ANNEX 7

SOUND SURVEY

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1 INTRODUCTION

This report deals with assessing the sound component of the "Maitenes S/S–El Alfalfal S/S and El Alfalfal II Power Plant–Alfalfal S/S Power Transmission Lines" project, consisting of two 17.1 km long power transmission lines that will provide for connecting the power generated by the PHAM into the grid (Sistema Interconectado Central, SIC). The Project also envisages expanding the existing Alfalfal S/S by 0.45 ha in order to make the respective connections to the new lines.

The layout in this stretch runs along the north sector of the Maipo River basin; an inspection visit identified the existence of isolated dwellings throughout the layout, with a greater housing density in the sector of the Los Maitenes Substation, including dwelling houses and a school.

This report assesses the acoustic impacts related to the construction of the high-voltage power line on the closest receptor locations. It establishes pre-operational noise levels (baseline noise level) in the vicinity of the Project, estimates the noise levels generated during the construction and operations stage in the area of direct influence (AID, as per its Spanish acronym), and evaluates these results against the regulations in force.

2 OBJECTIVES

The objectives of this study are:

- Identify the noise-sensitive sectors that may be affected by the construction and operation of the Project.
- Ascertain the baseline noise levels in the surroundings of the Project.
- Estimate the noise levels generated during the construction and operation stage.
- Assess the acoustic impacts against D.S. No. 146/97 of the MINSEGPRES.

3 REGULATIONS APPLIED: D.S. NO. 146/97

Noise levels were assessed against D.S. No. 146/97, which sets out the corrected maximum admissible sound pressure levels and the technical criteria for assessing and rating the emission of annoying noises generated by stationary sources such as industrial, commercial, recreational, artistic or other activities. Baseline noise levels were obtained by means of the procedure set out in the aforementioned decree for measuring background noise, which stipulates that: "To obtain the sound pressure level of background noise, the equivalent continuous sound pressure level (NPSeq, as per its Spanish acronym) shall be measured every five minutes until stable readings are obtained. Readings are be considered to be stable when the arithmetical difference between two consecutive logs is less than or equal to 2 dB(A). The latest level to be logged will be the one to be considered. Under no circumstances shall measurements extend for longer than 30 minutes."

The assessment of noise levels is conducted in relation with the zone where the receptor is situated:

- Zone I: That zone where allowable land uses pursuant to the land use planning instruments are residential and facilities on a neighborhood level.
- Zone II: That zone where allowable land uses pursuant to the land use planning instruments are equal to those for Zone I, in addition to facilities on a commune and/or regional level.
- Zone III: That zone where allowable uses pursuant to the land use planning instruments are equal to those for Zone I, in addition to inoffensive industries.
- Zone IV: That zone where allowable land uses pursuant to the land use planning instruments are industrial, including both inoffensive and/or bothersome industries.

The corrected sound pressure levels obtained from noise emissions from a stationary source, measured at the location of the receptor, may not exceed the values set out below:

Table 1 Corrected Maximum Permissible Sound Pressure Levels (NPC) in dB(A), Slow Response

Zones	Daytime Hours	Nighttime Hours
	From 7 to 21 h	From 7 to 7 h
Zone I	**55**	**45**
Zone II	**60**	**50**
Zone III	**65**	**55**
Zone IV	**70**	**70**

Source: D.S. No. 146/97

In rural areas, the corrected sound pressure levels obtained from noise emissions from a stationary source, measured at the location of the receptor, may not exceed the background noise by 10 dB(A) or more.

4 SOUND BASELINE

4.1 Measuring Instruments

The following equipment was used to characterize the noise baseline:

- Type-2 Integrating Sound Level Meter, Delta OHM HD2010.
- 94 dB, 1 KHz Sound Calibrator, Delta OHM HD9102.
- Wind Screen.
- 1.5 m high tripod. Garmin GPS 38. Digital camera.

