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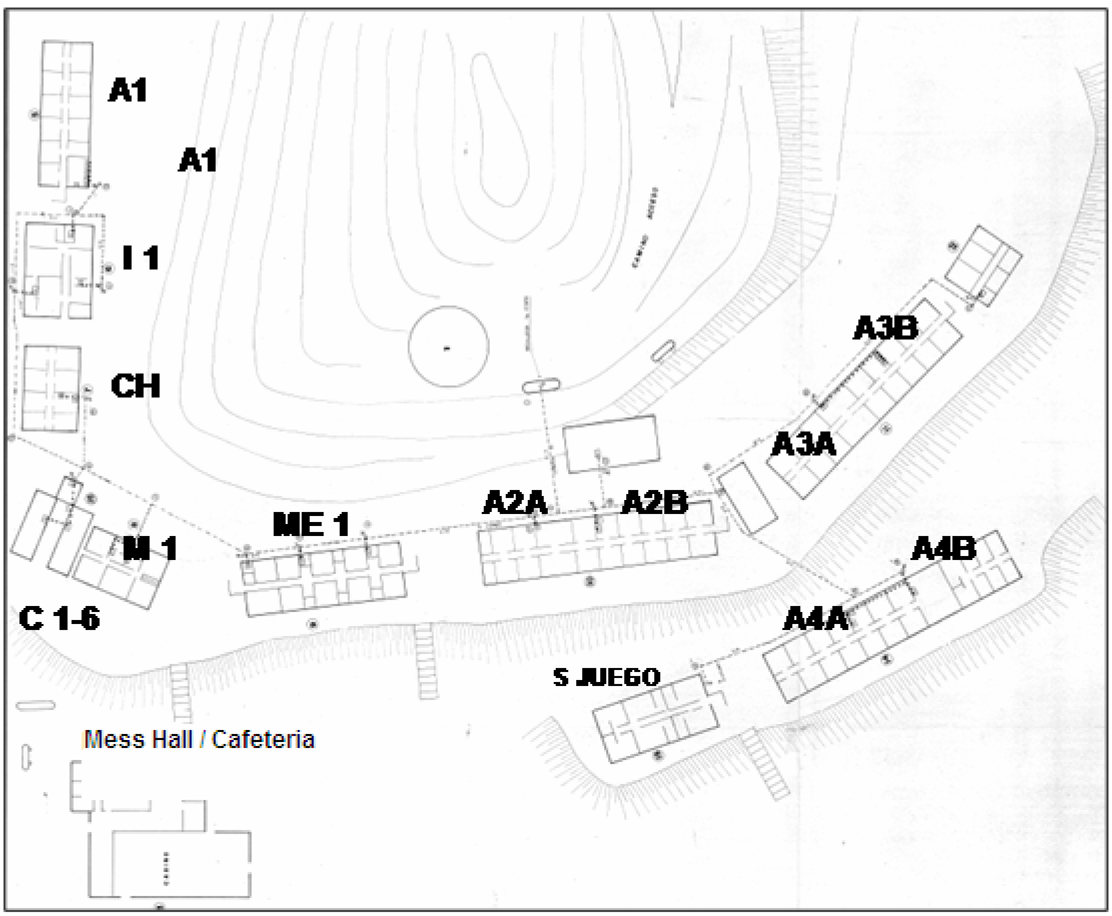
8.0 INFRASTRUCTURE

The Guanaco mine was operated as an open pit and heap leach operation between 1992 and 1998. Therefore, it already has infrastructure which was reconditioned between September 2009 and March 2010. This reconditioning consisted of improvements to the buildings and facilities, as described in this section.

8.1 Camp Services

The camp has accommodation, food, and recreation infrastructure and is located close to the access to the Guanaco site gatehouse. The reconditioning included minor modifications to the mess hall/cafeteria and kitchen areas to leave them totally functional and meeting current regulations. The camp layout is shown in Figure 8.1-1.

Figure 8.1-1: Camp Layout



8.1.1 Camp

Currently the camp has 119 rooms in two types of modules with a capacity for 300 people. One type of module has rooms with private bathrooms and the other type has rooms with one shared bathroom. Stage II of the camp reconditioning is to add three additional modules for contractors. These will have 40 beds per module, providing 120 extra beds for a total of 396 beds. The distribution of the rooms and bathrooms by module is shown in Table 8.1-1.

Table 8.1-1: Distribution of Rooms and Bathrooms by Module

Module ID and Type	No. of Rooms	No. of Beds	No. of Bathrooms	Comments
Current				
A -1	16	64	1	Contractors
I 1	6	6	5	Geology
CH	4	6	3	Guests
MI 1	5	5	5	Management
ME 1	9	9	5	Supervisors
A-2 A	6	12	1	Supervisors
A-2 B	10	20	1	GCM employee
A-3 A	6	12	1	UG Contract
A-3 B	10	40	1	UG contract
A-4 A	6	12	1	Plant
A-4 B	16	32	1	Plant
A5	10	40	1	Contractor
Guard House	3	6	1	GCM employee
C 1	2	2	1	Supervisors
C 2	2	2	1	Supervisors
C 3	2	2	1	Supervisors
C 4	2	2	1	Contractor
C 5	2	2	1	Contractor
C 6	2	2	1	Contractor
Total	**119**	**276**	**33**	
Future (Stage II)				
A6	10	40	1	**Contractor**
A7	10	40	1	**Contractor**
A8	10	40	1	**Contractor**
Total	**30**	**120**	**3**	
Grand Total	**149**	**396**	**36**	

The camp facilities meet current legal requirements and the camp has been officially approved by the authorities (Health Service of Antofagasta).

