PROJECT DESCRIPTION FOR SCOPING

Proposed Quarry Operation and Cement Plant Project

Barangay Lo-oc, Malabuyoc, Cebu

Submitted by:
SOUTH WESTERN CEMENT CORPORATION

Submitted to:
Environmental Management Bureau – Central Office)

An Environmental Report By:

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Submitted To:

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DOCUMENT TRACKING

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PROJECT DESCRIPTION

1 **South Western Cement Corporation (SWCC)** intends to construct a cement plant complex at Brgy. Looc, Malabuyoc, Cebu. The cement plant will have a production capacity of 3.6 MMTPY of clinker or 5.0 MMTPY of cement.

2 **SWCC** will also quarry limestone within MPSA No. 059-96-VII and MPSA No. 060-96-VII, located also at Brgy. Looc, Malabuyoc, Cebu. The annual limestone production rate is 6.0 MMTPY.

3 **Table 1-1** shows the details of the project, the Proponent, and the EIA Preparer.

Table 1-1: Basic Information on the Proposed Project, Proponent, and EIA Preparer

Name of Project	**SWCC Quarry Operation and Cement Plant Project**
Project Location	Brgy. Looc, Malabuyoc, Cebu
Project Category & Type (based on Annex A of MC 2014-005 Guidelines)	Cement Plant with Quarrying
Project Size	3.6 MMTPY Clinker/5.0 MMTPY Cement 6.0 MMTPY Limestone
Proponent Name	South Western Cement Plant
Proponent Authorized Representative	Engr. Rolando Burgos Project Manager
Proponent Address and Contact Details	No. 155 EDSA, Brgy. Wack Wack Mandaluyong City 1550
EIA Preparer (Consultant)	LCI ENVI CORPORATION
Preparer Contact Person	**Engr. Jose Marie U. Lim, MSc.** EIA Team Leader
Preparer Address and Contact Details	Unit 8L-M Future Point Plaza 3 111 Panay Avenue, South Triangle Quezon City, Metro Manila, Philippines Tel. No.: (632) 442-2830 Fax No.: (632) 961-9226

1.1 Project Location and Area

1.1.1 Project Location

4 The proposed cement plant complex will be in Brgy. Looc, Malabuyoc, Cebu. The general location map of the proposed project is shown in **Figure 1-1.** The geographic coordinates defining the boundary of the proposed project site are provided in **Table 1-2**. provided in the table below.

5 **Figure 1-4** shows aerial photographs of the project site, highlighting the features in the immediate vicinity of the site.

Table 1-2: Coordinates of the Proposed Project Site for Cement Plant Complex

POINT	LATITUDE (N)	LONGITUDE (E)
1	9°37'21.7738"N	123°19'15.0058"E
2	9°37'15.6199"N	123°19'13.1845"E
3	9°37'14.2185"N	123°19'19.2465"E
4	9°37'15.9739"N	123°19'27.8911"E
5	9°37'13.8274"N	123°19'37.5276"E
6	9°36'55.4036"N	123°19'39.5390"E
7	9°36'54.1224"N	123°19'23.8907"E
8	9°37'06.2929"N	123°19'14.8294"E
9	9°37'06.0600"N	123°19'11.5240"E
10	9°37'10.6127"N	123°19'12.5549"E
11	9°37'13.0722"N	123°19'06.2242"E
12	9°37'16.2038"N	123°19'08.2439"E

6 The proposed quarry area will also be in Brgy. Looc, Malabuyoc, Cebu, within MPSA No. 059-096-VIII and MPSA No. 060-096-VII. The locations of the MPSA and the quarry area are shown in **Figure 1-1.**

Table 1-3: Coordinates of the MPSA and Proposed Quarry Area

Corner	Latitude	Longitude
MPSA No. 059-96-VII		
1	9°36’30”	123°19’30”
2	9°36’30”	123°19’00”
3	9°38’00”	123°19’00”
4	9°38’00”	123°19’30”
5	9°38’30”	123°19’30”
6	9°38’30”	123°20’30”
7	9°38’00”	123°20’30”
MPSA No. 060-96-VII		
1	9°36’30”	123°19’30”
2	9°38’30”	123°19’30”
3	9°38’30””	123°20’30”
4	9°36’30”	123°20’30”
Proposed Quarry Area		
1	9°37'13.14"N	123°19'39.46"E

1.1.2 Project Area

7 The proposed cement plant complex of SWCC will occupy 47 hectares of land area while the quarry area will cover ~60 hectares. The two MPSAs has a total land coverage of 812.26 hectares.

