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3 INFLUENCE AREAS

3.1 GENERALITIES

The conceptualization of projects begins with the delimitation of the areas in which they are manifested to a greater or lesser extent, the impacts and effects generated by the development of projects, works or activities on the biophysical environment and the community that is established, by identifying, describing and analyzing the parameters or variables that characterize each of the environmental components. Therefore, the areas of influence of the projects vary according to the magnitude and nature of the impacts that can potentially be generated, the nature or conformation of the environment on which it operates and the particularities that characterize the communities that can be influenced.

An adequate delimitation of the areas of influence of a project is based to a large extent on the effectiveness of the controls and measures that are designed in environmental studies, in such a way that they comply with the objective for which it was conceived as a planning instrument, which provides sufficient management elements to provide the optimum management and control of the impacts that may be generated during the different phases of the project.

This document is intended to provide a clear illustration of the main criteria that were considered for the delimitation of the areas of influence of the "Town" project in concession 5969. It should be noted that some sites lack primary information, this, because they were not interested in the initial stage of exploration, it is expected that in the future these areas will increase the amount of resources to be used.

3.2 METHODOLOGY

The methodology used to delimit the Influence Areas (hereinafter AIs) of the present Environmental Impact Study (hereinafter EIA), was that belonging to the MADS and ANLA. These national environmental authorities define the impacts caused by the development of the project, work or activity on abiotic, biotic and socioeconomic environments, on components such as air, water, soil, fauna, flora and socioeconomic dimensions. These areas may include, among others, atmospheric or hydrographic basins (surface or underground), ecosystems and territorial units (town, municipalities, departments, etc.) and/or the territories of ethnic communities.

The AI of a project, work or activity varies between components and media (see Illustration 3-1).

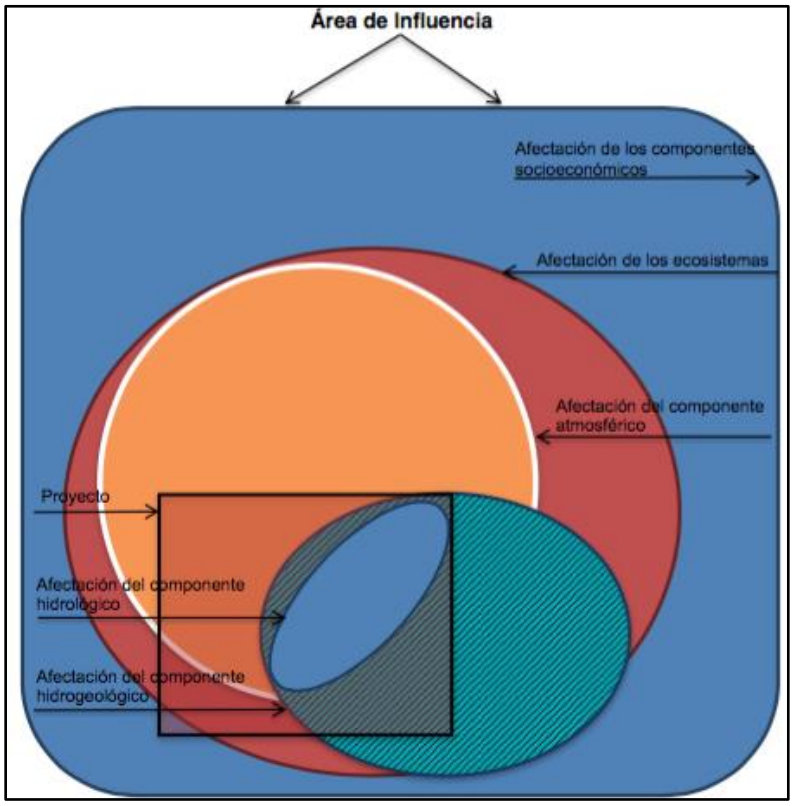

Illustration 3-1 Illustrative diagram of the definition of the area of influence considering component affectation
Source: Definition and identification of AI by MADS - ANLA.

The project, work or activity includes the planning, installation, construction, assembly, operation, maintenance, dismantling, abandonment and/or termination of all actions, uses of the space, as well as other activities and infrastructure related to and associated with its development.

This methodology establishes that, for the evaluation of the environmental study, it is only necessary to include the definitive area of influence, which must be duly substantiated and mapped. But due to the analogy between components and media, and the particularity of the project and study. It shall be presented individually by component and as a result for the respective medium.

The above, in order to support or argue adequately from the outset the variables considered for the construction of the IAs.

The IAs are made up of punctual and local. In the first phase, the mining project "Town" will be carried out in Mining Concession 5969, on the social and environmental components. While the Area of Local Influence (hereinafter AIL) carries an additional level of analysis, different from the area where the intervention will be carried out on the different media, corresponding to the rural access roads where the vehicles and sites of the locality will circulate, which also provide goods and services to the project, such as townships and municipal capitals.

Specific IAs are made up of the Direct Influence Area (hereinafter AID) and the Indirect Influence Area (hereinafter IIA). The AID presents the primary and/or specific alterations on the environmental components and means due to the intervention of the project. In the IIA, there are secondary alterations or alterations arising from the AID.

The IAs were used to delimit the territorial extension to be characterized in each component of the LBSA by the difference in technical scope between the AID and IIA, required by the terms of reference of the study. Also, to delimit the spatial extension of the possible alterations in each component, caused by the mining project "Town" in the concession5969, managing to diagnose the environment and the communities, before beginning with the operation.

In order to begin with the delimitation of the IAs, it was first determined the interrelationship of the underground mining settlement and surface infrastructure (See Illustration 3 2) that requires a demand for environmental goods and services for each component, obtaining as a result a direct and indirect alteration.