4.2 Measurement Times

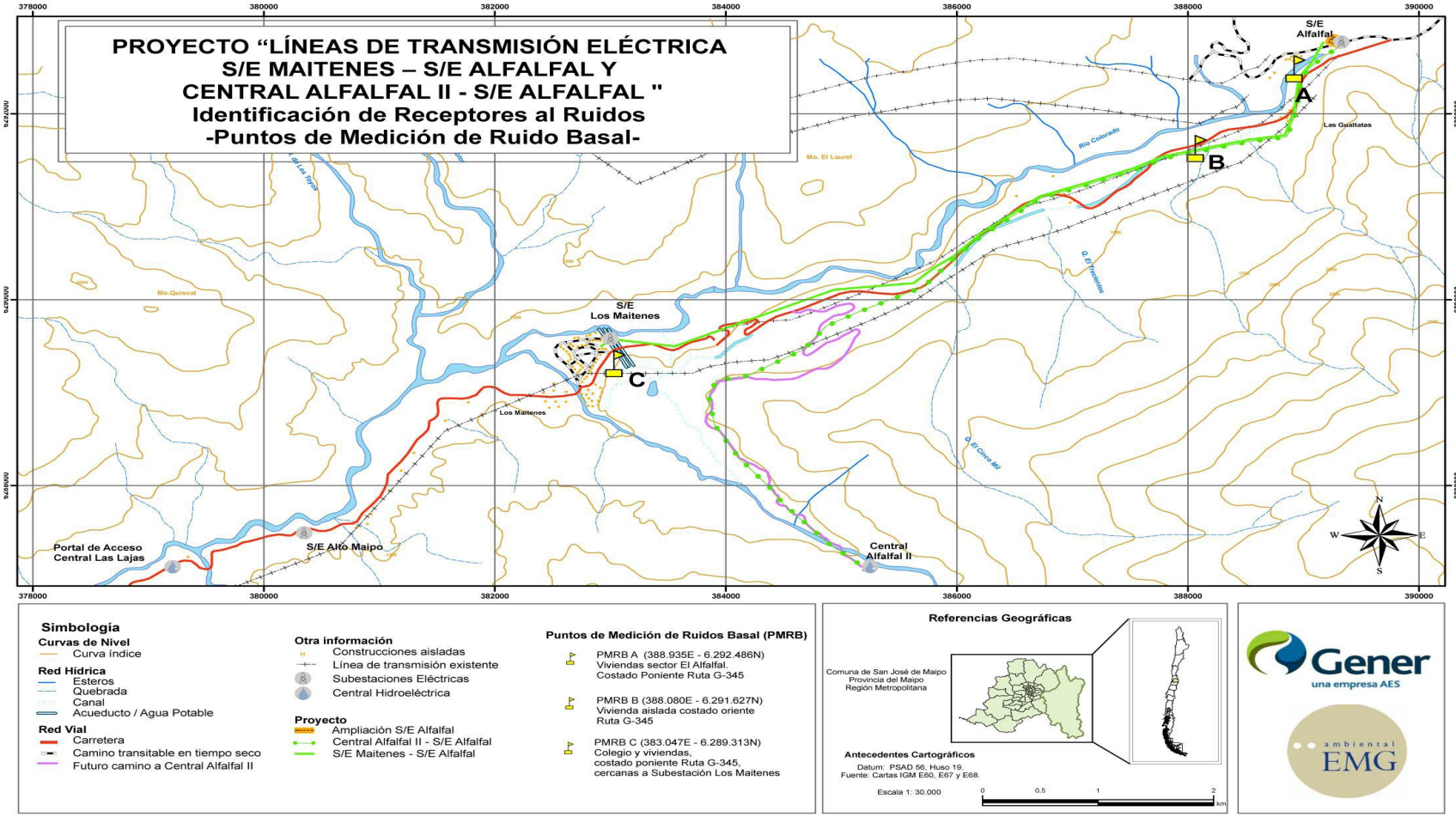
A series of noise baseline measurements were taken on November 11, 2008 during daytime hours and on February 10, 2009 during nighttime hours.

4.3 Measurement Points

In an inspection visit, noise-sensitive sectors at a higher risk of noise pollution caused by the construction of the Project were identified.

The following figure shows the zones featuring more noise-sensitive receptor locations, i.e. the access to the Alfalfal S/S and the exit from the Maitenes S/S.

Figure 1 Noise-sensitive Receptors



Source: In-house preparation based on IGM maps E60, E67 and E68, scale 1:50.000.

Therefore, measurements focused on these areas as they are the main noise-sensitive receptors. The following table shows the UTM (Datum PSAD 56) coordinate for each baseline noise measurement point, the distance to the layout, and a description of the vicinity.

Table 2 Location of Baseline Noise Measurement Points

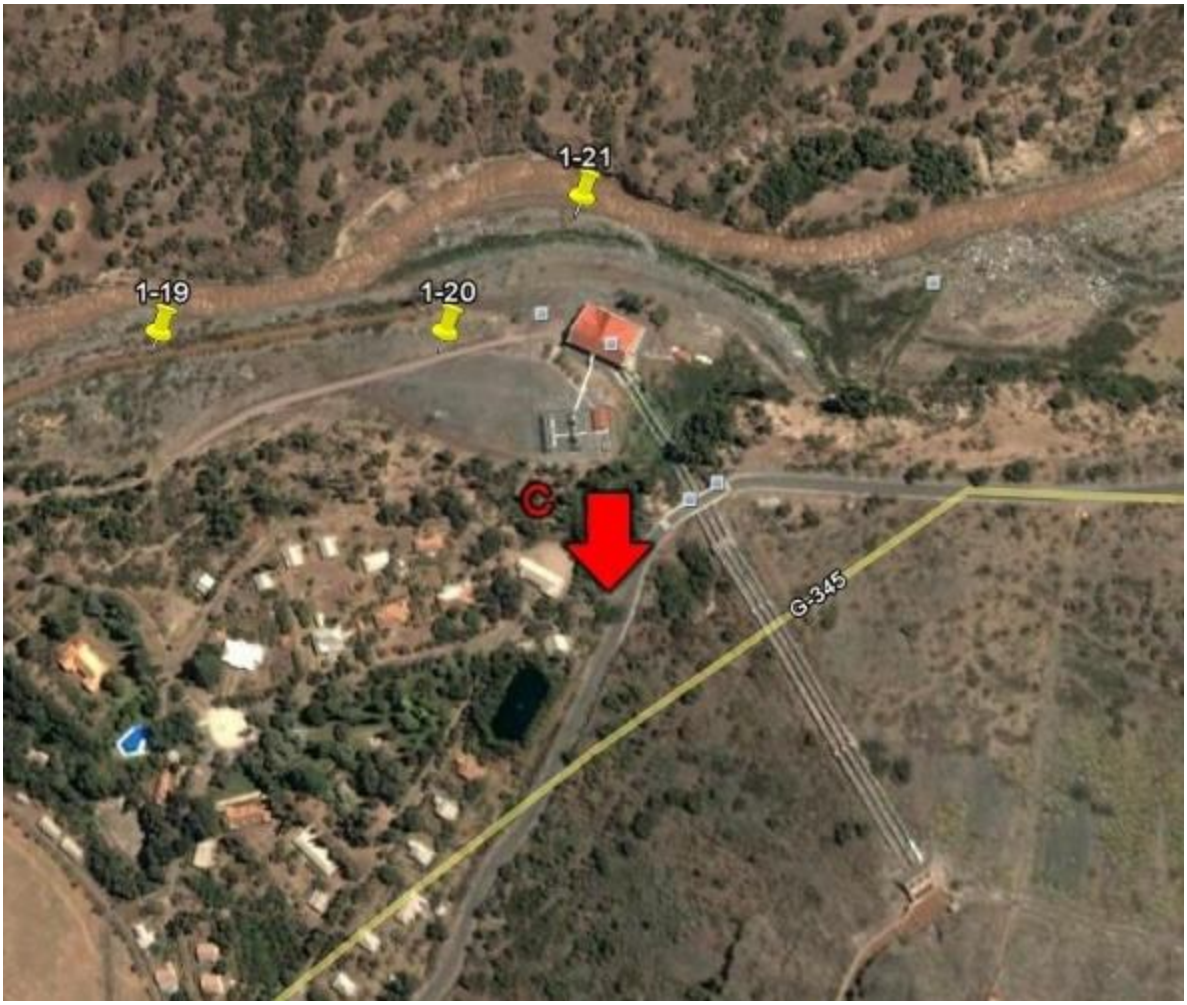
Point	UTM Coordinate, Datum PSAD 56		Distance (m)	Description
	East	North		
A	388.935	6.292.486	**80**	Dwellings in El Alfalfal sector. West side of Route G-345.
B	388.080	6.291.627	**50**	Isolated dwelling on the west side of Route G-345.
C	383.047	6.289.313	**70**	School and dwellings on the west side of Route G-345, near the Los Maitenes Substation.