1.1.3 Project Impact Areas

8 The study area for the EIA includes the direct and indirect impact areas. The project impact area generally consists of the (47+60)-hectare project footprints of the cement plant complex and quarry areas the direct impact area (DIA) and the areas in the immediate vicinity of the project site in the host barangay as the indirect impact area (IIA). In accordance with the guidelines provided in DAO 2017-15, the delineation of the direct and indirect impact areas will be updated as follows:

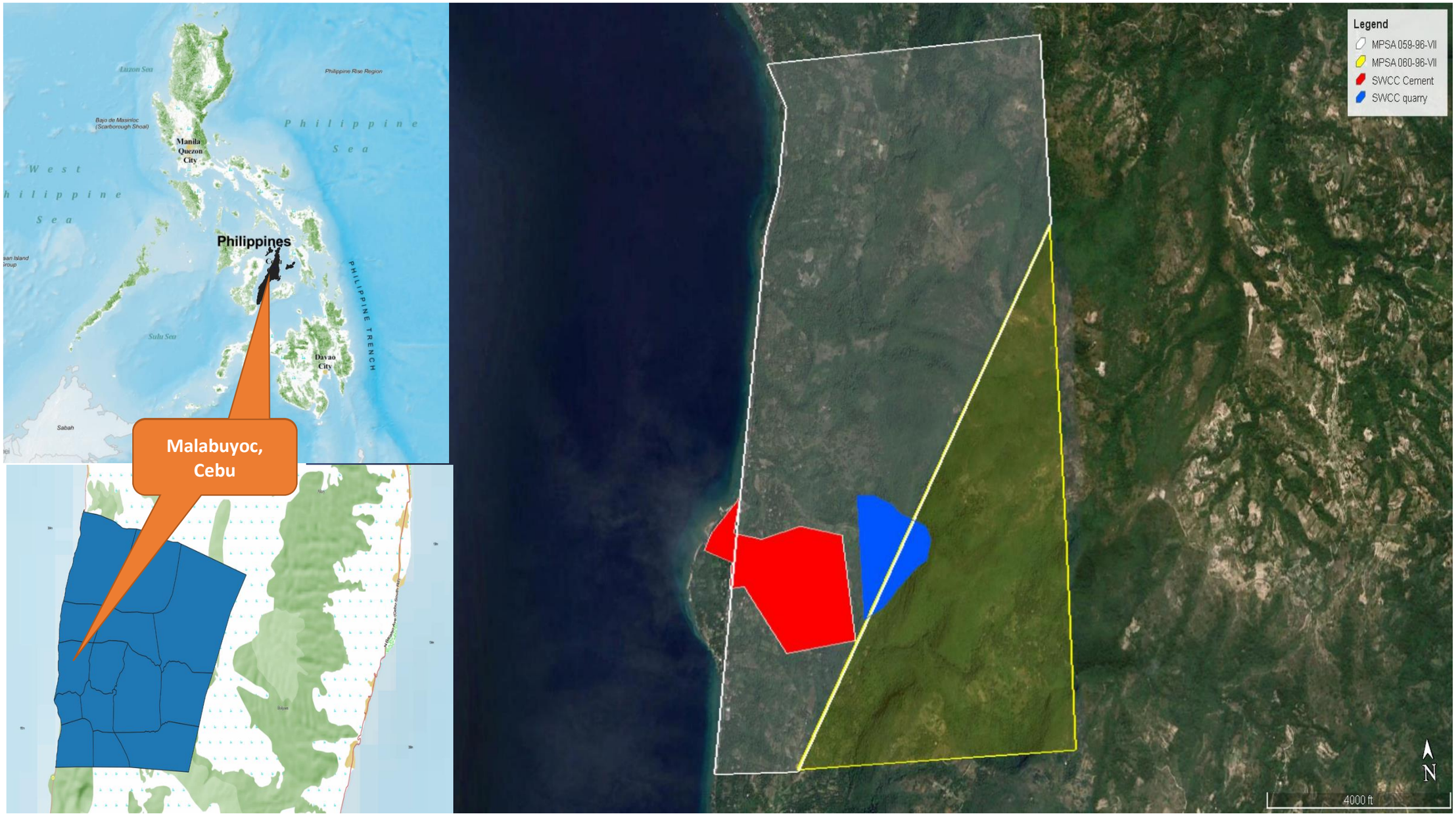
- For the Land component, the direct impact area (DIA) pertains to the areas that will be cleared and developed for the construction and operation of the proposed project components, which are identified in **Section 1.4**.
- For the Water component, the DIA refers to the nearby surface water that will be used to supply the water requirement of the proposed project.;
- For the Air component, the DIA covers the areas within the host barangay of Looc where the ground-level concentrations (GLC) of total suspended particles (TSP), the criteria pollutant of potential concern, are projected to rise.
- For the People component, the IIA encompasses the communities in the host Municipality of Malabuyoc particularly Brgy. Looc (host barangay) which are expected to benefit from the employment, business opportunities, taxes, and other potential socio-economic contributions of the project.

