important differences are detected between contrasted values, environmental control measures shall be reinforced.

In addition to the above, an on-line Monitoring program of flows captured by the Project shall be developed to provide the authorities and/or pertinent services with information about the captures carried out during the operation of the PHAM via On-Line technology.

Program for Follow-up of Road Impact in the Construction Stage

Follow-up of the road component shall be focused on monitoring the sufficiency of the environmental management measures indicated in Chapter 6. That will make it possible to detect the real effect of the contribution of traffic on the main roads in the area of influence of the project, particularly in those stretches where crossings are created between service roads and public roads.

The following table summarizes the Follow-up Program for the road component.

**Table 8.2.7.1
Summary of the Road Monitoring Program in the Construction Stage**

Road Follow-up	
Measurement Places and measurement procedure	<p>Measurement points shall be located on Route G-25, Route G-345, G-421, and Route G-455, and they shall coincide with the points determined by the National Census Plan. Since the routes indicated above are the only roads on which vehicular traffic flows in the area of influence of the project, and the National Census Plan has records of flows for each one of them, the follow-up shall determine increases in vehicular traffic and reassignments of flows precisely.</p> <p>Measurement procedures shall be carried out according to the methodologies used by the Road Department in the National Census Plan.</p> <p>Finally, measures involving improvement of roads and signage indicated in Chapter 6 of the EIA shall be verified.</p>
Measurement frequency and procedure	Monitoring of traffic flows shall take place for the first 3 consecutive working days of each month for a period of 6 months. Subsequently, it shall take place every 4 months, for an equal period of time, during the first three years of construction of the project when the largest contribution of traffic flow shall be generated.
Content of Monitoring Reports	<p>Reports shall contain the following items:</p> <ul style="list-style-type: none"> • Basic measurement methodology • Equipment used for measurement • Date and periods of analysis • Measurement place • Analysis of generation of traffic contributed by the Project through contrast between road supply and demand indicated in the Baseline and the records of the National Census Plan with the values obtained in the measurement. • Results of verification of the measures indicated in Chapter 6 (paving of roads,

	<p>signage at crossings, etc. The results shall be complemented with a photographic record.</p> <ul style="list-style-type: none"> • Conclusions and Recommendations. <p>The results of these analyses shall be included in a technical report presented to the Road Department of the MOP and CONAMA every six months.</p>
Unforeseen Impact	If any anomaly is determined during the follow-up in sectors potentially impacted by the Project, the contractors of works shall make the pertinent repairs or corrections.

8.2.7 Monitoring Program of Social Indicators in the Construction Stage

The PHAM has included the monitoring of variables that inform about the ways of life and local customs in its Follow-up Plan.

This monitoring is limited to the construction stage of the PHAM. The most relevant works shall be developed and the largest staff of workers and traffic flow shall be maintained during the construction stage. We propose an assessment be made of the results of the monitoring campaigns after the construction stage has been completed. On the basis of the trends detected, we propose that monitoring be redefined for the operation stage, regarding its timing and especially regarding the parameters to be followed.

Table 8.2.8.1 shows the characteristics of this follow-up.

Table 8.2.8.1
Summary of the Monitoring Program for Social Indicators in the Construction Stage

Monitoring of Social Indicators	
Measurement Places	<ul style="list-style-type: none"> - Alfafal and los Maitenes Localities - El Manzano Locality - El Canelo Locality - Baños Morales Locality - Lo Valdés Locality - El Volcán Locality - El Romeral Locality - Yeso River Road Sector - San Gabriel Locality
Measurement frequency and procedure	<p>Campaigns every six months are provided for the construction stage as this is considered a suitable period of time to capture the dynamism that might arise from the activities and works of the PHAM.</p> <p>For the first 5 years of the operation stage the procedure to be followed shall be monitoring the defined variables and parameters of the geographic, demographic, anthropological, socio-economic, and basic social welfare dimensions (See Appendix 39).</p> <p>The instruments for collection of information to be used shall be (See Appendix 39):</p> <ul style="list-style-type: none"> - Surveys of a statistically representative sample of households - Semi-structured interviews of key informers - Semi-structured interviews of leaders of social organizations - Analysis of statistics from Carabineros and health establishments in the commune
Content of	A report on the results obtained shall be prepared every six months. Graphs shall be

Monitoring of Social Indicators	
Monitoring Reports	used that show the comparative evolution of the parameters from campaign to campaign. This document shall be delivered to CONAMA.
Unforeseen Impact	If any anomaly should be determined during the follow-up in the host communities potentially impacted by the project, GENER shall make the pertinent decisions in time to mitigate or compensate the damaging effects, which is essential to harmonious relations with the communities near the project.

8.2.9 Monitoring of Vegetation in the Summer Pasture Area of La Engorda in the Construction Stage and Part of the Operation

To maintain follow-up on the performance of vegetation associated with the water resource, monitoring of vegetation shall be carried out during the construction stage and the first 5 years of operation of the Project in the sector of Alto Volcán. The monitoring shall be done between December and February every year, and its objective is to measure changes in the composition and abundance of vegetation, with the same method used in this first study.

The results of this follow-up shall make it possible to complement valuable information collected to date, corroborate foreseen impacts, and verify the efficiency and sufficiency of the control actions provided.

The results of the follow-up shall be presented to the Authorities.

**Table 8.2.9.1
Summary of the Monitoring Program of Vegetation in the Summer Pasture of La Engorda**

Monitoring of Vegetation in the Summer Pasture of La Engorda	
Measurement Places	- Sector of flat lowland plains and thickets on both sides of the conveyance ditch, taking the vegetation that is found upstream of the ditch as the control.
Measurement frequency and procedure	- Monitoring shall be done once a year during the summer, preferably between December and February. - Information shall be collected in the field about the composition and abundance of the species, by means of at least 40 parcels of 4x4m where coverage of each specie will be estimated. (20 parcels upstream of the sector of the conveyance ditch and 20 parcels downstream). The sampling parcels shall be fixed, in other words some reference shall be marked to make sure the measurements are always taken in the same place.
Content of Monitoring Reports	An annual report shall be prepared with the results of each campaign, compared with the results of previous campaigns in order to detect any changes in the composition and abundance of the vegetation. The report shall be delivered to the appropriate authorities.
Unforeseen Impact	If the vegetation does not perform as foreseen for the condition with project, a consensus shall be reached with the Authorities on the adoption of complementary compensatory measures.

8.3 INDEPENDENT ENVIRONMENTAL AUDIT

GENER shall carry out an Independent Environmental Audit during the construction activities of the project, whose objective shall be to oversee compliance with the environmental law applicable to the project and the correct application or implementation of the demands contained in the Environmental Qualification Resolution.

This audit shall make it possible to perform a follow-up of the sufficiency and effectiveness of the environmental management actions included in the engineering of the Project or the actions that arose during the environmental assessment (indicated in chapters 6 and 7 of this EIA).

The results of the audit shall be included in the Consolidated Monitoring Report.

This audit shall be arranged together with the CONAMA RM, particularly in regard to the definition of scopes and selection of external auditors.