Source: In-house preparation.

Figure 2 Measurement Points A and B

Source: In-house preparation based on Google Earth.

Figure 3 Measurement Point C



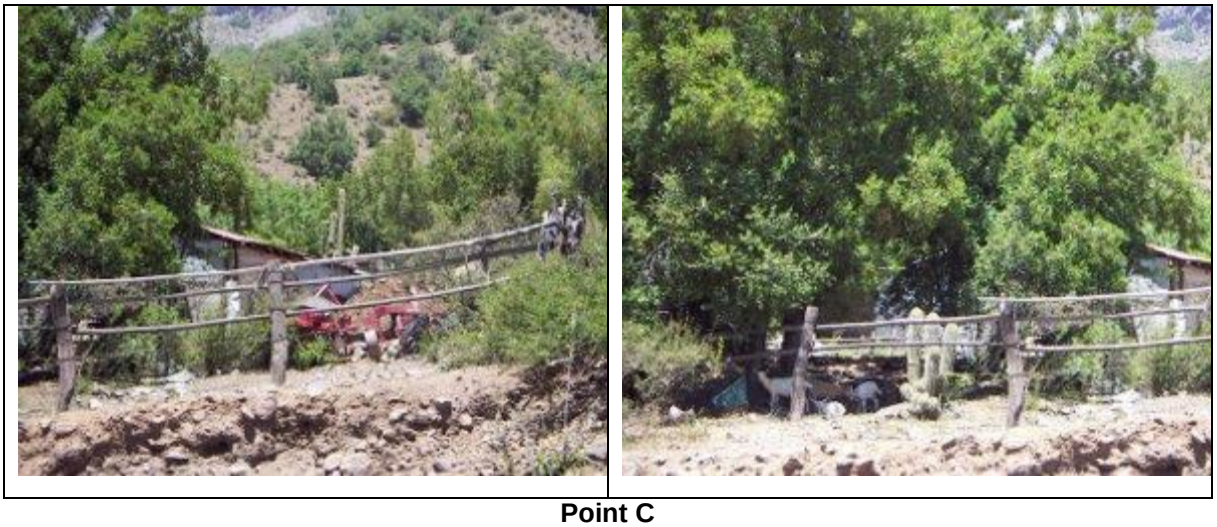
Source: In-house preparation based on Google Earth.

The figures above show baseline noise measurement points A, B, and C, which correspond mainly to the El Alfalfal and Los Maitenes sector. In these figures, the red arrow denotes the layouts of the Los Maitenes S/S– Alfalfal S/S and Alfalfal II Power Plant – Alfalfal S/S high-voltage power lines. It should be noted that no noise-sensitive receptors were identified between the Los Maitenes S/S and the El Alfalfal II Power Plant. Therefore, no baseline noise measurements were made nor were points assessed in the sector when modeling the scenario for the construction and operations stage of the Project.

Figure 4 Photographic Record of Point A, Point B and Point C

Point A

Point B



Point C

Source: In-house preparation.

5 BASELINE NOISE LEVELS

Measurements of the Equivalent Noise Level (NPSeq) were taken using an A-weighting filter and Slow Response settings, and the methodology set out in D.S. No. 146/97 for measuring background noise. The instrument was set at a height of 1.5 m.

The following tables summarize the Equivalent Noise Levels (NPSeq), the Minimum (NPSmin) and Maximum (NPSmax) instantaneous noise levels, as well as the main noise sources identified during the measurement period, arranged in a decreasing order of importance.

Table 3 Baseline Noise Levels dB(A). Daytime Period

Point	NPSeq	NPSmin	NPSmax	Noise Sources
A	52	50	59	River, light and heavy vehicles, birds, people, hammer, insects, wind, rooster.
B	63	48	82	Light and heavy vehicles, river, wind, birds, insects.
C	63	52	81	Light and heavy vehicles, school children, birds, river, insects, wind, Los Maitenes S/S.

Source: In-house preparation.