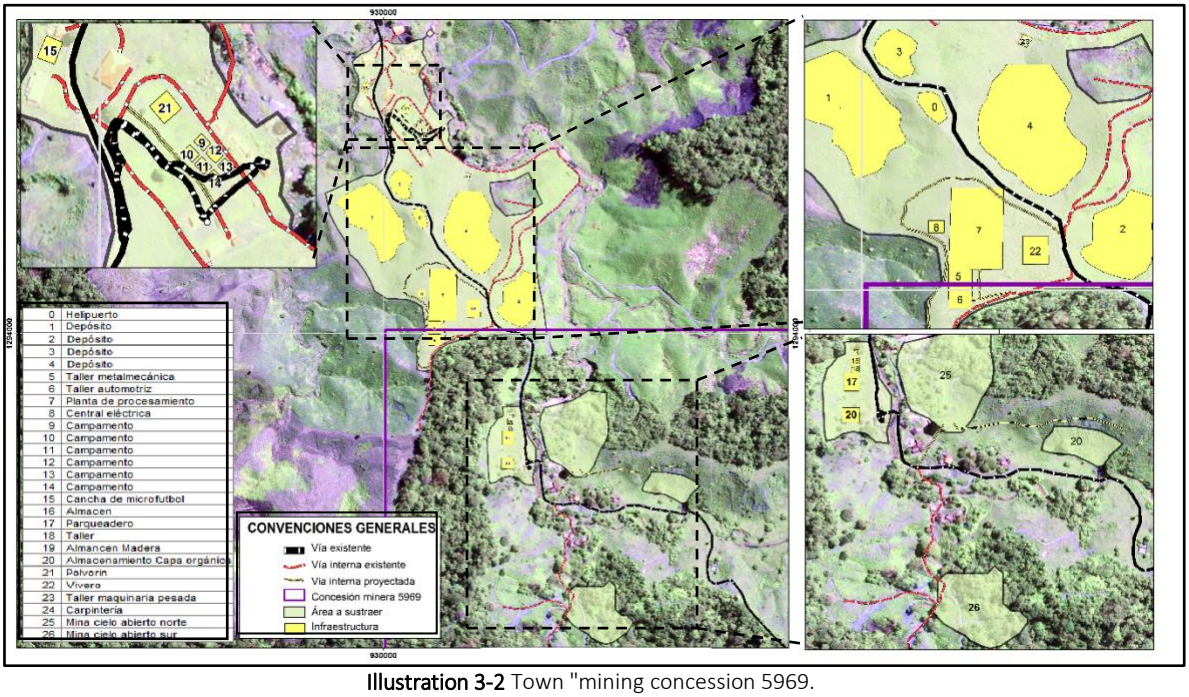

Illustration 3-2 Town "mining concession 5969.
Source: INGEX, 2015.

The AIs by means are the result of their respective components. For these it is not possible to make an algebra of maps where areas of affectations of different components can be added by the differences in their areas of affectation, therefore they were determined taking of the environmental component with bigger AI and that by their alteration there can exist indirect alterations on the remaining of components by the existing natural interaction.

The following are the areas of influence by component and resultant components for the abiotic, biotic and socioeconomic media.

3.3 AREAS OF INFLUENCE OF THE ABIOTIC ENVIRONMENT

The following are the areas of influence of the geomorphological and geodynamic components, hydrogeology, hydrography and hydrology, soils, and finally the results of AIs for this medium.

3.3.1 AREAS OF INFLUENCE OF GEOMORPHOLOGY AND GEODYNAMICS

Exogenous processes determine changes in the Earth's surface that contribute to the remodeling and reduction of primary reliefs by the isolated or combined action of the physical or chemical weathering of rocks, erosion and transport of the resulting materials and mass removal phenomena. These processes that destroy or modify the initial geofoams, are at the same time constructors of new forms of the ground by means of sedimentation or deposition of the transported materials, establishing a denudation - accumulation equilibrium, whose stability depends on the resistance and type of rock or sediment, and the action and duration of the meteoric agents typical of the prevailing climatic conditions (Carvajal, 2011).

For a better understanding of the geomorphological units, which will be modified by the implementation of the project, as well as those that will present side effects are described to follow the AIs:

3.3.1.1 Area of Direct Influence

This area corresponds to the geomorphological units that will be directly involved in the implementation of the project (see Illustration 3-3). In the short and medium term, the areas where activities will be presented will be modified, such as material cuts, loan and deposit areas, formation of slopes and construction of new infrastructure.

3.3.1.2 Area of Indirect Influence

Taking into account what Verstappen (1987) established, geomorphology involves concepts such as the shape of the terrain, processes, genesis and environment. Thus, the current relief is the product of the action of the different erosive processes that modify and sculpt the landscape. In tropical zones as in our case, the main erosive agent is water. Water as rain, permanent, seasonal or ephemeral currents.

For these reasons, the watershed presented in Illustration 3.3 with a yellow contour line, delimited by the watershed boundary of the river basin where the project is located, on which the different infrastructure works will be developed in a portion of it.

These interventions make it likely that there will be alterations in the geomorphology of the river basin in the long term that could alter one or more of the elements mentioned by Verstappen (see Illustration 3-3).