9 The impact area delineation for the proposed project is graphically presented in **Figure 1-2**.

1.1.4 Accessibility of the Project Site

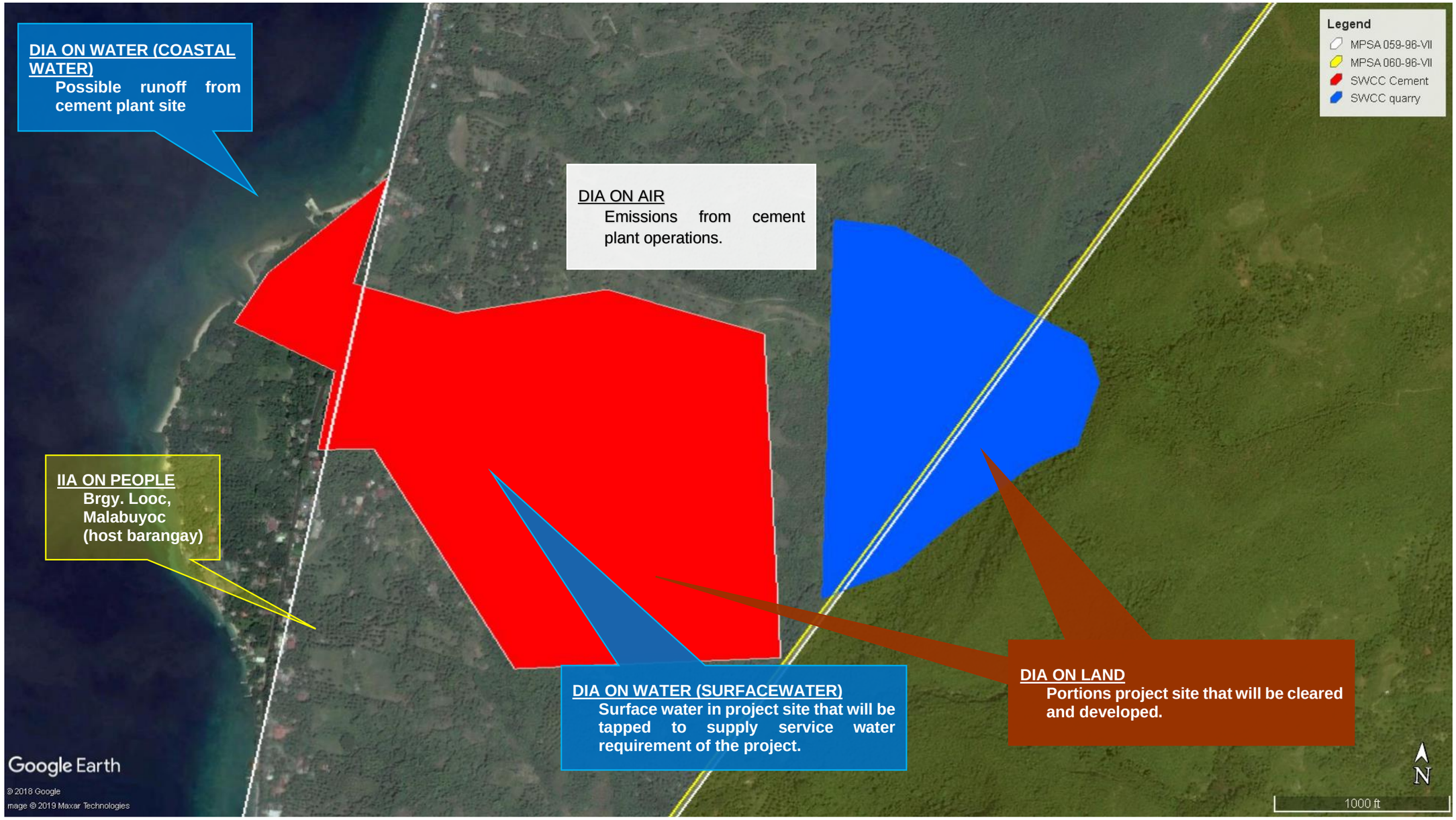
10 The proposed project site is in the south of Cebu City and approximately 149 kilometers away from the Mactan-Cebu Airport. The site can be easily travelled by any type of land vehicle. From Cebu City, the town of Malabuyoc is about 4-hour drive via CarCar-Dalaguete-Ginatilan Provincial Highway or about 3-hour drive via CarCar-Barili-Ginatilan Road.