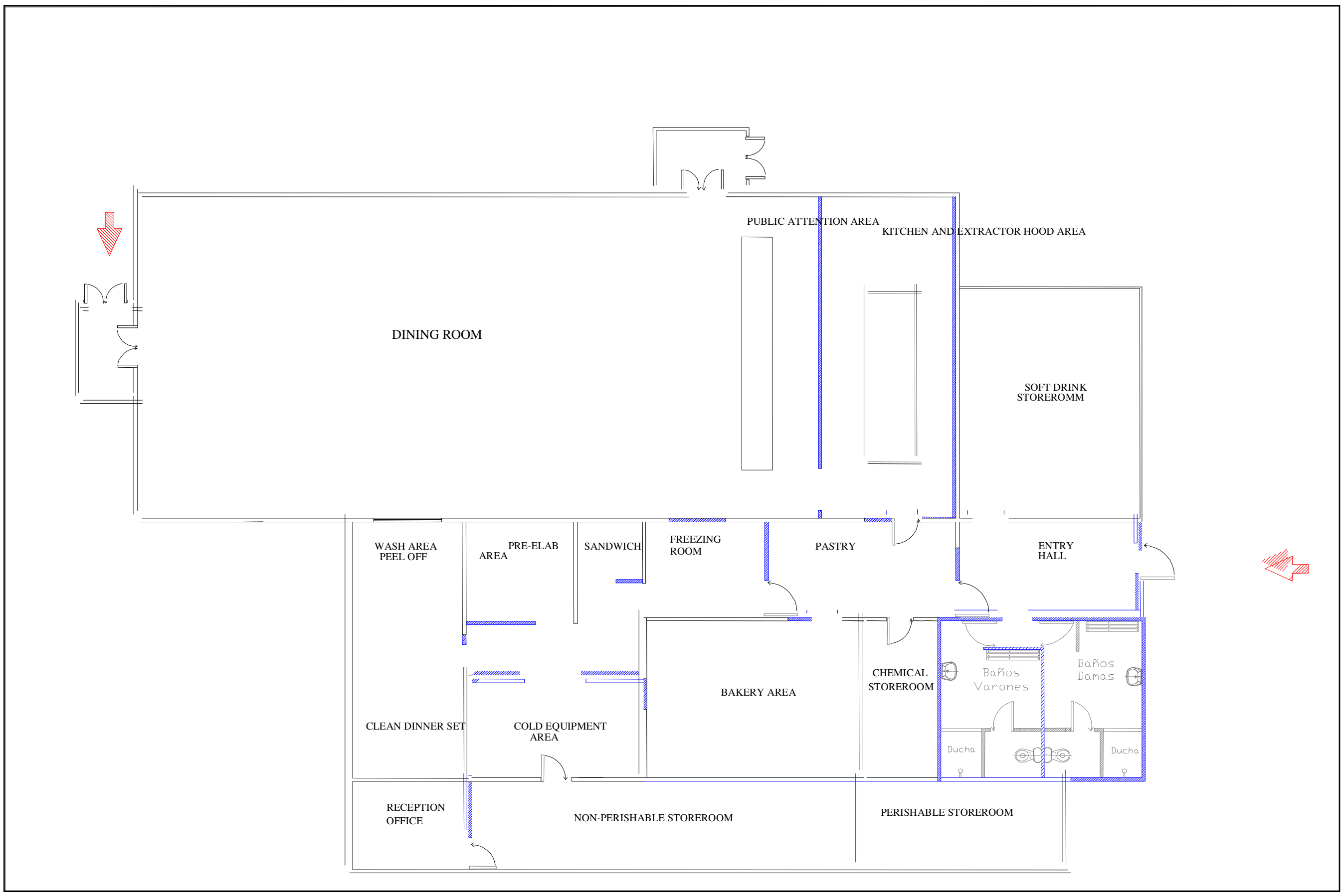
8.1.2 Mess Hall /Cafeteria

Currently the mess hall can cater for 150 people in separate sittings. There are facilities for the preparation of hot and cold food, bakery, and snack service (sandwiches). The areas for the preparation of food, store room, freezing storage, cleaning, and dining room occupy an area of 140 m^2 and are shown in Figure 8.1-2.

The mess hall meets the current legal requirements and has been officially approved by the authorities (Health Service of Antofagasta).

The camp and food services are run by a specialized catering contractor (currently Sodexho, an international company and catering contractor to several mining companies in the region).

Figure 8.1-2: Mess Hall/Cafeteria



8.2 Water Supply

8.2.1 Water Sources

GCM has water exploitation rights (see Section 2) for 16.59 L/s. Of this total, 4.84 L/s come from surface water catchment areas in the Domeyko Cordillera, located approximately 40 km from Guanaco. The remaining 11.75 L/s come from wells located at Pampa Yerbas Buenas, Quebrada Guanaco, Quebrada Sandón and the lower part of the Quebrada Pastos Largos.

Sources of Surface Water

Surface water from sources in the Domeyko Cordillera, specifically in Punta del Viento, Las Mulas and Pastos Largos (Figure 8.2-1) flows by gravity to the Guanaco Mine through 3" and 4" diameter HDPE pipelines, and is stored in two 600 m^3 tanks located in the administration area. Water is distributed from there to a 2,500 m^3 reservoir (located in the mine area) and two 700 m^3 storage reservoirs (located in the process plant area). Pipes have isolation valves at the points of storage and consumption and are semi-buried to protect them from low temperatures during the night. Currently, the water used by GCM for human consumption and exploration comes from this source.

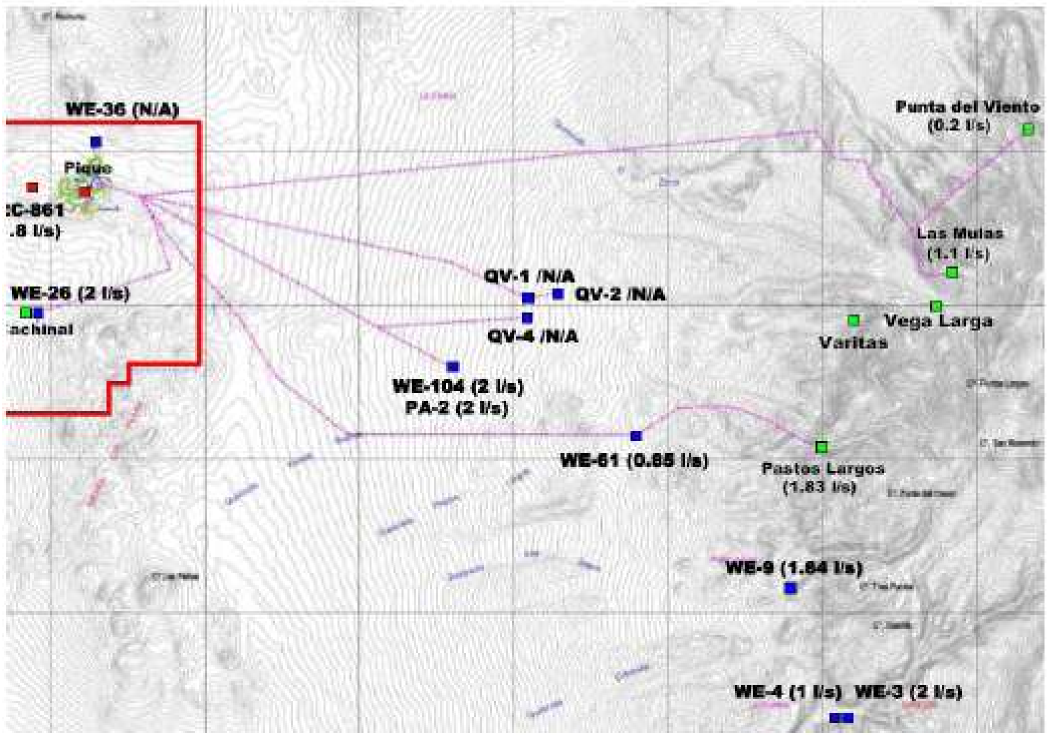
Sources of Underground Water

In order to provide water for the Phase III heap leach operation wells PA-2 and WE-104 (located 12 km east of the Guanaco Mine) (see Figure 8.2-1) will be started up. In total 4 L/s will be extracted and will be pumped to the plant by a 60 HP pump through an existing 110 mm HDPE pipeline.

Potable Water

Potable water is obtained from Pastos Largos and flows to the plant where a line feeds the potable water reservoir located in the camp where chlorine is added. This water is used for the potable water needs at the casino, showers, administration offices, and bedroom units. Bottled water is purchased for drinking.

Figure 8.2-1: GCM Water Sources



A weekly micro-biological analysis is performed according to the Sanitary Authorities requirements and to control the quality of the potable water. The following parameters are measured:

- Total coliforms, according to Chilean standard NCh 1620/2 Of. 84[1] .
- Escherichia Coli, according to standard method for analysis of potable and residual waters[2] .
- Residual free chloride developed by colorimetry [3].
- Arsenic, determined by generation of hydride method[4] .

The analysis is performed by an independent laboratory and GCM receives and maintains the corresponding records.

[1] NCh 409/1 Of. 2005, total Coliforms for each 100 ml should be zero
[2] NCh 409/1 Of. 2005, Escherischia Coli for each 100 ml must indicate absence
[3] NCh 409/1 Of. 2005, value accepted is in the range 0.2 – 2.0 mg/L
[4] NCh 409/1 Of. 2005, the maximum value is 0.01 mg/L.

A physical-chemical analysis is performed twice per year according to Chilean standard NCh 409 which includes the following assays:

- Chemical analysis as per NCh 409 for cations and anions such as total arsenic, total cadmium, total cyanide, free chlorine, chloride, total copper, hexavalent chrome, fluoride, total iron, total magnesium, total mercury, ammoniacal nitrogen, nitrate nitrogen, nitrite nitrogen, total lead, total selenium, sulphate, total zinc and phenolic compounds, detergent, dissolved solids.
- Micro-biological analysis: Fecal coliforms and total coliforms.
- Physical analysis: Turbidity, true color, odour, pH, taste.