Table 4 Baseline Noise Levels dB(A). Nighttime Period

Point	NPSeq	NPSmin	NPSmax	Noise Sources
A	55	49	66	River, light vehicles, birds, people, dogs.
B	58	56	72	Light vehicles, river, birds.
C	46	45	55	River, birds, dogs, Los Maitenes S/S.

Source: In-house preparation.

Figure 5 Baseline Noise Levels in dB(A). Daytime and Nighttime Periods

COPY IMAGE	COPY IMAGE

Source: In-house preparation.

Equivalent Noise Levels measured at the points under assessment range between 52 and 63 dB(A) with an average level of 59 dB(A) at daytime, while at nighttime they range between 46 and 52 dB(A) with an average level of 52 dB(A).

The prevailing noise sources are light and heavy vehicles, the Colorado River watercourse, and those typical of semi-rural areas such as birds, wind breeze, domestic animals, wind / foliage and insects, among others.

6 PROJECTED NOISE LEVELS

6.1 Construction Stage

This stage envisages the construction of high-voltage towers and the respective cable laying work.

The construction of the transmission system works basically begins with earthworks (excavations for the foundations), and then proceeds with the steel rebar work and placement of foundation concrete inside the excavation. At a later stage the concrete forms will be removed from the foundations and the excavations will be filled with the material from the excavation itself. Subsequently, the structures, which are pre-assembled on site, are erected. Once the structure is erected, wire laying work and the assembly of equipment at the substation begins, to finish off with the startup of the system.

The main equipment and machinery to be used in the construction of the lines will be trucks for carrying materials, backhoes, compressor and pavement breaker (if necessary) for the excavations, concrete mixer truck and concrete compressor, winches and brakes for cable laying, front loader for moving debris and, finally, minor equipment such as shovels, pick axes, pulleys, portable winches and minor tools.

During this stage impacts are expected to occur during the construction of foundations, in particular from earthmoving works and from concrete mixer truck and front loader operation. Major equipment envisaged for construction and the respective benchmark levels at maximum power are as follows:

Table 5 Equipment Envisaged for the Construction of the Towers and Noise Level in dB(A) at 15 m

Equipment or Machinery	NPSeq, dB(A)
Pump + Concrete Mixer Truck	**79**
Pavement Breaker	**74**
Backhoe	**73**
Front Loader	**79**
Hopper Truck	**74**
Total	**84**

Source: In-house measurements, US Environmental Protection Agency (EPA), preparation of data on noise emissions from construction activities (CONAMA 2001).

For assessment purposes the worst case scenario has been considered, i.e. the simultaneous operation of all sources, which corresponds to a noise level of 84 dB(A) at a distance of 15 m.

This emission level is projected to each receptor point considering, for that purpose, the model set out by ISO 9613-2 standard, "Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation".

The equation given by this standard is as follows:

$$L_{ft}\,(DW) = L_W + D_C - A$$

L_{ft} = Power Level by frequency octave band in dB

D_C = Directivity index in dB

A = Attenuation by octave band in dB

Attenuation (A)

$$A = A_{div} + A_{atm} + A_{gr} + A_{bar} + A_{misc}$$

A_{div} = Attenuation due to geometric divergence.

A_{atm} = Attenuation due to atmospheric absorption.

A_{gr} = Attenuation due to the effects of terrain.

A_{bar} = Attenuation due to sound barrier.

A_{misc} = Attenuation due to other effects.

Attenuation due to geometric divergence (A_{div})

$A_{div} = 20 \log (d / d_0) + 11dB$

d: = Is the distance from the source to the receptor in meters.

do: = Is the benchmark distance (= 1m).

Atmospheric absorption (A_{atm})

$A_{atm} = xd/1000$

Table 6 Atmospheric Attenuation Coefficient

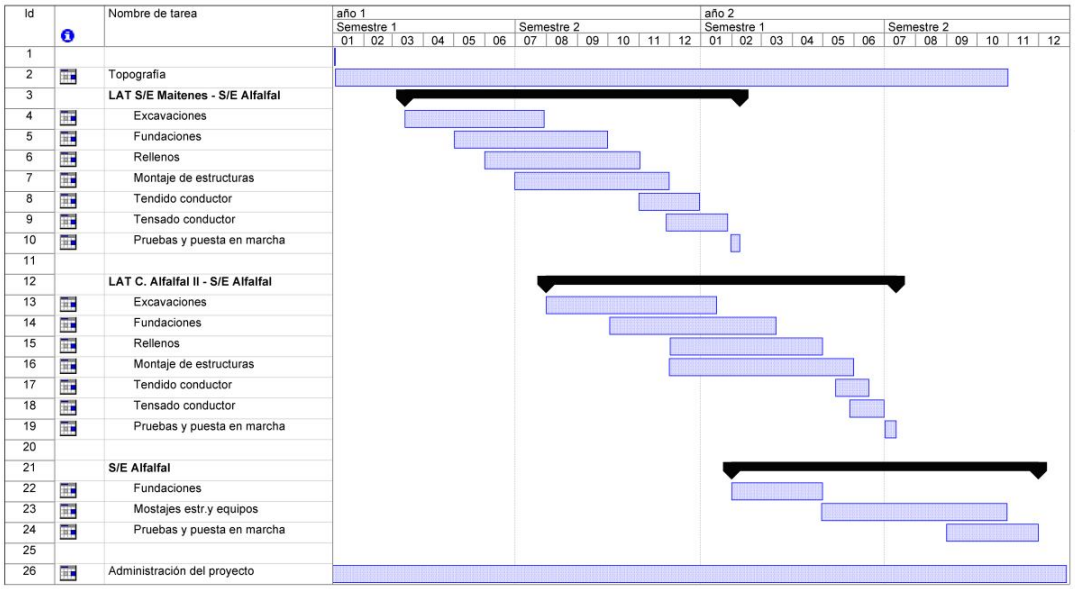
T°	H%	Atmospheric Attenuation Coefficient, dB/km							
		63	125	250	5000	1000	2000	4000	8000
10	70	0.1	0.4	1	1.9	3.7	9.7	32.8	117
20	70	0.1	0.3	1.1	2.8	5.0	9.0	22.9	76.6
30	70	0.1	0.3	1	3.1	7.4	12.7	23.1	59.3
15	20	0.3	0.6	1.2	2.7	8.2	28.2	88.8	202
15	50	0.1	0.5	1.2	2.2	4.2	10.8	36.2	129
15	80	0.1	0.3	1.1	2.4	4.1	8.3	23.7	82.8