Figure 1-1: General Location Map of the Proposed Project



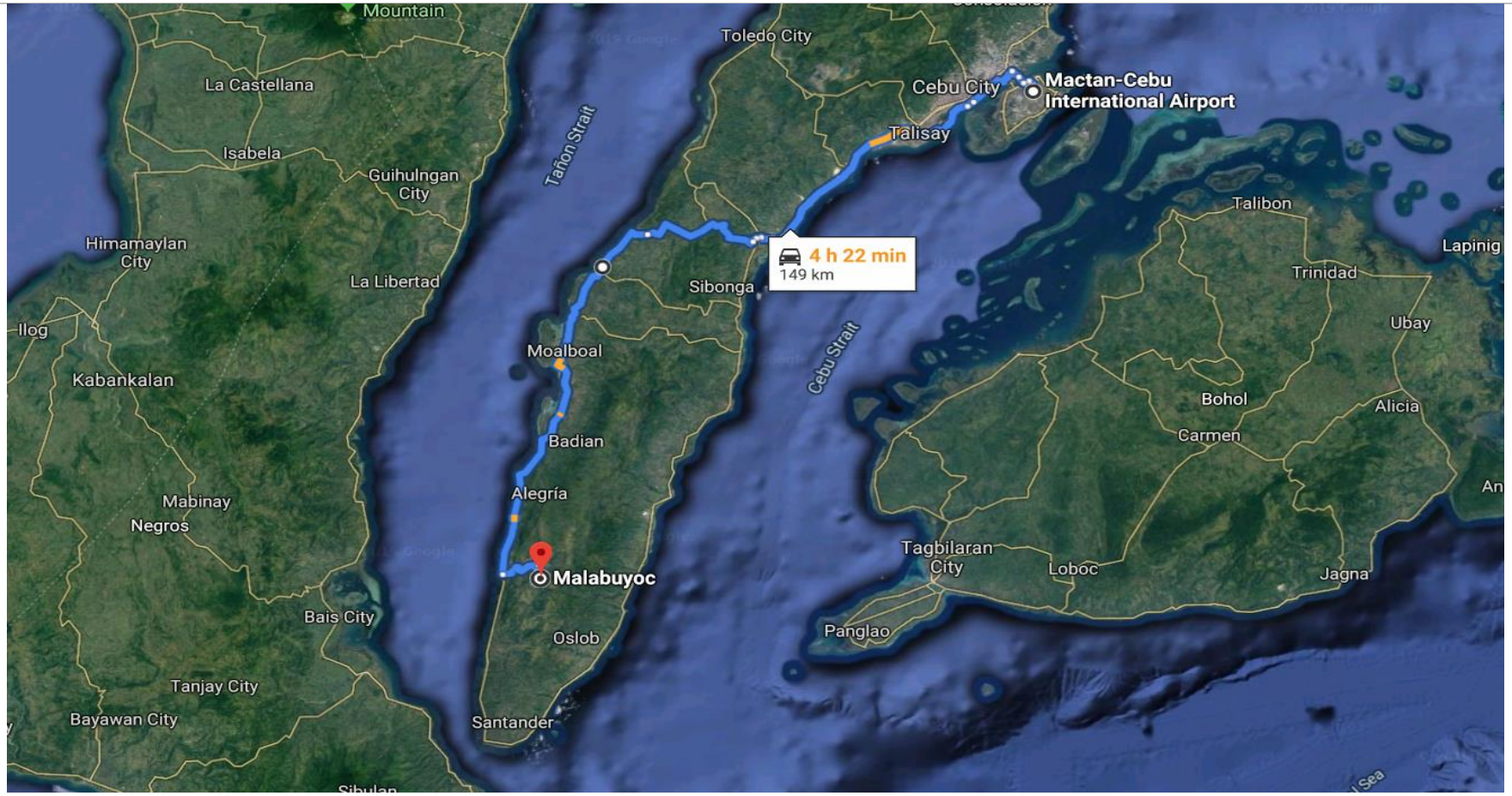
PROJECT PROPONENT: SOUTH WESTERN CEMENT CORPORATION	FIGURE TITLE: **GENERAL LOCATION MAP OF THE PROPOSED PROJECT**	FIGURE NO.: **1-1**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: MAP GENERATED IN QGIS BASE MAP: NAMRIA