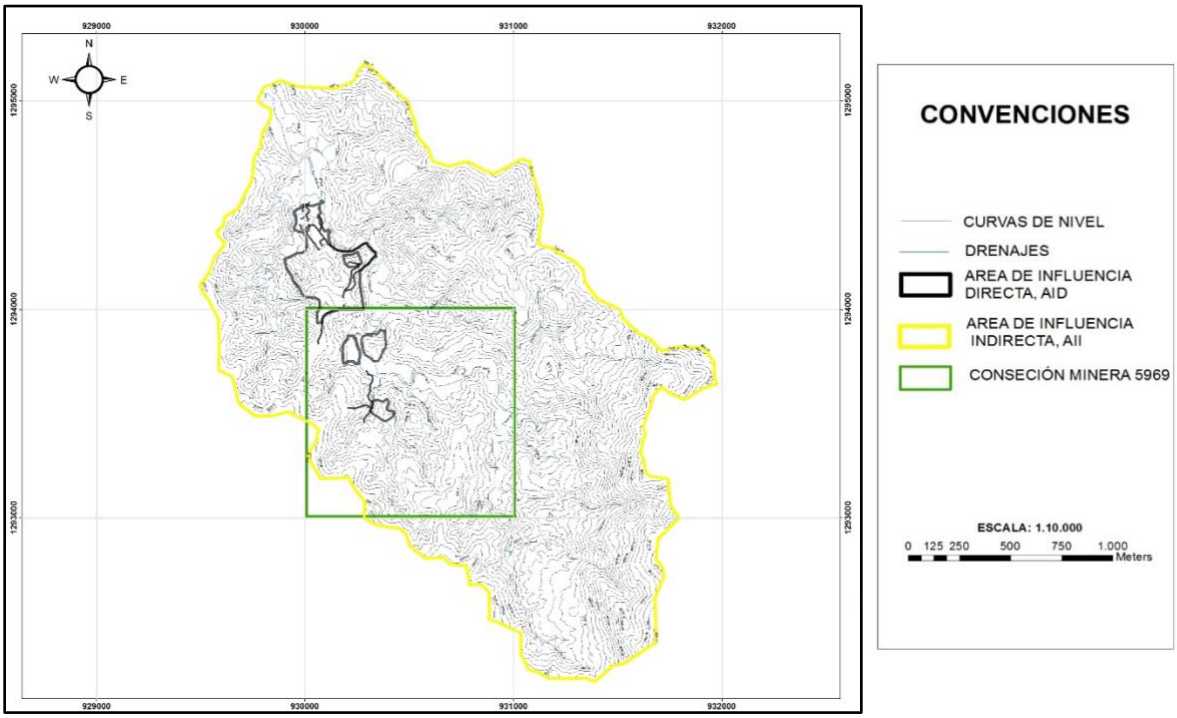

Illustration 3-3 Geomorphology AIs
Source: INGEX, 2015.

3.3.2 AREAS OF INFLUENCE OF HYDROGEOLOGY

From a hydrogeological point of view, AID is defined as the region where direct alterations caused by mining activity are expected to occur. The hydrogeological system involves the analysis of both the geological and hydrological environments, for this reason the watershed is usually delimited as the area of the hydrogeological impact analysis, being defined as the area of surface water or groundwater discharging into a natural hydrographic network with one or more natural streams, of continuous or intermittent flow, which converge into a larger stream that may in turn lead to a main river, a natural reservoir of water, a swamp or directly into the sea.

For this reason, the area of the basin delimited as AID is made up of a portion of the basin, which includes the part of the territory where the extractive activity will be developed (See Illustration 3 4). From the perspective of hydrogeological analysis, the IIA can be delimited by a river basin larger than that defined for DAI, but containing it, since the indirect impacts mentioned above are reflected in the same system.

The mining project's IIA does not identify regional aquifer systems, due to the low hydrogeological potential of the region identified in macro studies developed by the Colombian Geological Service and IDEAM.

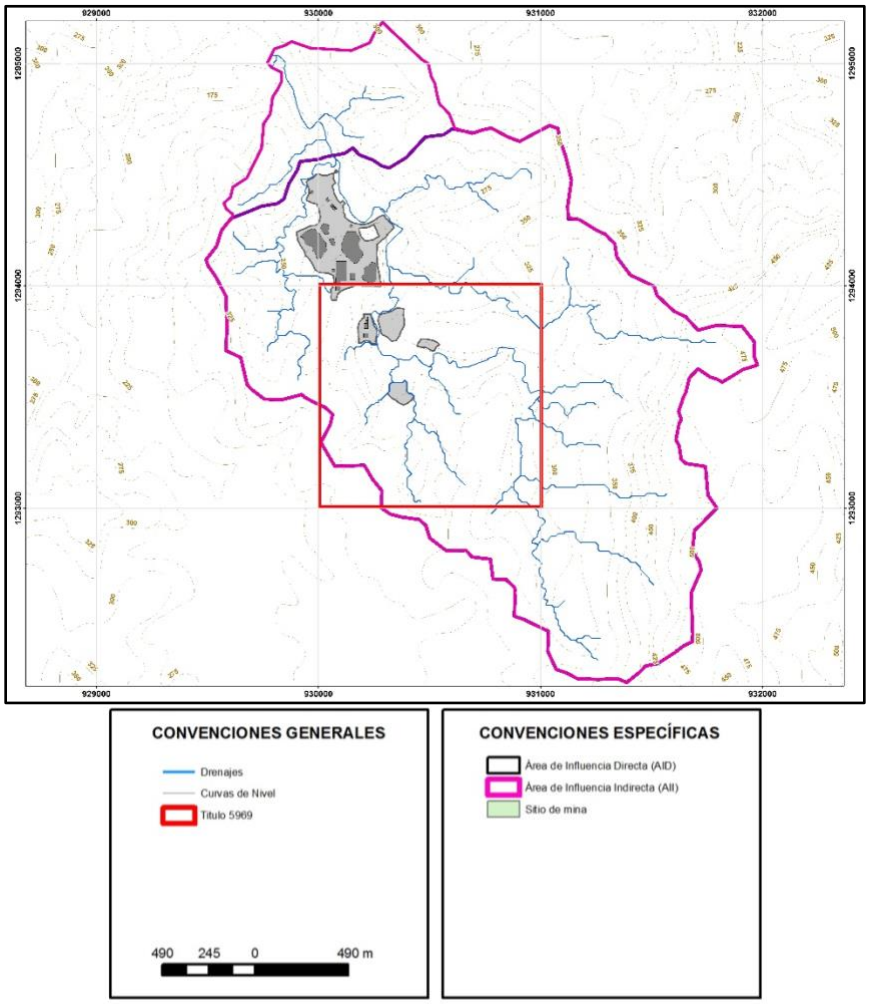

Illustration 3-4 Areas of direct and indirect influence of the mining project
Source: INGEX, 2015.

3.3.3 AREAS OF INFLUENCE OF HYDROLOGY AND CLIMATOLOGY

The manifestation of an impact on water currents is defined by the interventions that could alter the natural regimes of currents, physic-chemical conditions, the hydrological cycle and the climatological balance. From this it is possible to quantify the degree of affectation and improvement given the direct impact that the "Town" project may have on the hydrological and climatological balance of the basin in mining concession 5969.