The analysis is performed by an independent laboratory and GCM maintains the results on file.

8.2.2 Project Water Requirements

The construction and operations phases will require both industrial water and potable water.

Industrial Water

Industrial water necessary for the construction phase will be needed principally for the soil compaction activities, preparation of concrete on site, and road watering for dust control. Industrial water will be obtained from the tanks located in the administration area.

For operations the main use will be for the irrigation of the Phase III heap, water from the reservoir and tanks at the plant will be used. These have pumps to distribute the water to the consumption points at crushing and leaching.

Fresh Water

Because water with low salts and suspended solids is required for the ADR plant, preparation of reagents, and in the filter plant, water from Pastos Largos will be used preferentially at these points because of the physical-chemical characteristics of this water.

Potable Water

The potable water requirement during operations is about 0.24 L/s for a staff of approximately 190 workers with a consumption of 110 L/person/day, including contractors and owner's personnel in the exploration, mine, and administration area. This will rise to 0.35 L/s when there are approximately 300 people on site.

During the construction and operation of the project, bottled drinking water will be provided. This water will be purchased in sealed 20 L bottles from an authorized supplier in the region who will guarantee the quality of the water as required by regulations.

Fire Water

Fire water will be provided from the water pond, where the bottom part of the 2,500 m^3 fresh water reservoir will provide 2 hours of dedicated water supply (500 m^3). Fire water will be pumped into the fire water distribution system by a NFPA 20 fire water pump. The system will be maintained pressurized by a fire water jockey pump.

Fire protection water will be distributed around the plant area by a dedicated reticulation system to a number of fire hydrants and hose reels. In the event of a power failure a diesel fire water pump will provide fire water to the system.

8.2.3 Water Balance

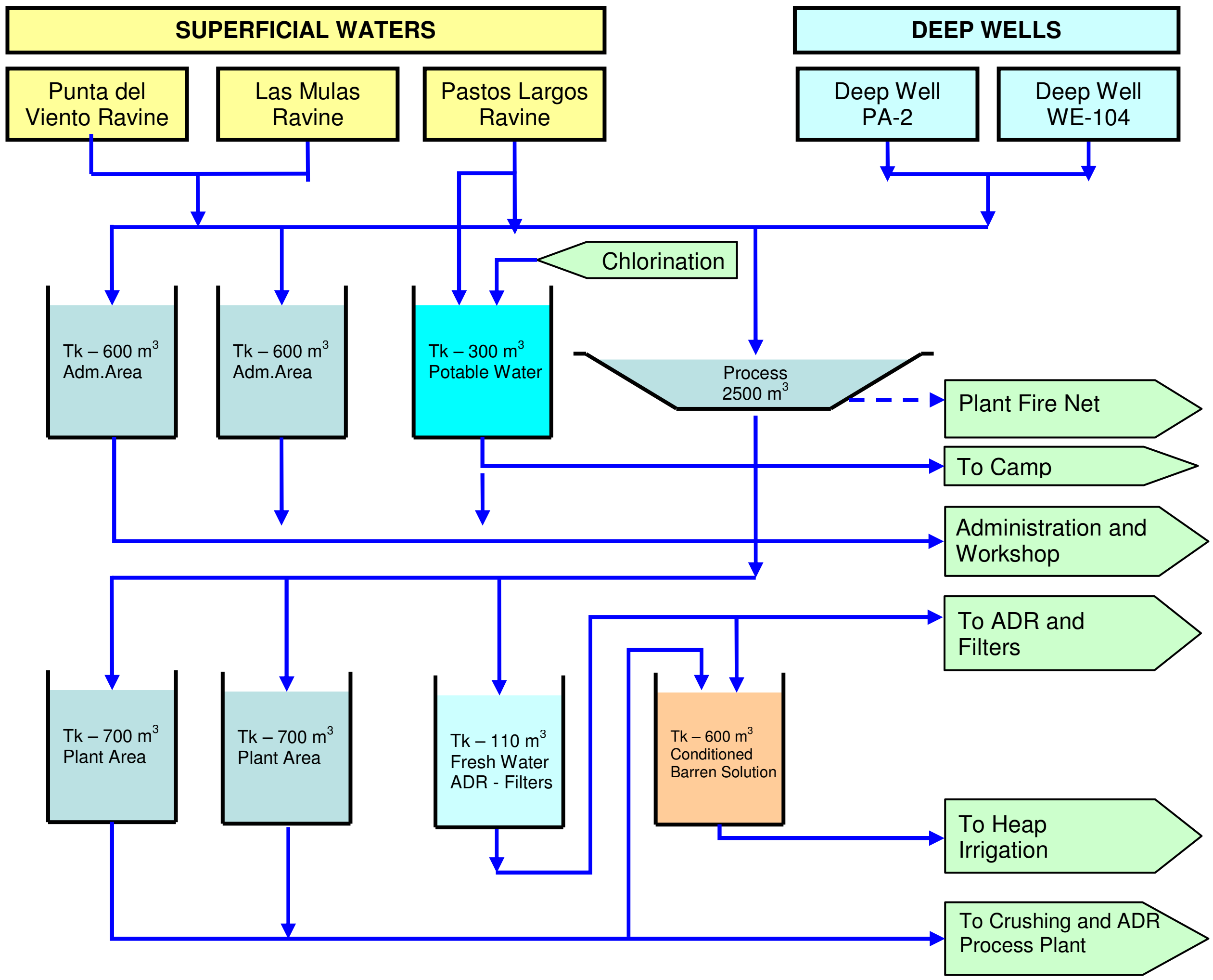
The water balance for the project is summarized in Table 8.2-1.

Table 8.2-1: Project Water Balance

Production	Present	Future	Unit	Water Type
Heap Tonnage	4,000	4,000	tpd	
Agitation Leach Plant Tonnage	0	1,000	tpd	
Fresh Water Consumption				
Heap	5.30	5.30	L/s	Raw water
Elution	1.08	1.08	L/s	Fresh water
Potable (300 people)	0.35	0.35	L/s	Chlorinated fresh water
Tailings (make up)	0.00	1.88	L/s	Raw water
Tailings (irrigation)	0.00	1.04	L/s	Raw water
Mine	1.00	1.00	L/s	Raw water
Total Consumption of Water	**7.73**	**10.65**	**L/s**	
Water Availability	**16.59**	**16.59**	**L/s**	

Figure 8.2-2 shows the water supply and distribution flow diagram.

Figure 8.2-2: Water Supply and Distribution Flow Diagram



8.3 Power Supply

Studies to determine the power demand and establish the power supply for the project were performed by Ceyge Ltda. Ingeniería y Construcción.

The Guanaco mine will operate independent of the national grid systems in the area, Sistema Interconectado Central (SIC[5]) and the Sistema Interconectado Norte Grande (SING [6]), because this supply is not as attractive financially as self generation.

8.3.1 Electrical Demand

The power demand for the first phase operation of the heap leach, ADR plant, crushing plant, and general maintenance and administration activities is shown in Table 8.3-1.

Table 8.3-1: First Phase Power Demand

Area	Maximum Demand (kW)	Average Demand (kW)	Annual Energy Consumption (MWh)
100 - Mine	342	224	1,963
200 - Crushing	1,098	722	6,326
300 - Grinding and Thickening	-	-	-
360 - Heap	320	320	2,803
400 - Leaching	-	-	-
500 - CCD	-	-	-
600 - ADR	345	188	1,643
700 - Filter Plant	-	-	-
800 - Reagents	55	18	157
900 - Services	402	203	1,776
Total	**2,562**	**1,675**	**14,668**

Electrical designs and estimates of power demand were prepared by GCM for the mine area, by Ceyge for the crushing plant, by Vector for the leach area, and by AMEC for the other areas. The estimated power demand for the project was calculated from the designs prepared to date (March 2010) for the underground mine operation, crushing plant, leach plant and CCD, filter plant, tailings area, and services. The estimated second phase power demand is shown in Table 8.3-2.