Figure 1-2: Primary and Secondary Impact Areas



PROJECT PROPONENT: SOUTH WESTERN CEMENT CORPORATION	FIGURE TITLE: **PRIMARY AND SECONDARY IMPACT AREAS**	FIGURE NO.: **1-2**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: MAP GENERATED IN GOOGLE EARTH

Figure 1-3: Accessibility Map of the Proposed Project Site



PROJECT PROPONENT: SOUTH WESTERN CEMENT CORPORATION	FIGURE TITLE: **ACCESSIBILITY MAP OF THE PROPOSED PROJECT SITE**	FIGURE NO.: **1-3**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: MAP GENERATED IN GOOGLE MAPS

Figure 1-4: Aerial Photographs of the Project Site

PROJECT PROPONENT: SOUTH WESTERN CEMENT CORPORATION	FIGURE TITLE: **AERIAL PHOTOGRAPHS OF THE PROJECT SITE**	FIGURE NO.: **1-4**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: MAP GENERATED IN GOOGLE EARTH

Figure 1-4a: Aerial Photographs of the Project Site

PROJECT PROPONENT: SOUTH WESTERN CEMENT CORPORATION	FIGURE TITLE: **AERIAL PHOTOGRAPHS OF THE PROJECT SITE**	FIGURE NO.: **1-4b**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: MAP GENERATED IN GOOGLE EARTH

Figure 1-4a: Aerial Photographs of the Project Site

PROJECT PROPONENT: SOUTH WESTERN CEMENT CORPORATION	FIGURE TITLE: **AERIAL PHOTOGRAPHS OF THE PROJECT SITE**	FIGURE NO.: **1-4c**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: MAP GENERATED IN GOOGLE EARTH

1.2 Project Rationale

11 The proposed cement plant is in line with the goal of the national government to build infrastructure, as cement is a major construction material. Public and private developments hinge on the steady supply of cement. Furthermore, higher supply of cement leads to lower prices. Cement is almost universal in terms of building applications—ranging from government projects such as low-cost socialized housing, public elementary schools and hospitals, highways and bridges, and to privately-funded endeavors such as condominiums, commercial centers, and individual housing units.

12 It is important to maintain the supply of cement to maintain its prices. If supply of cement curtails, higher prices of cement may impede the progress of infrastructure projects, which may then lead to cutting of basic social services. A solution to low supply of cement is importation, but this solution undermines the local economy. Establishing cement manufacturing facilities in the country us important to provide a reliable supply of cement, lessen the dependence on imported cement products, and to assure competitive prices that supports local economy.

13 The Philippine Board of Investments (BOI) is looking for investors as it expects demand to bubble to 40 million tons/year by 2020[1]. This increase in demand is aided by the current administration's plan to focus its spending on infrastructure building. According to the Cement Manufacturers' Association of the Philippines, the cement facilities in the country have an installed and operating capacity of 34.5 million tons annually[2]. Based on the reports, a demand of about 5.5 million metric tons must be filled. Additionally, other sources warn that the current shortage of cement may delay construction of new buildings, which in turn will hold back creation of more spaces that can be used for business enterprises[3].

14 The proposed project will also have effects on the local economy of Malabuyoc, Cebu. The project can contribute to the development of the area by providing local employment, tax contributions, and increased commercial trading.

1.3 Project Alternatives

15 Alternatives analysis is carried out to determine the most favorable alternative considering such factors as economic viability, technical feasibility, magnitude and extent of impacts on environment and people. The project is analyzed as the preferred alternatives while assessing "without the project" alternatives or "do nothing alternatives. Technology employed by the project was also assessed against similar technologies employed in the sector.