Ground effect (Agr)

$Agr = 4.8 - (2hm/d)(17 + (300/d)) > 0$

The power lines and towers to be built will not interfere with each other in terms of civil works on the site; therefore, for the purpose of projecting noise levels, the distance from the power line and tower nearest the sensitive receptors at each assessment point will be taken into consideration.

Figure 6 Project Timeline



Source: AES Gener S.A.

The noise levels estimated at each assessment point are shown in the following table.

For the purpose of calculating atmospheric absorption, the sound spectrum typical of these works, which corresponds to the sum total of all sources set out in Table 7, is used:

Table 7 Sound Spectrum. Construction Stage

Frequency in Hertz. Levels in dB(A)								dB(A)
63	125	250	500	1000	2000	4000	8000	
80	81	77	77	77	77	77	73	84

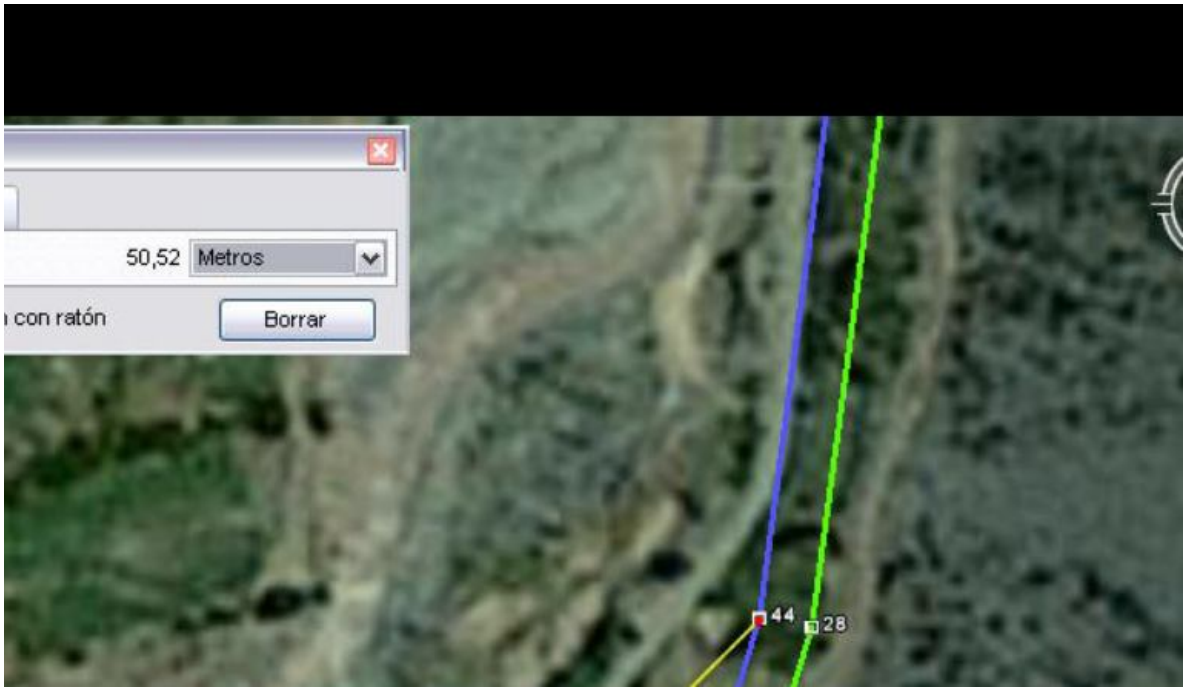
Source: In-house preparation.

An average temperature of 20ºC and 70% humidity are considered.

Figure 7 Distance from a High-voltage Transmission Tower to the Receptor. Assessment Point A Scenario

Source: In-house preparation based on Google Earth.

Figure 8 Distance from a High-voltage Transmission Tower to the Receptor. Assessment Point B Scenario



Source: In-house preparation based on Google Earth.

Figure 9 Distance from a High-voltage Transmission Tower to the Receptor. Assessment Point C Scenario

Source: In-house preparation based on Google Earth.

Table 8 Projected NSeq. Construction Stage

Point	Distance (meters)	Hm (m_2)	Attenuations in dB(A)			NPSeq, dB(A)
			Adiv	Agr	Aatm	
A	80	120	15	4.0	2.2	63.3
B	50	75	10	3.4	0.5	69.7
C	70	105	13	3.9	1.1	65.7

Source: In-house preparation.

Due to overlapping activities, for the worst case scenario doubling the source, i.e. 3 dB(A) higher than the assessed level, will be considered as shown in the following table:

Table 9 Projected NPSeq with Simultaneous Activities. Construction Stage

Point	NPSeq, dB(A)
A	66.3
B	72.7
C	68.7

Source: In-house preparation.

Figure 10 Projected Noise Levels. Construction Stage

COPY FIGURE 10

Source: In-house preparation.