3.3.3.1 Area of indirect influence

According to the above, the hydrological component will be basically impacted in its physicochemical characteristics, due to the continuous discharges of domestic and industrial wastewater that will be generated during the development of the project, In this way, taking into account the modeling of

wastewater with the QUAL2Kw water quality model and according to the criteria of Resolution 631 of 2015, AID is determined as the area corresponding to the micro-basin or tributaries of Quebrada town, according to the extension of the spill stain which will reach a length of 797.33 meters from the dumping point. (See illustration 3-5. and Annex 3.4)

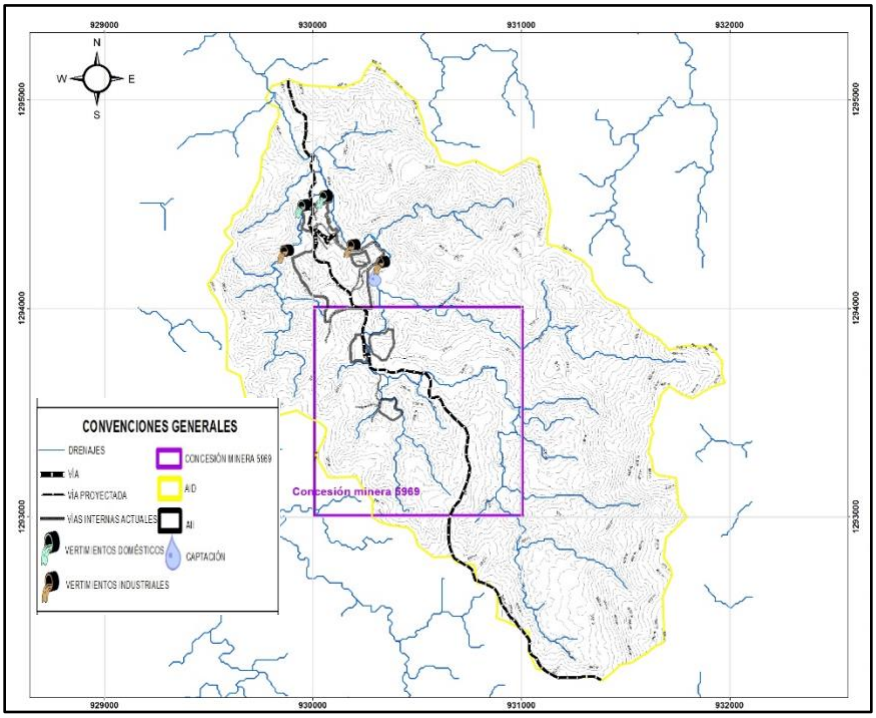

Illustration 3-5 Hydrology AIs.
Source: INGEX, 2015.

AID's northern boundary is defined by the intersection of the nameless creek (#2) and the nameless creek (#1), which is the most important stream that could be affected by the mining concession. The selection of this limit is carried out because this section is where the water currents could be most affected.

To the south, AID is defined by mining concession boundary 5969. Because the affected area does not have a very large extension and because the coverage in this area did not change drastically, no significant changes in the water balance are expected in higher areas of the basin.

On the west side, the AID boundary is defined by the nameless creek (#2), taking even the left edge of this water source. This is because this source can be affected by the profit plant which is bounded by this current.

The AID, limits by the east with the stream without name #1, which can be affected by the quality or availability of mining in this area.

3.3.3.2 Area of indirect influence

The IIA for this component is determined on the basis of the development of the impacts defined in the IYD, which may be indirect or with side effects in terms of modification of the water balance, physicochemical characteristics and availability or supply of the resource mainly to the downstream community, and thus from the points where the discharges will be established or defined as AID, the IIA is determined as the basin and on the extent of the 600-meter current by the possible

The northern boundary of the IIA is defined up to the confluence of the nameless ravine #3, only bordering the nameless ravine #1, because the effects of mining extraction could affect the water availability of the tributary in this section.

The southern, eastern and western limits reach the watershed of the affected currents, although according to the extent of mining development, no effects are projected beyond the area of direct influence of the project in these directions.

3.3.4 SOIL INFLUENCE AREAS

3.3.4.1 Area of direct influence

The AID of the soil component is defined by those areas of settlement or intervention of the project where alterations and changes will be generated in the physical-chemical properties of the soil, such as texture, structure, consistency and porosity, which are affected by the removal of soil that inverts its horizons or completely removes them for mineral extraction or infrastructure construction, and by the compaction generated by the weight of machinery, materials or deposits.

In addition, within the chemical properties of soil, nutrient availability to plants could be affected by acidification reactions, oxidation or changes in clays containing them within the soil matrix. These changes may occur due to the addition or dumping of material left over from the mining process.

AID is also determined by the one where new erosive processes are induced or existing ones are dynamic due to earth movements. Where pollutants are generated, or current land use is changed.

Based on the foregoing, the AID of the Town project corresponds to the mineral extraction sites (Yacimiento Norte y Filo de hambre) and the processing or benefit of these (benefit plant), as well as the associated activities, among which are the dumping sites of processing materials (dump, waste, among others), machinery park, access roads, warehouses, workshops, warehouses, camps, casinos and other recreational areas. (See Illustration 3 6).

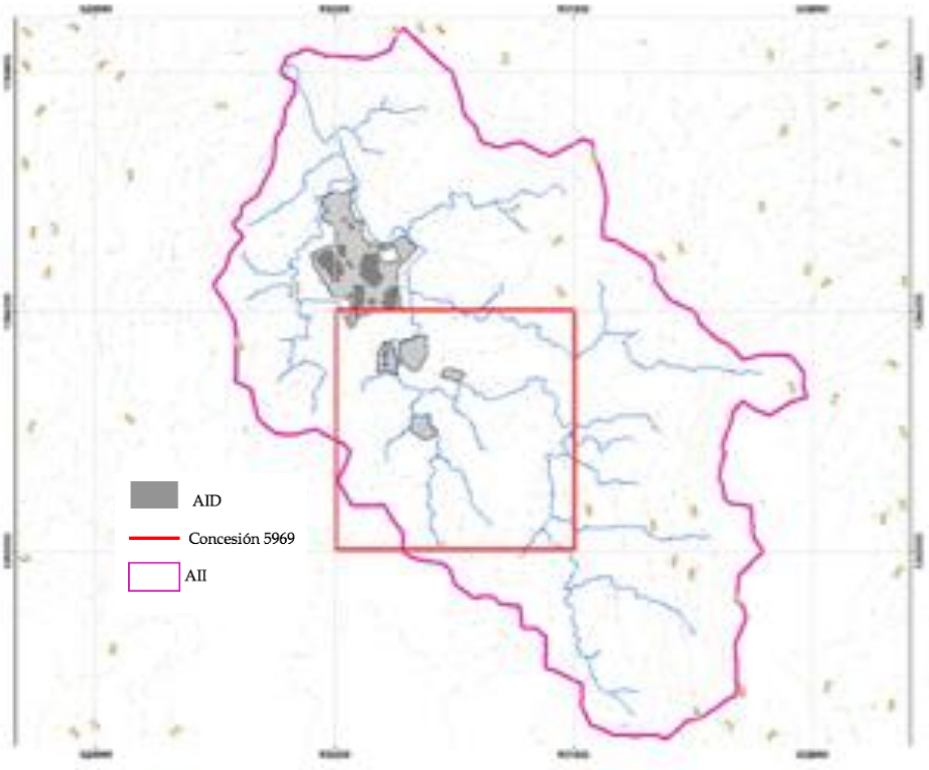

Illustration 3-6. Soil AIs
Source: INGEX, 2015.