[1] Manila Bulletin. BOI seeks more cement investments as infra projects lifting demand. 2 June 2017.

[2] Inquirer.net. Cement supply enough for Build, Build, Build. 17 January 2019

[3] Philippine News Agency. Cement shortage seen to delay new construction projects. 10 April 2019

1.3.1 Site Selection

16 Mining and quarry projects are site specific as dictated by the location of the resources. Unlike other natural resources, there are no alternative sites in developing mineralized areas. The location of ancillary facilities (i.e. processing plants) were determined based on economic, technical, and environmental factors.

17 Upon selecting the potential sites for the proposed cement plant complex and quarry sites, the following factors persuaded the proponent to choose the site in Barangay Lo-oc, Malabuyoc, Cebu as the final project site. The proposed site was chosen for the following reasons:

- Good quality limestone is present in the area;
- The area is accessible from the national highways;
- The landowners are reasonable to deal with; and
- There are no immediate volcanic hazards in the area.

18 The proposed project site is already owned by **South Western Cement Corporation**. The proposed site is known to contain limestone; therefore, it was not practical to select other sites. The zoning of the project site is also suitable for industrial purposes; the project footprint will not be built on agricultural areas.

1.3.2 Technology Selection

19 There has recently been a global trend for *"stand-alone"* cement-grinding plants instead of installing grinding units within integrated cement lines. **South Western Cement Corporation** will choose to implement a cement full cement plant instead of the cement grinding facility because of the presence of raw materials in the area.

20 There are two types of cement production processes: the wet process and the dry process. **SWCC** will use dry process because of its minimal water requirement. The savings in fuel cost by using the dry process as opposed to the wet process is the compelling reason why modern cement plants use the dry process.

1.3.3 No Project Option

21 If the proposed project will not proceed, the existing biophysical, environmental and socio-economic conditions in the project site will remain the same. None of the potential effects of the project, positive or negative, will occur. There will be no increase in the economic activity in the host barangays and municipality and any adverse effect of the project on the existing environment would be avoided. However, the mineral resource present in the project site will not be developed and the resulting socio-economic benefits of Brgy. Looc and the Municipality of Malabuyoc will not occur.

22 If the proposed expansion of the cement plant and the quarry will not be pursued, the cement market will be affected. Cement prices may be higher if the supply does not meet the current demand. The market may also resort to buying of imported cement instead of the local cement if the supply is low.

1.4 Project Components

1.4.1 Major Components

23 The project components for the SWCC cement plant and quarry operation are summarized in **Table 1-4,** while **Figure 1-5** shows the plant layout.

Table 1-4: Project Components of SWCC cement plant and quarry

Description	Type of Machine
Quarry Fleet	Hydraulic excavator, 45- ton
	Hydraulic excavator, 80- ton
	Off-Road Dump Trucks, 50 tonner
	Articulated Dump truck, 40 tonner
	Dozer D8R
	Air truck Drill + air compressor
	Hydraulic excavator, 20-ton
	Motor Grader
	Vibratory compactor
	Fuel truck
	Lube truck
	Water truck
	Tower Light
	Telescopic Crane (150 Tonner)
Main Crushing Plant	Double Shaft Hammer Crusher, 1500 TPH
Additive/Coal Crushing	Double Roller Hammer Crusher, 400 TPH
Rectangular Storage	Limestone storage, 50,000 MT
Feed Bins for Raw Materials	Pre-mix bin, 1 x 200 tons, Limestone
	HG Corrective, 1 x 200 tons, Limestone
	Silica, 1 x 100 tons
	Iron, 1 x 100 tons
	1 x 100 tons
Raw Grinding System	Vertical Roller Mill, 450 TPH, wet
Homogenizing Silo	15,000 Tons
Preheater	200 tons capacity, raw meal
Rotary Kiln	5,500 TPD, Clinker
Clinker Cooler	5,500 TPD
Coal Grinding and Dosing System	Vertical Roller Mill, 36-45 TPH
Gas Conditioning Tower and Dust Treatment Facility	600, 000 m3/h
Clinker Silo	50,000 MT
Additive Storage with Stacker and reclaimer machine	for Pozzolan, Gypsum storage, 10,000 MT

Description	Type of Machine
Cement Mill	Vertical Roller Mill, 2 x 175 TPH
Feed Bins, clinker and additives	Clinker Bin: 2 x 500 tons Gypsum Bin: 2 x 60 tons Pozzolan: 2 x 100 tons Limestone: 2 x 100 tons Cement Silo: 3 x 25,000 tons
Packhouse	Rotary packer, 5 x 100 TPH

1.4.2 Support Facilities

24 Warehouses, administration building and staff house, and parking and truck marshalling area will be constructed to support the operation of the cement plant. Medical clinic, fire station and power substation will also be constructed as support facilities. A water treatment facility will also be constructed and used to treat the water to be used during the operation.