Estimated noise levels at the receptors located in the vicinity of the layout range between 66.3 and 72.7 dB(A).

The works to be carried out at El Alfalfal S/S consist in expanding this substation by three 220-kV bays and one 110-kV bay, including the installation of a 110/220 kV, 300 MVA transformer to allow for the connection of the two circuits from the El Alfalfal II Power Plant and the circuit from the Los Maitenes S/S.

Due to the fact that there are no noise-sensitive receptors near the El Alfalfal II Power Plant or the sector between the Los Maitenes S/S and the El Alfalfal II Power Plant, these bays were not assessed on site, nor were they included in this report.

6.2 Operations Stage

The level of perceptible noise for this stage corresponds to that generated by ionization of the air surrounding the high-voltage power lines; this phenomenon occurs when the electric gradient exceeds the dielectric rigidity of the air, resulting in small sparks or discharges a few centimeters away from the power lines known as crown effect.

The degree or intensity of the crown discharge and the audible noise are conditioned by environmental factors such as humidity, density, fog, wind and water in the form of rain.

According to J.J.M. Requena[1], each small discharge during which particles are abruptly ionized and violently driven by the power line's electric field can give rise to a sound shock wave; actually, it has been demonstrated that every discharge is accompanied by a dry buzz.

[1] El ruido producido por líneas de alta tensión (Noise produced by high-voltage lines). Jornadas Nacionales de acústica. Valencia 1994.

Noise levels in the event of rain or fog and certain conditions may reach 60 dB(A), although the characteristic noise ranges between 35 and 50 dB(A).

The figure below shows the sound spectrum typical of the noise produced by a high-voltage power line in sunny, cloudy and rainy weather; an increase of up to 10 dB may be noticed when comparing the noise level occurring in sunny weather vs. rainy weather.

Figure 11 Sound Spectrum Produced by a High-voltage Power Line

INSERT FIGURE 11

Source: In-house preparation.

In rainy weather, raindrops producing various types of local discharges are the main source of noise. The presence of frost on power lines is another noise-producing source.

In the case of dry weather, rough spots such as scratches, industrial or vegetable pollution deposits, at times small insects, on the surface of power lines are the places where localized discharges occur and also constitute a source of noise.

Considering a noise emission level of 35 dB(A) for a dry scenario and of 50 dB(A) for a rainy one, and a transmission line at a height of 25 m, the sound attenuation profile is as follows:

Figure 12 Sound Attenuation Profile. Operations Stage

INSERT FIGURE 12

Source: In-house preparation.

It should be noticed that higher noise levels are expected under rain conditions. Therefore, for the purpose of assessing the worst case scenario, the noise level estimated at each point of baseline assessment will be specified considering this situation.

Table 10 Projected Noise Level. Operations Stage. Considering One Line

Point	Distance (meters)	Estimated NPSeq (dBA)
A	80	33.5
B	50	37.6
C	70	34.7

Source: In-house preparation.

The above table refers to the projected noise level only for the power line nearest the receptor at the assessed points. The actual scenario envisages the two power lines. In the worst case, both lines will emit the NPSeq specified in the above table at receptor locations; therefore, the maximum projected noise levels at the assessed points will be those shown in the following table:

Table 11 Projected Noise Level. Operations Stage. Considering both Lines

Point	Distance (meters)	Estimated NPSeq (dBA)
A	30	36.5
B	35	40.6
C	80	37.7

Source: In-house preparation.

Figure 13 Projected Noise Levels. Operations Stage (worst-case scenario: both lines operating at the same distance from the receptor)
INSERT FIGURE 13

Source: In-house preparation.

The noise level associated to the operation of the transmission lines at the assessed points ranges between 37 and 41 dB(A).

7 ASSESSMENT AGAINST D.S. No. 146/97

7.1 Construction Stage

In order to assess the estimated noise levels for the Project, the land use set out in the land use planning regulations should be known so as to standardize it against the zones set out in D.S. Nº 146/97 of MINSEGPRES.

All the measurement points are located in a rural zone; thus, the maximum noise level not to be exceeded by the Project will be the baseline noise level plus 10 dB(A).

Construction works will be carried out only during daytime hours and will therefore be assessed during that period using the measured baseline levels.

The following table shows the projected noise levels for the construction stage and the maximum limit set out by D.S. Nº 146/97 for daytime periods.

Table 12 Assessment of Projected Levels. Construction Stage – Daytime Period

Point	Projected Level (dBA)	D.S. No. 146/97 (dBA) Daytime Limit	Excess (dBA)	Meets the Standard?
A	66,3	62	4,3	**No**
B	72,7	73	0	**Yes**
C	68,7	73	0	**Yes**

Source: In-house preparation.

Points B and C meet the maximum allowable noise levels. Point A exhibits a sound level that exceeds the regulations; therefore, mitigation measures are envisaged to ensure compliance with the standard; these are specified in section 9 of this report.

7.2 Operations Stage

All the measurement points are located in a rural zone; thus, the maximum noise level not to be exceeded by the Project will be the baseline noise level plus 10 dB(A). Due to the fact that the line operates on a continuous basis, the noise level generated during both daytime and nighttime periods has been taken into consideration, as shown in the following tables.

Table 13 Assessment of Projected Levels. Operations Stage – Daytime Period

Point	Projected Level (dBA)	D.S. No. 146/97 (dBA) Daytime Limit	Excess (dBA)	Meets the Standard?
A	36,5	62	0	**Yes**
B	40,6	73	0	**Yes**
C	37,7	73	0	**Yes**

Source: In-house preparation.