[5] Central Interconnected System
[6] Norte Grande Interconnected System

Table 8.3-2: Estimated Second Phase Power Demand

Area	Maximum Demand (kW)	Average Demand (kW)	Annual Energy Consumption (MWh)
100 – Mine	1,368	896	7,852
200 - Crushing	1,294	851	7,454
300 - Grinding and Thickening	1,401	1,328	11,634
360 - Heap	316	316	3,093
400 - Leaching	208	208	1,829
500 - CCD	40	30	262
600 - ADR	383	209	1,826
700 - Filter Plant	1,054	292	2,558
800 - Reagents	55	11	95
900 - Services	654	407	1,787
Total	**6,773**	**4,548**	**38,390**
Total kVA	**8,466**	**5,685**	-

8.3.2 Electrical Power Production

Seven Perkins-FGWilson model PE660 diesel generators (see Figure 8.3-1) are being installed to provide power for the first phase of the project. The units have a 600 kVA rating and operate at low voltage (380 V) and 50Hz. The units are enclosed and will produce 489 kVA under site conditions. At any time there will be 6 operating units and one stand-by for the first phase operation which includes the Phase III heap leach, ADR plant, and auxiliary services.

Each of the units has a control panel and synchronization that permits up to 8 units to work in parallel on a common bar. The controllers communicate through an RS485 interface, and automatically and proportionally share the active and reactive loads. Of the six units in operation, one acts as the master and the others as slaves, this optimizes power generation to meet the demand.

Figure 8.3-1: PE660 Genset and Synchronization Panel

In order to cover the future electrical demand for the second phase of the project six additional 1,000 kVA, low voltage (380 V) generators will be added. These generators will be arranged in interconnected groups of three units so as not to exceed the maximum capacity of the low voltage switches available in the market.

Each of these units will have a control panel for synchronization of the connection to the common bar communicating through an RS485 interface, and they will automatically and proportionally share the active and reactive loads. The units will be automatically loaded even though the units are of different power, because the load is shared between the generators in proportion to the rated power. Of all the units in operation, one acts as the master and the others as slaves.

The electrical system will operate so that the entry and exit of units is automatic and the programming will match the supply to the plant load, adding units to and removing units from the network as required. The characteristics of the generators are shown in Table 8.3-3.

Table 8.3-3: Characteristics of the Generators

Equipment	Quantity	Characteristics	Nominal Power (kVA)	Maximum Power[7] (kVA)
Perkins-FG Wilson	6 operating 1 stand-by	Model PE660 380 V, 50Hz	480	510
Perkins-FG Wilson	6 operating	Model TBD 380 V, 50Hz	1,000	1,050

8.3.3 Energy Balance

The energy balance for the first and second phase requirements are summarized in Table 8.3-4 which indicates that six units are sufficient to satisfy the average first phase demand. For periods of maximum demand it is necessary to reduce the load or to put the seventh unit into service. For the second phase, the average power generated will meet the estimated average demand of the plant. For periods of maximum demand the installed capacity is more than sufficient to meet the demand, allowing for unit maintenance.

Table 8.3-4: Electrical Energy Balance

	Demand (kVA)		**Generation (kVA)**	
	Average	**Maximum**	**Average**	**Maximum[8]**
Current condition	2,094	3,202	2,880	3,060
Future condition	5,685	8,466	8,880	9,360

8.3.4 Facility Description

Power Generation

The generators will be installed in an existing, reconditioned generator building located south-west of the crushing plant (see Figure 8.3-2). The six PE660 units will be installed first and later the 1,000 kVA units will be installed. There is a fuel storage facility adjacent to the building which will be refurbished and upgraded with automatic control.

[7] Working at 105% of derated nominal power for 1 hour in a 12 h period.
[8] Operating gensets working at 105% of derated nominal power for 1 hour in a 12 h period.

The generators will be connected to a 380V, 6,000 A distribution bar located in the distribution centre in the generator building electrical room. All the plant consumers (mine, crushing, process plant, and infrastructure) will be fed from the electrical room. The interior layout of the generator building is shown in Figure 8.3-3.

The main switches will be supervised from the control room and the engine controls will be supervised via Allen Bradley E3 intelligent relays. Overload protection switches and circuit breakers will be set manually.

Figure 8.3-2: Location of the Electrical Generation Plant

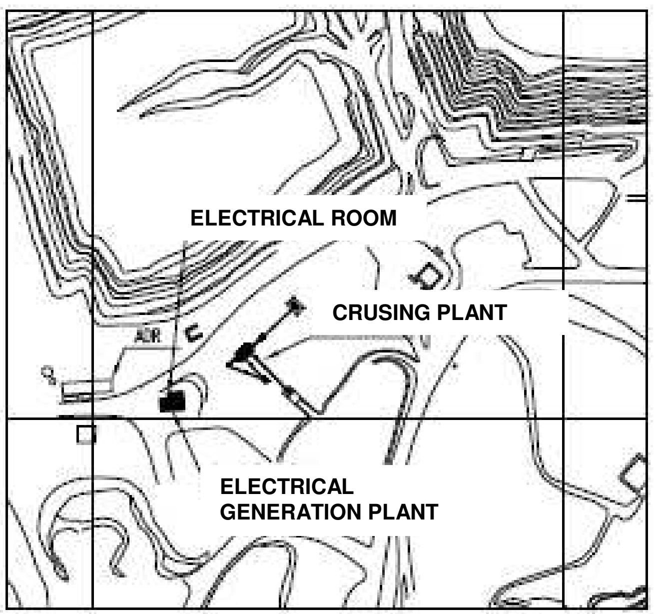
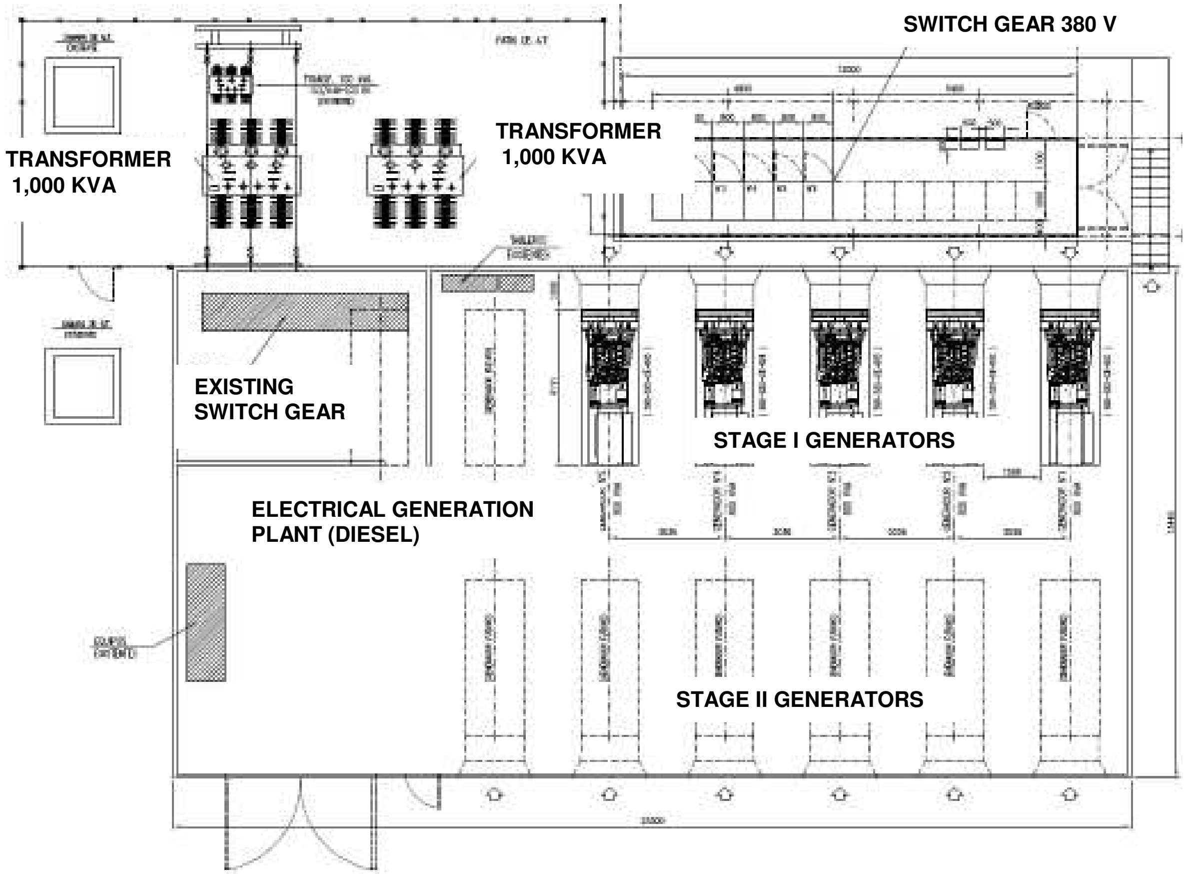