25 The plant shall build an Explosives Magazine (warehouse/storage facility) to specifically store explosives that will be used in the blasting activities. This facility will be constructed based on the guidelines set by the Bureau of Fire Protection (BFP), the Philippine National Police-Firearms and Explosives Division (PNP-FED) and DAO 2000-98 to primarily decrease the risk of accidental explosion to people and property. The explosive storage facility will have a maximum capacity to store for one month's usage. Physically, the storage room may only be about 10 x 10 meters well-ventilated, locked and secured with a fence all around the room about 5 meters from the walls of the room. The Explosives Magazine shall feature the following items:

- Designed to be fire, blast, and even bullet-resistant;
- The facility will be situated in an isolated zone, away from nearby residents and the main production facility;
- Installed security fences and gates, warning signs, and closed-circuit television;
- No other openings except for the entrance/exit and ventilations;
- All ventilations will be provided with metal screens to prevent unauthorized access;
- The doors will have multiple security locks, which will be kept by a representative of PNP-FED, plant's security officer, and the master blaster;
- Equipped with lightning arrester, wooden matting, anti-static devices, fire extinguishers, and vapor-proof lighting fixtures;
- The immediate surrounding will be cleared with any combustible material; and
- Has separate chambers to contain the stocks of dynamite, blasting caps, fuses, and ammonium nitrate.

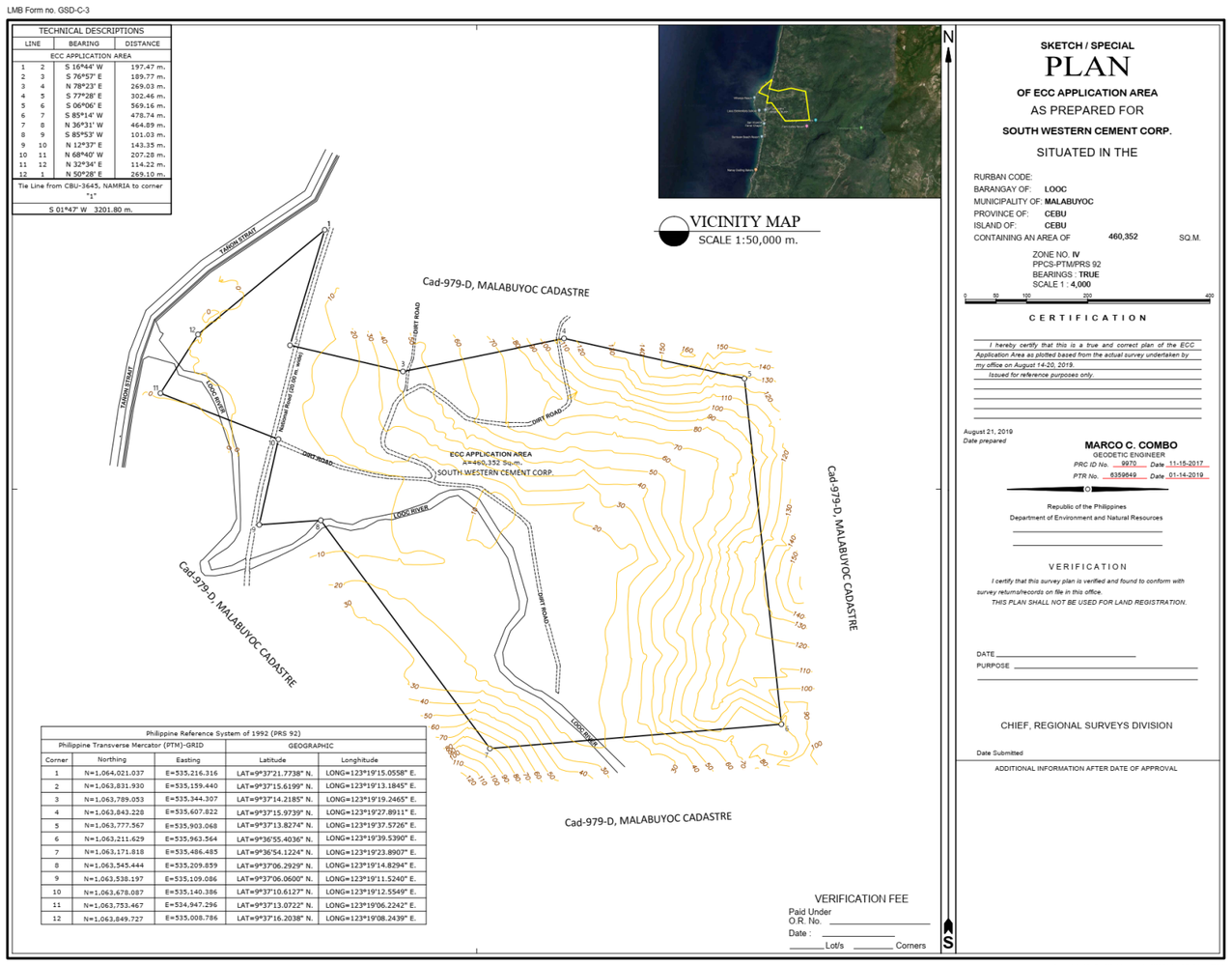
1.4.3 Temporary Facilities (During Construction)