Table 14 Assessment of Projected Levels. Operations Stage – Nighttime Period

Point	Projected Level (dBA)	D.S. No. 146/97 (dBA) Daytime Limit	Excess (dBA)	Meets the Standard?
A	36,5	62	0	**Yes**
B	40,6	68	0	**Yes**
C	37,7	56	0	**Yes**

Source: In-house preparation.

The projected noise levels during the operations stage meet the maximum daytime and nighttime noise levels set out in D.S. No. 146/97 of the MINSEGPRES.

8 ASSESSMENT THROUGH AN IMPACT MATRIX

8.1 Construction Stage

Based on the preceding data, the following table shows the impacts identified in relation with the Noise component as a result of works carried out during the construction stage.

Table 15 Impact Rating Matrix. Noise Component. Construction Stage

MILIEU: Physical		COMPONENT: Noise					
ACTIVITIES	IMPACT	LOCATION	RATING				
			Ch	Re	Te	Ty	Mg
▪ Works related to the construction of the lines and S/S	IR1: Generation of noise perceived at receptor locations near the Project	Point A	-	Rev	Tem	Dir	Me
		Point B	-	Rev	Tem	Dir	Low
		Point C	-	Rev	Tem	Dir	Low

RATING CRITERIA: Ch= Character [Positive (+), Negative (-)]; Re= Reversibility [Reversible (Rev), Recoverable (Rec), Irrecoverable (Irr)]; Te= Temporality [Temporary (Tem), Permanent (Per)]; Ty=Type [Direct (Dir), Indirect (Ind), Synergic (Syn), Cumulative (Cum)]; Mg= Magnitude [High (Hi), Medium (Me), Low (Low)].

Source: In-house preparation.

IR1: Generation of noise at receptor locations near the Project

The following definition is used as a criterion to determine the magnitude of an impact:

- Low: noise level is below the standard,
- Me: noise level exceeds the standard by between 0 dB(A) and 10 dB(A), and
- Hi: noise level exceeds the standard by more than 10 dB(A).

In this manner the impact expected from the construction of the Project may be expected to be of a low magnitude for points B and C, while it will be of medium magnitude for point A because it exceeds by 4.3 dB(A) the limits set out in D.S. No. 146/97 for that sector. For this reason, this impact has been rated as a MINOR NEGATIVE impact for points B and C, and as NEGATIVE, MITIGABLE for point A. In this connection, section 9 of this report presents a number of measures intended to mitigate this impact.

8.2 Operations Stage

Pursuant to the information presented above, one impact associated to the noise component is the generation of permanent noise perceived at receptor locations near the Project as a result of the operation of the lines. The rating for this impact during the operations stage is shown in the following table.

Table 16 Impact Rating Matrix.

MILIEU: Physical		COMPONENT: Noise					
ACTIVITIES	IMPACT	LOCATION	RATING				
			Ch	Re	Te	Ty	Mg
▪ Operation of the lines during daytime.	IR2: Generation of permanent noise perceived at receptor locations near the Project	Point A	-	Rec	Per	Dir	Low
		Point B	-	Rec	Per	Dir	Low
		Point C	-	Rec	Per	Dir	Low
▪ Operation of the lines during nighttime.	IR2: Generation of permanent noise perceived at receptor locations near the Project	Point A	-	Rec	Per	Dir	Low
		Point B	-	Rec	Per	Dir	Low
		Point C	-	Rec	Per	Dir	Low

RATING CRITERIA: Ch= Character [Positive (+), Negative (-)]; Re= Reversibility [Reversible (Rev), Recoverable (Rec), Irrecoverable (Irr)]; Te= Temporality [Temporary (Tem), Permanent (Per)]; Ty=Type [Direct (Dir), Indirect (Ind), Synergic (Syn), Cumulative (Cum)]; Mg= Magnitude [High (Hi), Medium (Me), Low (Low)].

Source: In-house preparation.

IR2: Generation of permanent noise perceived at receptor locations near the Project

The same criteria as those established for IR1 have been used to determine the magnitude of an impact.

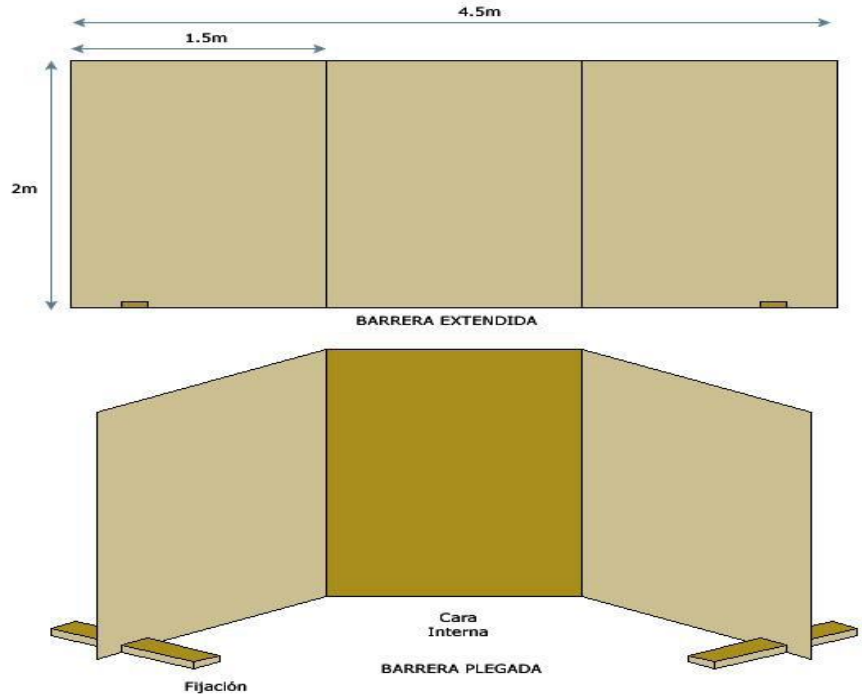
In this case, the noise levels associated to the operation of the Project (i.e. the transmission of electric power) will not exceed the daytime and nighttime limits set out in D.S. No. 146/97 at the assessed points. For this reason, the magnitude of this impact is low, and the impact has been rated as MINOR NEGATIVE.