3.3.4.2 Area of indirect influence

The area of indirect influence (IIA) corresponds to the micro basin in which the project is located, but which will not be intervened or will not suffer direct effect from mining activity; Among these possible impacts are the movement to nearby areas of polluting particles and dust from material removed from the deposits or from the benefiting plant due to the effects of wind or water currents, which favors the current transport underneath the suspended solids. These situations may occur in the event that reservoir sites are located close to water sources or that the slope favors these movements, as well as precipitation or runoff. In this case, it is necessary to implement measures that minimize the risks of transport through the soil to natural drains (rivers, streams, etc.).

Another indirect impact that may occur is the alteration of the stability of the soil units around the DAI due to extraction of minerals or soil removal that may generate vibrations that accelerate erosive processes in the nearby hillside areas.

The areas of the IIA that could be affected by indirect changes or alterations are the areas bordering on the AID, which include access roads to the mining project, parking lots and auxiliary machinery warehouses.

3.4 RESULT OF THE AREA OF INFLUENCE OF THE ABIOTIC MEDIUM

3.4.1 DIRECT AREA OF INFLUENCE OF THE ABIOTIC ENVIRONMENT

The area of direct influence (AID) corresponds to the micro basin where the project is located, taking into account the modeling of dumping (Appendix 3).4), where the influence of the same was evaluated for wastewater and domestic water associated with the operation of the mining project "Town" (Concession 5969), where it is concluded that there are no significant differences in the scenario with and without project; therefore, it does not exceed the length of the respective section and there are no alterations on the water quality indicators.

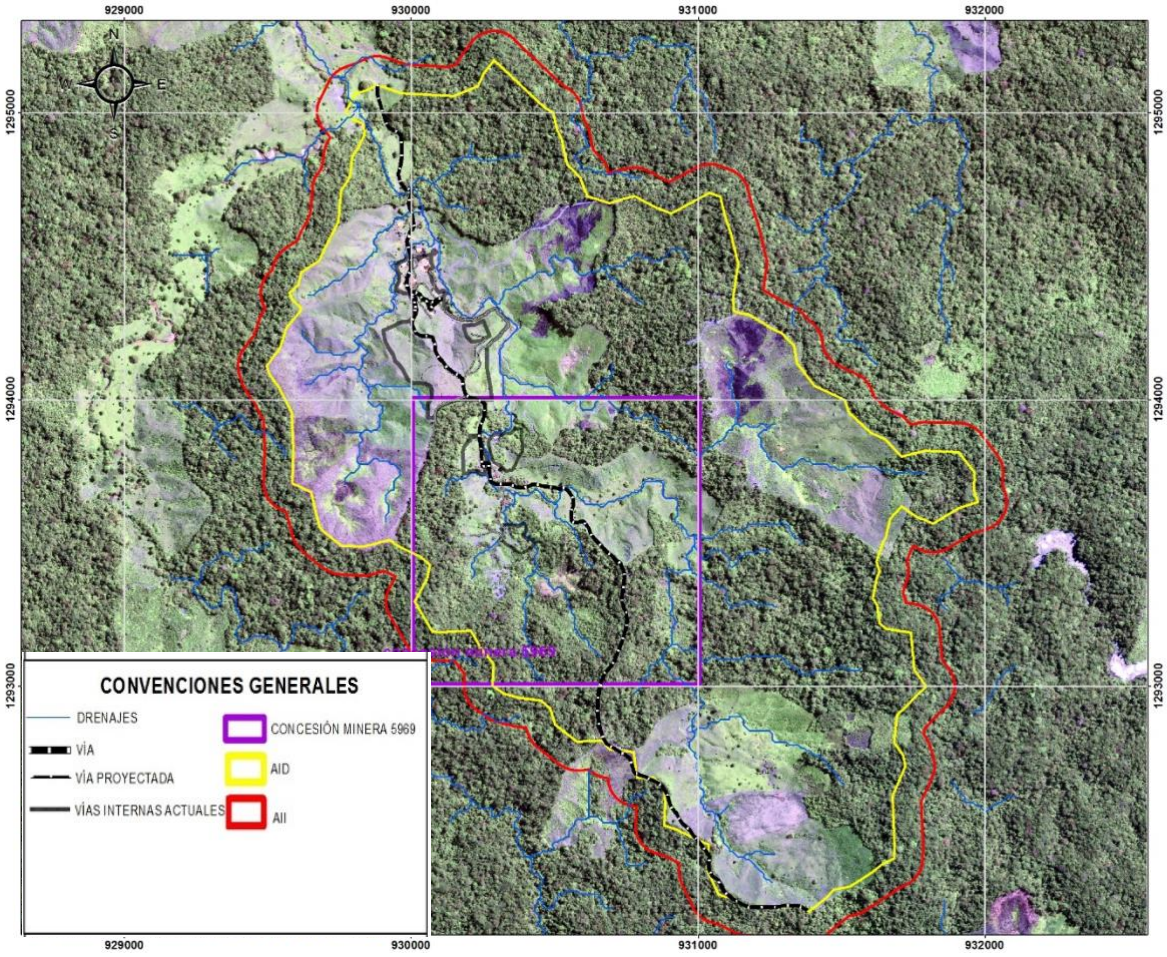

Illustration 3-7 Area of Direct and Indirect Abiotic Influence (See Annex 3.1).

Source: INGEX, 2016.

These results were obtained from the QUAL2Kw water quality model for the five points where the discharges are located, therefore, the gullies with the greatest impact are SN#2 and SN#9, where the unnamed gullies SN#5 and SN#8 end.

In the same way, other impacts can be seen in this area, such as the alteration of each of the aforementioned components and the pressure on the water resource. Such interventions make it likely that there will be alterations in the abiotic component of the river basin in the long term that could alter one or more of the elements mentioned.