Figure 8.3-3: Generator Building Layout



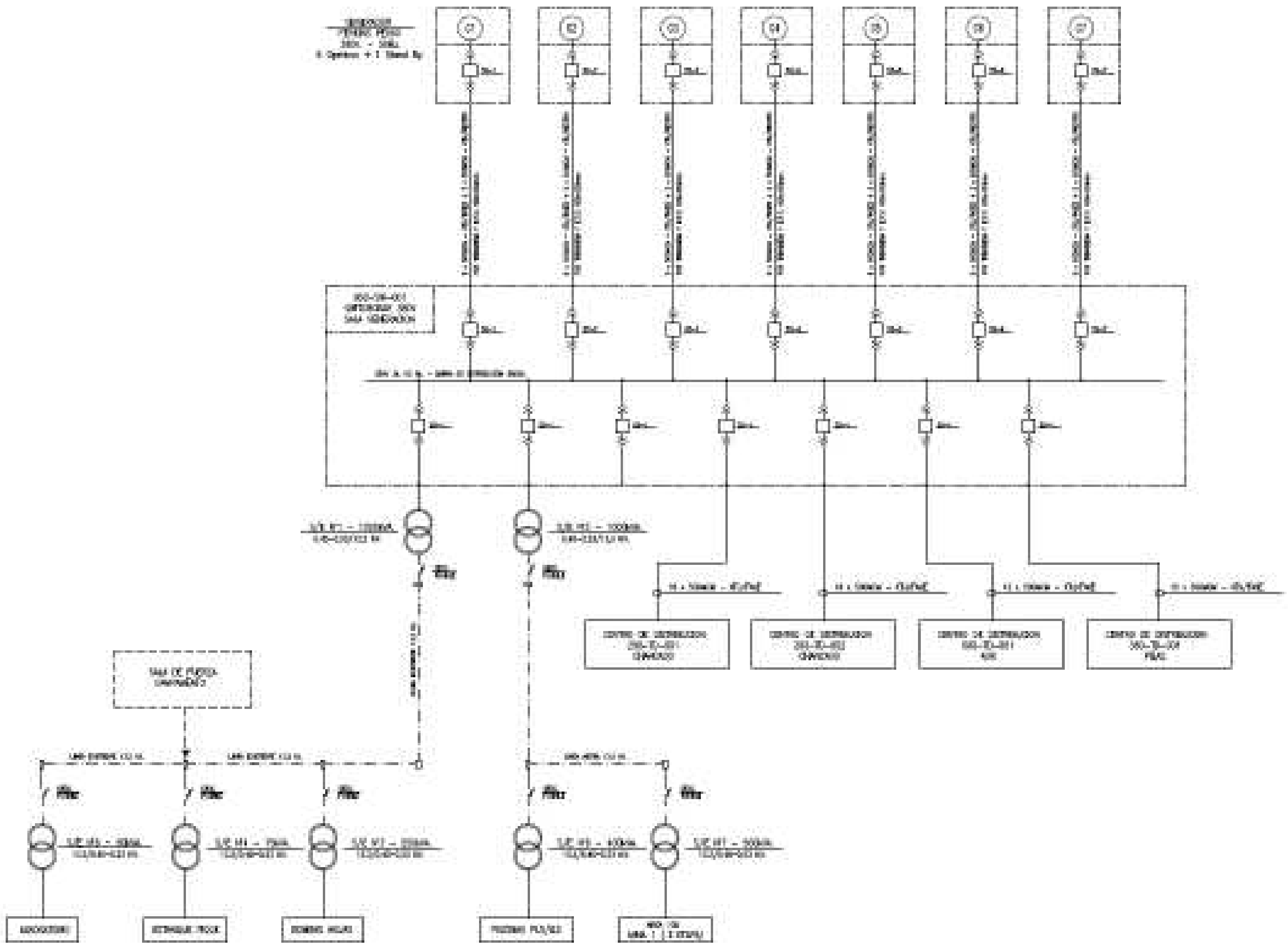
Power Distribution System

The power distribution system for the first stage of production (heap leach Phase III, ADR plant, crushing plant, general maintenance activities, and administration) will be at two voltage levels (see Figure 8.3-4):

- Low voltage (380 V) for consumers close to the generator building (heap leach Phase III, crushing plant, and ADR plant)
- Medium voltage (13.2 kV) for more distant consumers such as ILS and PLS ponds, underground mine, and infrastructure (camp, administration, laboratory).

A power distribution center will be installed in the generator building electrical room and will consist of low voltage switchgear that will supply the crushing and ADR areas via feeders conducted through cable tray, electrical boxes, and duct banks.

Figure 8.3-4: First Phase Power Distribution System



Voltage will be increased from 380 V to 13.2 kV by two 1,000 kVA (existing) transformers, and will be distributed via two overhead lines one connected to each transformer. One line will feed the infrastructure (camp, laboratory, and water supply) and the other line will feed the mine and PLS and ILS ponds.