9 MITIGATION, REPAIR OR RESTORATION AND/OR COMPENSATION MEASURES PLAN

Given that the projected noise levels for the construction stage exceed the standard at a specific point, the following control measures have been envisaged so as not to exceed the limit set out in D.S. No. 146/97 and to prevent disturbances to the community.

- Mobile sound barriers that will be set up at the working face, in particular around concrete mixer equipment, as well as around specific activities such as materials cutting. These sound barriers will at least 2 m high and will be made of a material with a minimum density of 10 kg/m_2, such as 15 mm oriented strand board (OSB).

Figure 14 Standard Mobile Sound Barriers



Source: In-house preparation.

- Prevent heavy machinery from unnecessarily driving through and, generally, the installation of any source of noise near neighboring properties.
- Perform regular maintenance on equipment so as to keep it in conditions similar to those of new equipment.
- Efforts will be made to properly use equipment featuring default noise reduction systems. For example, avoid opening doors on compressors or on any other machinery with a soundproof cabin.
- The number of and time that idle equipment remain at the site will be limited, and in particular the noise generated by truck motors while waiting.
- All equipment used at the construction site will have all the exhaust and muffler systems recommended by the manufacturer in order to keep associated noise as low as possible.
- The use of horns at the worksite will not be allowed. To that end, truck drivers will be informed of this measure in writing.
- In addition, a joint management plan involving the community is envisaged to disclose the schedule of activities to be performed, for example, the occurrence of noise events such as the construction of the foundations, their duration and the times at which they will be carried out at point A.

The following table shows the projected noise levels for the construction stage and the maximum limit set out in D.S. No. 146/97 for the daytime period, considering mobile sound barriers as a mitigation measure; the attenuation provided by these barriers ranges between 12 and 15 dB(A) according to measurements taken by the consultant.

Table 17 Assessment of Projected Levels. Operations Stage with Mobile Sound Barriers – Daytime Period

Point	Projected Level (dBA)	D.S. No. 146/97 (dBA) Daytime Limit	Excess (dBA)	Meets the Standard?
A	54,3	62	0	**Yes**

Source: In-house preparation.

It should be noticed that when mobile sound barriers are used, all the measurement points conform to the maximum noise limit set out in D.S. No. 146/97 of the MINSEGPRES.

10 ENVIRONMENTAL TRACKING PLAN

In order to assess the noise levels generated in the construction of the Project, Corrected Sound Pressure Level (NPC, as per its Spanish acronym) measurements will be taken following the methodology set out in D.S. No. 146/97 of the MINSEGPRES.

Table 18 Environmental Tracking Plan. Noise Component

Measurement Period	Point	Frequency
Daytime	A	On a monthly basis throughout the period when the working face is in the vicinity of such location.

Source: In-house preparation.

The points specified are the minimum to be considered in the tracking plan, without prejudice to their being expanded pursuant to what has been observed on site.

Quarterly reports will be prepared and kept at the worksite. In case the results of measurements do not comply with the regulations, additional measures will be taken in order to comply with the current regulations, and a copy of the report will be sent to the Sanitary Authority and to the Illustrious Municipality of San José de Maipo.

A Type 1 or Type 2 integrating sound meter, with slow response and A-weighting filter, which meets the requirements set out in Title IV art 7 of D.S. No. 146/97, will be used.

Measurements shall be accompanied by a technical report that shall contain at least the following information:

- Identification of the source owner,
- Identification of the receptor,

- Date and time of the measurement,
- Identification of the type of noise,
- A sketch or photograph of the location where the measurement is taken,
- Identification of other noise generating sources that may affect the measurement (its origin and characteristics shall be specified),
- NPC values obtained for the stationary source of noise and the correction procedures used,
- Background noise values obtained, if necessary,
- Identification of the instrument and calibration used,
- Identification of the person who took the measurements.

In case it is not feasible to take the measurements in the affected properties, the levels measured at the points nearest the source will be projected so as to obtain the Corrected Sound Pressure Level (NPC) at receptors to be assessed, by using a sound propagation model based on the international standard ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation.

11 CONCLUSIONS

The noise-sensitive receptors are located at a distance of approximately 35 and 80 meters from the layout.

Equivalent noise levels measured at these receptors range between 52 and 63 dB(A) during daytime hours, while they range between 46 and 58 dB(A) for the night period.

The prevailing sources of ambient noise are those characteristic of semirural areas such as birds, wind breeze, domestic animals, insects, as well as the regular course of the Colorado River and light and heavy vehicle traffic along paved roads, contributing to a large extent to the overall baseline noise.

Projected noise levels during the construction stage range between 66.3 and 72.6 dB(A) at receptor locations in the vicinity of the layout, while during the operations stage they range between 37 and 41 dB(A).

The estimated noise levels during the construction stage exceed the limit set out in D.S. No. 146/97 at a specific point of the layout (point A); for this reason, noise control measures intended to mitigate such noise levels will be taken in order to comply with current regulations.

It is finally concluded that, when considering the mitigation measures described, the expected noise levels during the construction stage comply with the limit set out in D.S. No. 146/97 of the MINSEGPRES. The projected noise levels during the operations stage meet the regulations in force.