3.4.2 INDIRECT AREA OF INFLUENCE OF THE ABIOTIC ENVIRONMENT

The indirect area of influence (IIA) corresponds to the micro basin in which the project is located, with a buffer of 100 m from the AID, established as a protection zone and where some type of impact may occur, but which will not suffer a direct impact from mining activity; These potential impacts include pollution from industrial dumping and solid waste, whether by project personnel or mining waste that can reach water sources, which favors current transport under suspended solids. These situations may occur in the event that reservoir sites are located close to water sources or that the slope favors these movements, as well as precipitation or runoff.

Another indirect impact that can occur is the alteration of the flow rate due to the extraction of minerals and their sedimentation.

The areas surrounding the IIA that could be affected by indirect changes or alterations are the areas surrounding the IIA, where the project infrastructure and open-pit mines are established.

It is important to clarify that although no significant differences were found between the current and future scenarios in the spillage modeling (Appendix 3.4), it is essential to delimit a protection and/or buffer zone due to the presence of any of the impacts mentioned above.

3.5 AREAS OF INFLUENCE OF THE BIOTIC ENVIRONMENT

For the biotic environment, it is not possible to determine AIs individually for each of their components, due to a high interrelationship or dependence between components such as flora, fauna and ecological connectivity. That is to say, a possible alteration in any of the components of this medium implies another possible alteration in the rest, but at different levels. The results of the AID and IIA for this medium are therefore presented below, by means of a joint analysis.

3.5.1 AREA OF DIRECT INFLUENCE OF THE BIOTIC ENVIRONMENT

The biotic AID was defined based on the modeling of air and noise carried out by the company Specialists in Environmental Engineering and Services SA.S and under the Aermod View model, in which the results of noise propagation and dispersion of polluting particles were taken into account, due to the effect that both noise and emission generate on the fauna and flora present in the study area, mainly caused by the ore processing plant, extraction operation, surface infrastructure and internal operation roads, in its different stages.

According to the study carried out by Carnicer (2007), small-diameter particulate matter (0.1 µm and 10 µm) directly interferes with gaseous exchange of plants by blocking the stomata. The effect of particulate matter on both plants and animals is also related to the chemical composition of the

particles, causing toxic effects at the time of ingestion, as well as causing diseases to wildlife such as lung alveoli and vision problems. It is important to note that higher concentrations of particulate matter are proportional to proximity to unpaved roads.

Next in Illustration 3-8 the biotic AID is presented, which is delimited by a lilac-colored outline line and by the following limits:

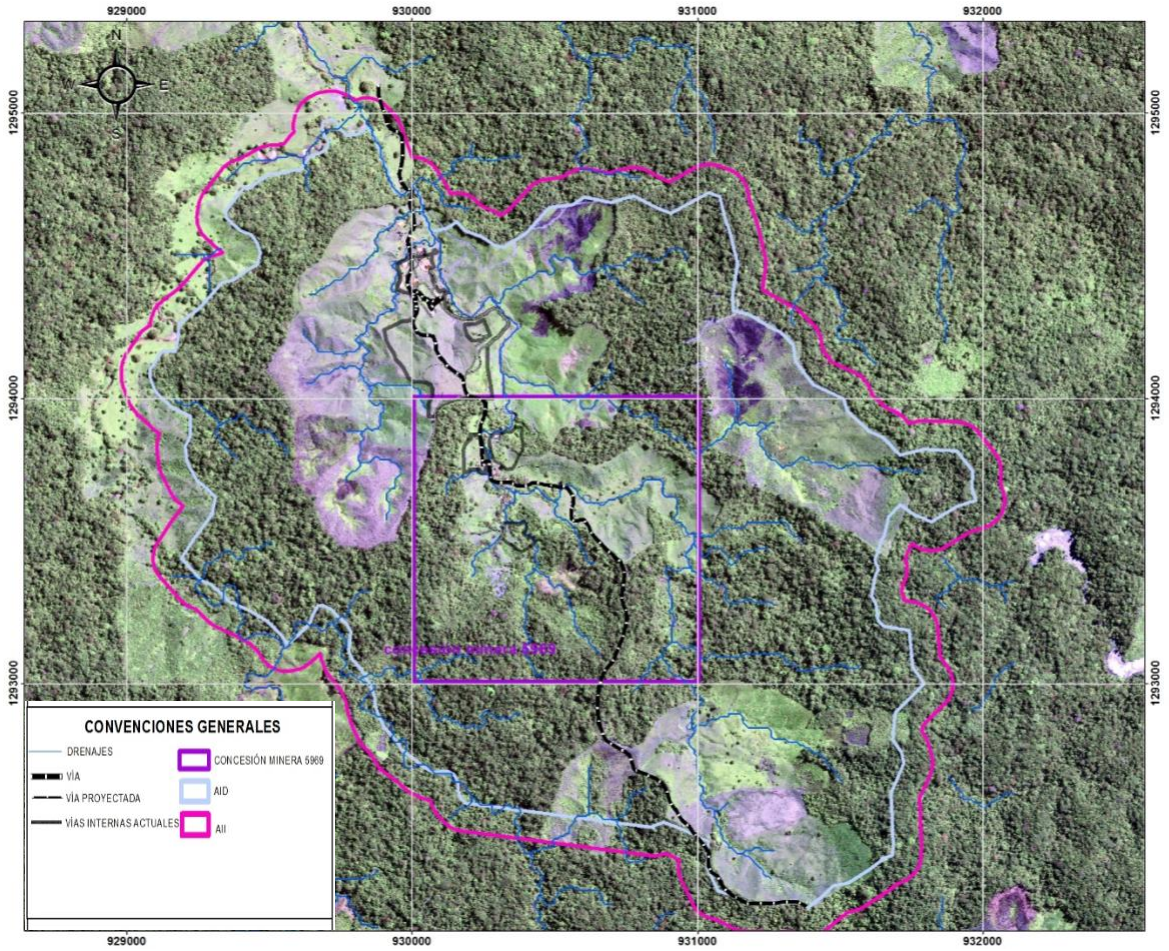

Illustration 3-8 Biotic environment AIs (See Annex 3.2).
Source: INGEX, 2015.

3.5.1.1 West boundary of the AID

At this limit, possible direct alterations are caused on the forest strip on the external west side of the watershed, corresponding to the scaring off of fauna. Generated by the mineral processing plant and the transit of the internal operation road, generating emissions to air and noise.