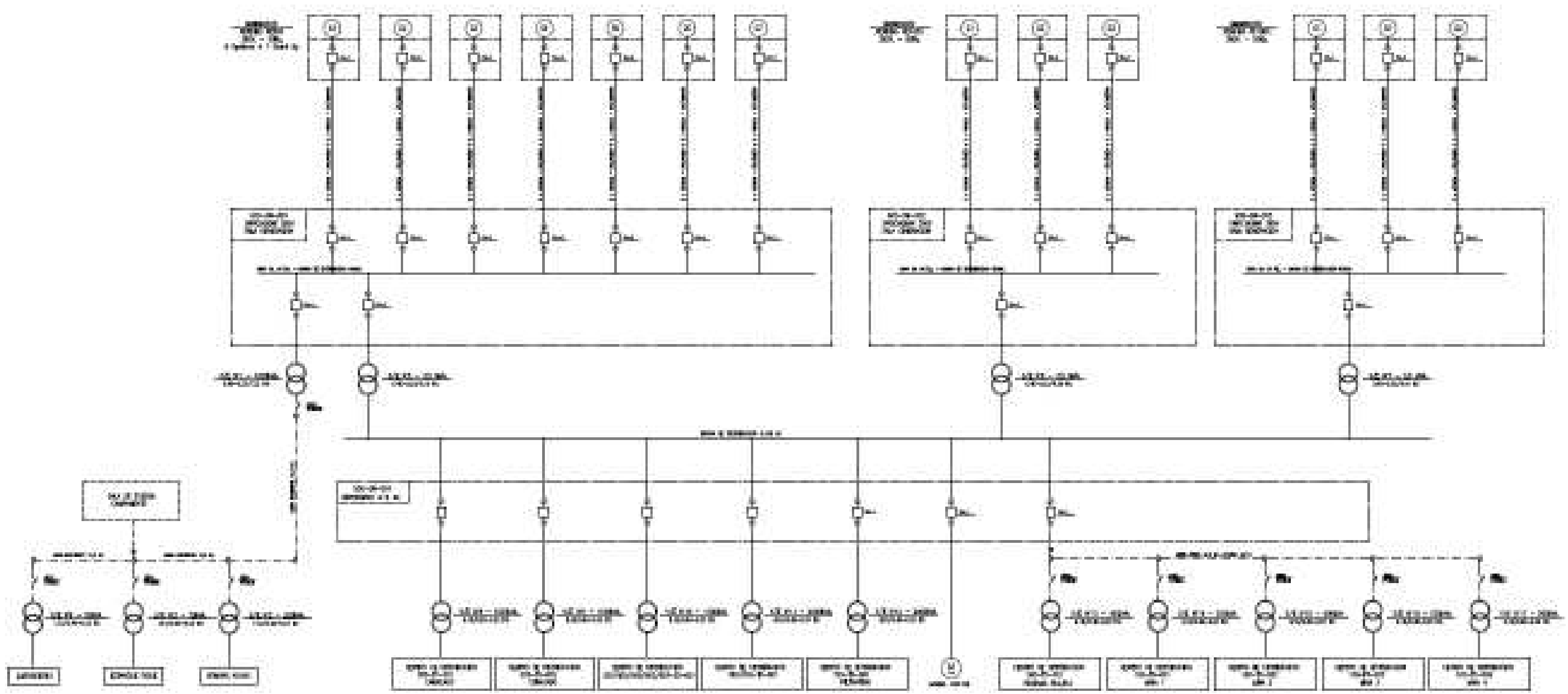
There is an existing 13.2 kV overhead line feeding the infrastructure area with transformers to reduce the voltage 380 V. These will remain in the present locations, the electrical facilities in this area will not change.

A new medium voltage line (13.2 kV) to the underground mine and PLS and ILS ponds will be installed, with capacity for the present and future requirements. Voltage reduction transformers already exist in the plant and they will be re-used.

In order to meet the energy demand from the underground mine, process plant (grinding, leach plant, CCD, and filter plant), tailings area, and ancillary systems the layout of the distribution network will be modified as shown in Figure 8.3-5. A new 4.16 kV bar will be added to which the 380V bar of the first phase (PE660) generators will be connected by means of a 0.4/4 kV, 3.5 MVA transformer.

The 1,000 kVA generators for the second phase will be connected in groups of three to a 380V, 4,000 A bar which will also be connected to the 4.16 kV bar via a 3.5 MVA, 0.4/4.16 kV transformer.

Figure 8.3-5: Future Distribution System



The 13.2 kV line that feeds the infrastructure area (camp, laboratory, and water supply) will not be modified and will continue to be connected to the 380 V bar of the PE660 generators via the existing 1,000 kVA transformer.

A 4.16 kV switchgear will be installed to connect the loads to the new distribution bar to supply the existing loads for the crushing plant, ADR, and heap via 4.16/0.40 kV unit substations located near the point of consumption. Underground cable ducts will be used.

The 13.2 kV line that feeds the underground mine area and the PLS and ILS ponds will be modified to 4.16 kV and extended to feed the underground mine. The existing transformers will be replaced by 4.16/0.40 kV transformers and new equipment will be incorporated for the mine loads.

For the 1,300 kW ball mill a 4.16 kV synchronous motor with slow start will be installed to limit the impact of starting on the generators. An exciter will also be installed to regulate the power factor of the system.

Electrical Rooms

Electrical distribution for the heap leach, ADR plant, crushing plant, maintenance, and administration will be through four electrical rooms located at the generator building, crushing plant, ADR plant, and heap leach areas.

When the underground mine and process plant come into operation there will be one electrical room for the grinding, leaching, and CCD area, and another for the filter plant.

The electrical rooms will be container type (metallic containers). They will be installed on foundation columns 1.5 m above ground level and will contain the following electrical distribution equipment:

- Low voltage distribution centers
- Motor control centers
- Power panels
- Control panel
- PLC cabinets
- Condenser banks
- Battery banks.

Each room will also have the following auxiliary equipment:

- Power distribution and lighting panel (380 – 200 V)
- Air conditioning system

- Fire detection and extinction system including portable fire extinguishers. The fire detection system will be photoelectric and will be connected to the plant operation control room. Each room will have an exterior alarm (horn) and beacon connected to the fire detection system.
- The fire protection system use CO_2 as the extinguishing agent
- Normal and emergency lighting system.

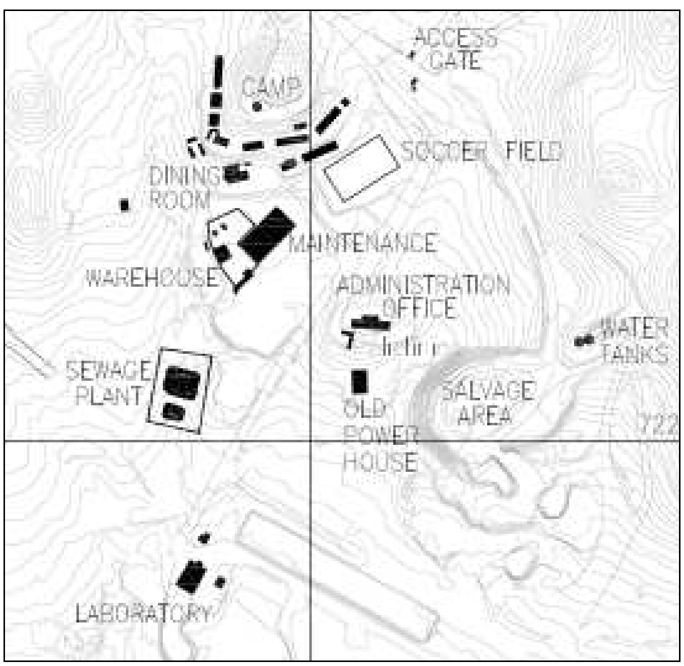
The electrical rooms at the generator building, ADR plant and crushing plant are re-conditioned. The heap leach, process plant, and filter plant electrical rooms will be new.

8.4 Sewage System

Sewage water from the camp and administration offices will be delivered to a treatment plant (Figure 8.4-1) which consists of two sedimentation and clarification chambers, an aeration pond, and a treated water storage pond.

The sedimentation/clarification chambers are built of reinforced concrete and have inspection covers in the roof. The two lines operate in parallel. From the clarification chambers clarified water flows to a 25 m x 25 m x 4 m deep aeration pond where air is injected through diffusers located at the bottom of the pond.