3.5.1.2 East boundary of the AID

In this case, the probable direct alterations of the previous boundary, on the forest strip to the east side, generated by the operation of the mineral extraction and the transit in the internal operation road, are caused by the probable direct alterations of the previous boundary, on the forest strip to the east side, generated by the operation of the mineral extraction and the transit in the internal operation road.

3.5.1.3 Northern - southern and central boundary of the AID

In the northern and southern extremes there are possible direct alterations of the previous boundaries within the basin, plus removal of non-forest vegetation cover and some isolated trees where the project will be settled. Mainly generated by the mineral extraction operation, the processing plant and transit on the operational internal road.

3.5.2 INDIRECT AREA OF INFLUENCE OF THE BIOTIC ENVIRONMENT

The IIA was established by means of a buffer or buffer zone (protection zone) of approximately 100 m, where fauna can be moved as a result of the scare caused by noise generation once the plant begins to operate and the traffic of the vehicles in charge of loading and unloading onto the project's own lanes.

The western end forest is a possible biological corridor of potentially feline mammals, whose tracks were found in a previous assessment. This corridor can serve as a buffer for the fauna species displaced by anthropogenic intervention due to their proximity to the infrastructure of the mining project. In addition, towards this area, the particulate pollutants are likely to have already dissipated and the noise levels generated will have decreased considerably. In addition, the food resources of this area make it suitable for the sustainability of wildlife that depends entirely on the flora and water resources.

3.6 AREAS OF INFLUENCE OF THE SOCIO-ECONOMIC ENVIRONMENT

In order to determine the areas of influence for the socioeconomic environment, the terms of reference and instructions issued by the Environmental Authority were applied, according to which, in order to delimit them, it is necessary to consider the effects that may derive from the operation in its different degrees and scales. The criteria set out in the Environmental Studies Evaluation Manual (2002) were also taken into account.

3.6.1 AREA OF DIRECT INFLUENCE OF THE SOCIO-ECONOMIC ENVIRONMENT

For the purposes of dimensioning and analyzing with greater precision the AID areas, it was decided to classify the same in the Area of Direct Punctual Influence (AIDP), which includes the specific exploitation site whose properties will be required in its entirety for the execution of the project and the Area of Direct Local Influence (AIDL), as the areas that will receive the greatest effects of the

operation of the project, outside the exploitation site but in direct connection with the location and its characteristics.

In some cases, local designations do not coincide with official information and cartography. The most relevant case is the path Cuturú Abajo, which includes the population of a sector known locally as Cuturú Medio. For the local population, this sector is considered to be a path, a name with which the local administrations of the municipality of Segovia and the town of Fraguas are currently being approached. From the point of view of official cartography and for administrative purposes this is a place and is included in Cuturú Abajo.

We will work with the local designation to present primary information collected in the field during the development of the social baseline. For its part, official information will be used to prepare the records for Cuturú Abajo, including Cuturú Medio when separate data are not available. For this purpose, when only Cuturú Abajo is mentioned it will be understood that this site is being included and when separate data are available they will be presented as such.

- The AIDP for the present EIA is the trail The Fish.
- The AIDL for the present EIA are the trails Laureles and Cuturú Abajo (includes the Middle Cuturú sector).

3.6.1.1 Cultural and socio-economic criteria for defining AID

Proximity and connectivity with the project due to the fact that the access road crosses the above-mentioned paths and consequently all construction work, adaptation, maintenance and movement flows of personnel, machinery and inputs will have a direct impact on these populations.

- Eventually, the access road will be an axis of circulation and location of activities aimed at satisfying demands for products or services and possible linear settlement of floating population that has some direct or indirect relationship with the activities developed during the execution of the project.
- Reflection of infrastructure works in local population dynamics, economy, social mobilization and population mobility.
- The price, use and ownership of the land may vary as a result of the proximity to the project and the impact of the economic resources derived from it.
- Neighborhood connections and cooperative relations present among the inhabitants of the AID trails.
- The only community organization registered with management activities that represents and convenes the AID populations is the Laureles Village Community Action Board.

In addition, the criteria for defining the areas of social influence included the possible impacts generated as a result of the operation and the scope and depth of the effects generated, which are set out below.

- Alteration in population dynamics.

- Increase in the demand for physical infrastructure, public and social services.
- Modifications to the landscape.
- Increased employment generation.
- Alteration of economic dynamics.
- Increased social investment.
- Increase in supply and demand for commercial products, public and private goods and services.
- Disruption of behavior patterns and changes in cultural patterns.
- Strengthening of associations and associations.
- Increase in local and regional community integration.
- Alteration in the dynamics of citizen and union participation.
- Generation of expectations.

Table 3-1. Area of Direct Social, Punctual and Local Social Influence [1]

Municipality	Town center	Town	Criteria for inclusion	Observations
Segovia	Capital	Town	The project's exploitation area is located specifically on this sidewalk. Therefore, the main works and the expected immediate effects will be manifested in this town.	Direct Point Influence
	Fraguas	Cuturú Abajo	• Alteration of cultural patterns • Changes in economic dynamics • Dispersed linear settlements of floating population • Crossing point between the project and the Segovia inter municipality road - Zaragoza	This town includes the population of the sector or site Cuturú Medio. Local Direct Influence.
	Fraguas	Laureles	• Alteration of cultural patterns • Changes in economic dynamics	The only trail that has JAC constituted.

[1] Governorate of Antioquia. Administrative Planning Department. Statistical Yearbook of Antioquia, 2013[E-Resource] Medellín: Departamento Administrativo de Planeación, 2014. For the present analysis, data were taken from the Political-Administrative Division of the Antioquia Governorate and the town Atlas of the Department.

Municipality	Town center	Town	Criteria for inclusion	Observations
			• Dispersed linear settlements of floating population • Adequacy of access roads • Crossing point between the project and the Segovia inter municipality road - Zaragoza	Local Direct Influence.

Source: INGEX, 2015.

3.6.2 INDIRECT AREA OF INFLUENCE OF THE SOCIO-ECONOMIC ENVIRONMENT

The definition of the socioeconomic IIA was based on the political-administrative division of municipal, co-regimental and local government. The source of the data for the analysis and characterization of the IIA are official and validated secondary sources that allow us to present the context in which the project is inserted and to observe, as required in the terms of reference, in an integrative manner, the essential aspects of economy, development, organization, culture and conflicts.