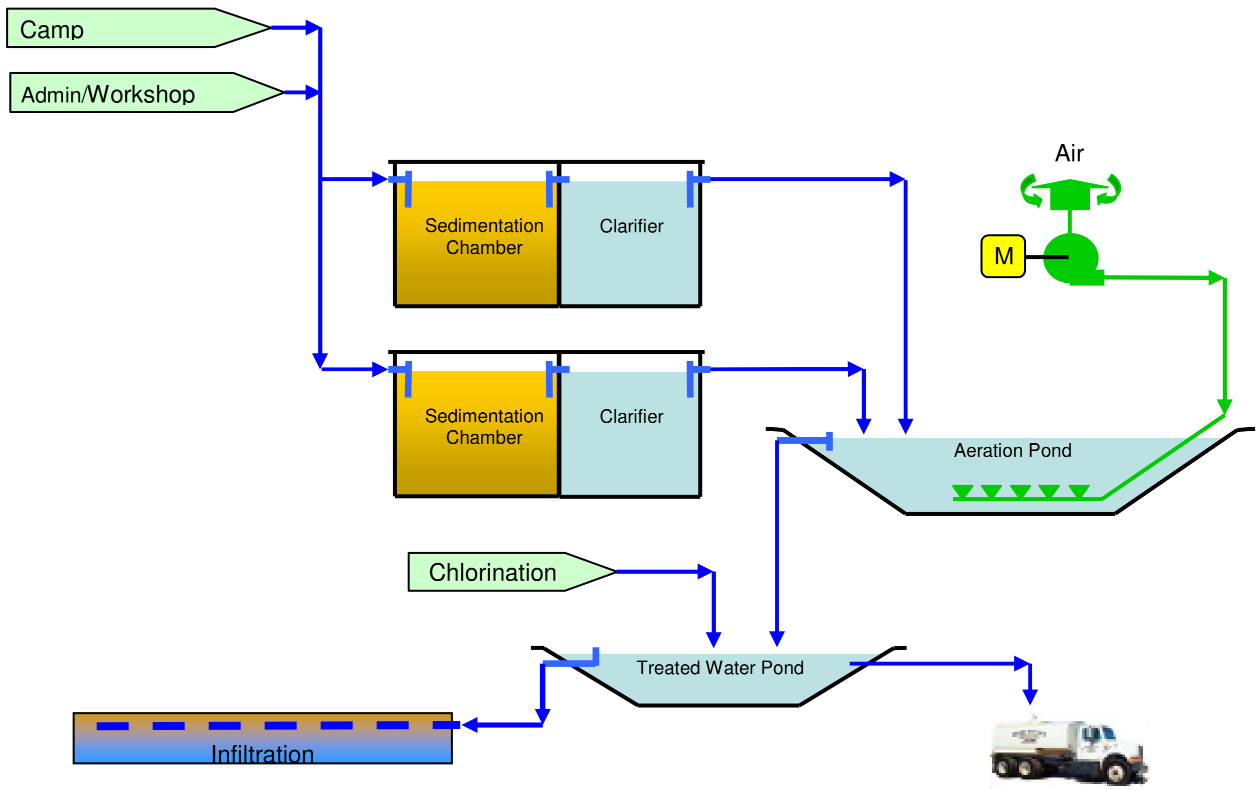
Figure 8.4-1: Sewage Treatment Plant Location



Water then flows to a 6 m x 6 m x 3 m deep storage pond where chlorine is added (Figure 8.4-2). The treated water is used in the road irrigation. Excess water is infiltrated to the ground using a fishbone type infiltration pond.

The system was authorized by the Antofagasta Health Service by Exempt Resolution 972, dated March 12 1996, for a flow of 36,288 L/day. The facilities are isolated from the rest of the property by a wire mesh fence with a double gate for access.

Figure 8.4-2: Sewage Treatment System



For the process plant area modular bathrooms with package sewage water treatment plants will be provided. Treated water will be aerated and then infiltrated to the ground, it will not be used for road irrigation. One plant will be installed in the crushing area and another in the process plant area.

8.5 Access Roads

Main Access Road

The main access to the Guanaco mine is by an existing public road, route B-865, which connects to Highway 5 North at Km 1,198. The road is a good quality unpaved road on which maintenance will be performed every quarter. It is possible that a sealant will be added to provide a better surface and reduce dust, but this decision is still pending.

Site Roads

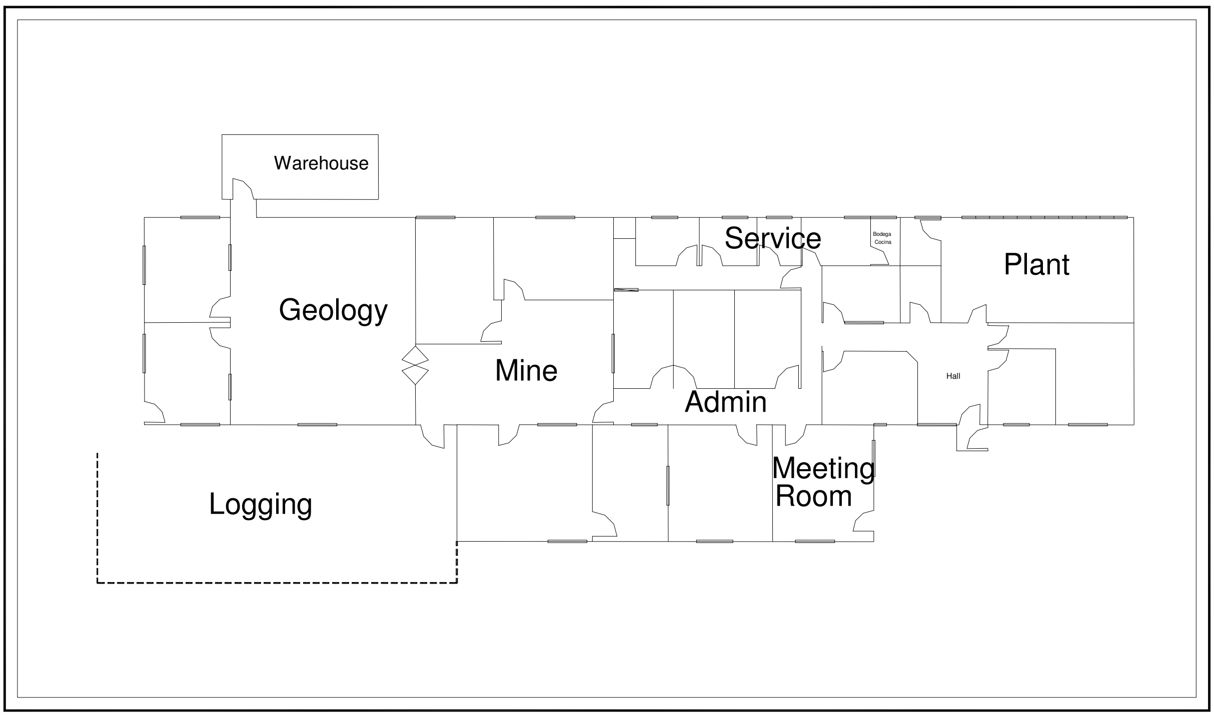
Site roads in the plant, mine, and camp area will be unpaved and will be irrigated with fresh water or treated water from the sewage treatment plant to minimize the quantity of particulate material in suspension.

8.6 Ancillary Buildings

Offices

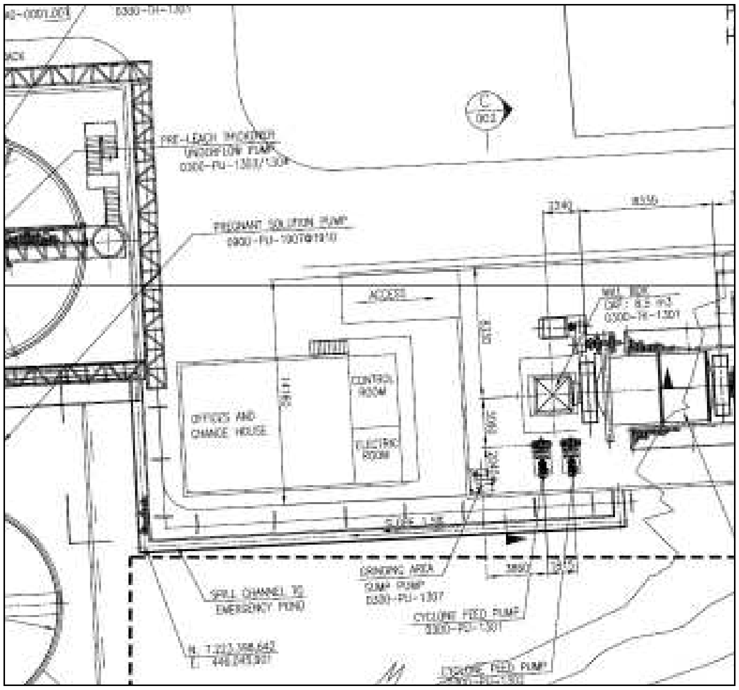
Currently GCM has a 370 m^2 building in which general management, administration, and the mining and geology management offices are housed. In 2010 these offices were modified and repaired and the layout is shown in Figure 8.6-1.

Figure 8.6-1: Administration Offices Layout



A 350 m^2 building is included at the process plant between the grinding area and the agitation leach and CCD area (see Figure 8.6-2) that will include the change house for the operators in this area and the offices for process management.

Figure 8.6-2: Location of Offices and Change House - Process Area



Gold Room

The gold room is a high security area because there is gold in the metallic state. Because of the high density (19 g/cc) a small volume of gold has high commercial value.

The gold room is located in the ADR plant and is a structural steel building with galvanized sheeting riveted to the structural support. It has a security door with double security locks, and the keys are kept by at least two different supervisors who must both be present to open the door. The vault will only be opened in the presence of the Shift Supervisor, Plant Manager, Administration Manager, or other person who has written authorization for this function.

The access control room is at the entrance to the ADR plant. All the monitors which show and record the images captured by the closed circuit TV cameras strategically located around the plant and especially in the gold room are located in this room. These cameras allow monitoring of the movement of personnel in the area. The gold room is illuminated 24 hours to provide high quality images.

Guards are stationed in the access control room and they record the entry and exit of personnel to the ADR plant and the gold room in a log book. The guards are also responsible for the operation of the six cameras and three monitors 24 hours a day.

When there are no operators or guards in the ADR building an alarm system will be in service, which will be activated if any door opens or other access is obtained or when the movement sensors detect movement inside the building.

Every person entering the gold room must declare his/her tools and/or other implements that he/she is carrying when entering the area. When leaving the plant, every person will be checked with a portable metal detector, as required by the company regulations. Also, every container will be checked in front of a TV camera, in order to record the check. Tools, equipments, instruments, and tool boxes will be checked against the entry inventory when they are taken out of the gold room.

Doré bars will be identified and packed prior to transport off site in an armoured truck. Procedures for shipping and transportation of doré will be agreed with the refiner/purchaser and recorded in the corresponding contract.

Access Guardhouse

There is an existing guardhouse at the entrance to the Guanaco mine which has offices for access control and for the guards.

Entrance permits for access to the site must be requested with 48 hours notice and must indicate the personal details of the applicant and the area that will be visited. Guards will verify the type of freight entering the site and the destination and storage. Alcohol and drugs, perishable food, products for sale, animals, and weapons are forbidden on site. Articles for personal use such as electronic devices must be registered at the entrance.

8.7 Infrastructure Capital Costs

8.7.1 Camp

In 2010 the camp, kitchen, and mess hall room were repaired and reconditioned as shown in Table 8.7-1. These costs were provided by GCM. These will be considered sunk costs and as such are not included in the capital cost estimate (see Section 14).

Table 8.7-1: Repair and Reconditioning Costs for the Camp and Kitchen/Dining Room

Item	Cost (US$)
Mine Staff	22,878
Staff A2 Side A	1,920
Staff A2 Side B	5,436
Staff A3 Side A	16,568
Staff A4 Side A	4,367
Containers	22,034
First Aids Service	2,575
Staff A1	39,049
Staff A3 Side B	34,586
Staff A4 Side B	34,031
Bath A4-A	2,762
Kitchen/Dining Room	58,000
Administration Building	19,867
Residual System	100,000
Total Buildings	**364,074**
Kitchen/Dining Equipment	30,334
Camp Equipment	
Bunk beds	7,148
Mattresses	4,000
Bed Clothes	4,000
Lockers	12,143
Heaters & Heating System	20,000
Total Equipment	**77,625**
Total Cost	**441,698**

8.7.2 Water Supply

The existing water supply facilities will be used for the first phase of the project, and modifications for water supply to the heap leaching area and ADR are included in each specific area. Therefore no capital cost was allocated for water supply wells or pipelines.

US$ 600,000 were allocated by GCM for capital expenditure required for the second phase of the water supply and distribution system, for the increased demand from the process plant (grinding, agitation leaching, and CCD), and filter plant.

8.7.3 Power Supply

The capital cost for the electrical facilities for generation and distribution system for crushing, ADR, heap leaching and systems for the preparation of the underground mine are shown in Table 8.7-2. Details by area are provided in Appendix C. These will be considered sunk costs, and as such they are not included in the capital cost estimate (see Section 14)

Table 8.7-2: Electrical Facilities Costs for Crushing, Power Generation and Distribution, ADR, and Phase III Heap

Area	Cost (US$)
100 – Mine	245,404
200 – Crushing	14,846
300 – Grinding and Thickening	0
360 –ILS and PLS Ponds	126,754
400 – Leaching	0
500 – CCD	0
600 – ADR	4,808
700 – Filter Plant	0
800 – Reagents	0
900 – Services	0
Electrical Installation Contract	1,130,769
Total	1,522,581

Capital expenditure required for the second phase of the power supply and distribution system for the increased demand from the process plant (grinding, agitation leaching, and CCD), filter plant, and the start up of the underground mine are summarized in Table 8.7-3. Details of the costs are provided in Appendix C. These expenditures are considered to be part of the capital cost for the project.

Table 8.7-3: Summary of the Costs for Additional Power

Area	Cost
100 – Mine	1,045,826
200 – Crushing	227,963
300 – Grinding and Thickening	0
360 –ILS and PLS Ponds	41,000
400 – Leaching	0
500 – CCD	0
600 – ADR	90,385
700 – Filter Plant	0
800 – Reagents	0
900 – Services	2,517,732
Electrical Installation Contract	1,160,480
Total	5,083,386

8.7.4 Sewage Treatment

The expenditures for reconditioning the sewage treatment system are considered as sunk costs, and as such are not included in the capital cost estimate (See Section 14).

The cost of reconditioning of the sewage treatment plant was US$100,000.

8.7.5 Access Road

The access road is in good condition and no investment is necessary. Road maintenance is included in operating costs.

8.8 Infrastructure Operating Costs

8.8.1 Camp Services

The operating cost provided by GCM for accommodation services, food, cleaning of the camp and kitchen/dining room casino is US$20 per man/day.

For the administration and kitchen/dining room building maintenance a total of US$2,000 per year was included.

8.8.2 Water Supply

GCM provided a cost for fresh water of US$0.50 /$m^3$. This cost includes extraction, pumping, and plant distribution, including the electrical energy.

Maintenance of the fresh water system was reported by GCM to be US$20,000 per year.

8.8.3 Power Supply

The unit cost of electrical energy was calculated by Ceyge based on the diesel generators operating at 380V and 50 Hz. Based on quotations and technical information from distributors of generator equipment, and the estimated annual demand the unit cost of power was estimated to be US$180 /MWh. This includes fuel, maintenance, and the financial costs of the operation.

8.8.4 Sewage

The maintenance cost for the sewage treatment system was reported by GCM to be US$24,000 /year including US$2,000 /month for septic tank cleaning.

8.8.5 Access Roads

The following have been included in road maintenance costs:

- Maintenance of the access road to the site: maintenance of the road three times per year at a unit cost of US$ 20,000 (US$ 60,000 per year).
- Maintenance of site roads: maintenance of the road once per year at a cost of US$ 20,000.