The IIA was considered to be the area comprising the urban headquarter of the municipality of Segovia (Antioquia) and the town center of the village of Fraguas (Machuca), which is within the jurisdiction of the municipality of Segovia, northeastern Antioquia sub-region, department of Antioquia. The areas of influence are presented in the plans that make up this document. The selection and analysis of the IIA is based on the indirect effects of project implementation. The following selection criteria are defined according to the degree, extent and intensity of the impacts generated by the project.

Due to the size and characteristics of the project, it is considered that its impacts do not go beyond the proposed geographical limits, nor is its influence considered such that it should be prolonged to other sectors of the municipality or municipalities in the sub region.

3.6.2.1 Other cultural and socio-economic criteria for defining IIAs

- Places of supply of public and private products and services.
- Concentration of population that will eventually be linked as direct and indirect labor force.
- The headquarters of social and political organizations that can have some degree of influence on the dynamics of the project, such as ASOCOMUNAL (Association of Community Action Boards), Associations of small miners, Trade Unions, among others.
- Origin and destination of the main economic dynamics generated by the project.
- In the case of Fraguas (Machuca), it is the closest physical village to the project.

- In the case of Segovia, it is the urban headquarter that has competence and administrative jurisdiction in the districts of influence, headquarters of the local administration and public-state entities.
- Destination of taxes, corresponding economic benefits and municipality to which the production will be reported, which implies that it has the option of managing resources from royalty funds.

Table 3-2. Area of Indirect Social Influence

Municipality	Town center	Location	Inclusion criteria
Segovia	Header	Urban Header	Potential municipality that provides inputs, services, labor and as a center of activities and dynamics derived from the flow of income originated by the operation of the project. Headquarters of the entities that provide health, education, financial, recreational and commercial services for the personnel negatively and positively impacted by the project. Administrative jurisdiction for all areas of influence of the project in all its components.
	Fraguas (Machuca) Town	Town center	This is the closest town to the project, with a population with a mining vocation, potential labor supply and location of service providers for the project. Site of temporary and partial location of personnel. Temporary storage place for inputs and machinery. Location and availability of Inspection and local police station and precinct.

Source: INGEX, 2015.

In summary, the areas of social influence defined are due to the analysis and integration between the impacts of the other components, to the overlapping of their geographical scope and the inclusion of cultural and socioeconomic variables (Illustration 3-9).

It should be noted that there is only coincidence between the other components and socioeconomic in AIDP, due to the size and location of the works involved in the operation of the mining project. For the other areas of social influence, other criteria of local and regional context and reality were considered, as already explained.

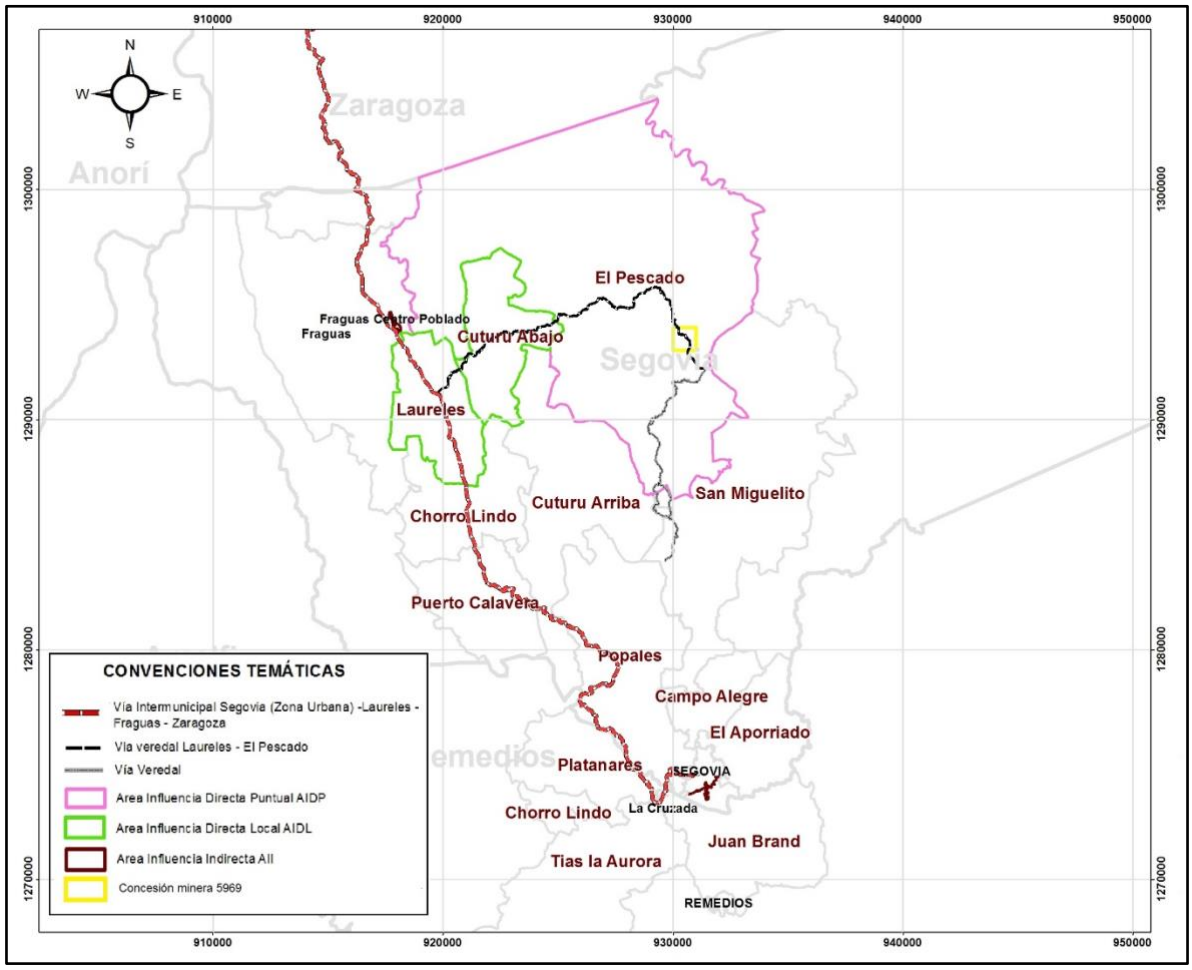

Illustration 3-9 Local and punctual area of social influence, concession contract 5969 (see Appendix 3.3.).

[1] Manual for the evaluation of environmental studies: criteria and procedures. Bogotá: Environment Minister, 2002.