26 Temporary facilities during construction includes: (a) re-purposed container vans which will serve as on-site office and accommodation for workers, (b) sanitary facilities with septic tank (will be emptied-out and condemned after construction is completed), (c) temporary sub-station will be installed to provide power supply during construction activities.

27 To support the construction activities, temporary facilities such as the following will be installed in the project site:

- Re-purposed container vans which shall serve as on-site office and accommodation for workers;
- Sanitary facilities with septic tank that will be emptied-out and condemned after construction is completed;
- Temporary protective fencing and lighting;
- Gatehouse and site security facilities;
- Temporary parking space;
- Temporary and secured equipment and material storage areas (i.e. diesel storage area);
- Temporary site office;
- Emergency spill kits;
- First aid stations;
- Temporary solid and hazardous waste storage areas;
- Portable sanitation facilities;
- Diesel storage tanks;
- Generator sets

Figure 1-5: Lot Plan for the Proposed Project



PROJECT PROPONENT: **South Western Cement Corporation**	FIGURE TITLE: **LOT PLAN FOR THE PROPOSED PROJECT**	FIGURE NO.: **1-5**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: PROJECT PROPONENT

Figure 1-6: Plant Layout for the Proposed Project

PROJECT PROPONENT: **South Western Cement Corporation**	FIGURE TITLE: **PLANT LAYOUT FOR THE PROPOSED PROJECT**	FIGURE NO.: **1-6**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: PROJECT PROPONENT

1.4.4 Pollution Control Devices

1.4.4.1 Air Pollution Control

28 The priority in the cement industry is to minimize the increase in ambient particulate levels by reducing the mass load emitted from the stacks, from fugitive emissions, and from other sources.

29 Collection and recycling of dust in the kiln gases is required to improve the efficiency of the operation and to reduce atmospheric emissions. For control of fugitive particulate emissions, ventilation systems should be used in conjunction with hoods and enclosures covering transfer points and conveyors. Drop distances should be minimized using adjustable conveyors. Dusty areas such as roads should be regularly sprinkled with water to reduce dust generation.

30 The main air pollution sources in cement manufacturing are the milling or resizing of cement raw materials; homogenizing of milled materials and kiln-feeding, kiln operation, clinker storage and transport to grinding equipment.

31 The operations of the air pollution control system are described in the following sections:

Dust Collectors

32 Limestone run-of-mine undergoes crushing and size classification without introduction of water, unlike the comminution of construction aggregates and gold and copper ores. Dust collectors are installed to control the emission of fugitive dust into the air. A blending storage facility for limestone is enclosed in a form of a dome to protect against wind and rain to help minimize accumulation of airborne particles. Inside the storage, the screened limestone is heaped in piles. Stacking and reclaiming mechanism is done by a bridge scraper that runs through the length of the limestone pile at variable speed so as to adjust the withdrawal rate for production requirement.

Bag Filters

33 Bag filters are installed around the plant to regulate the escaping gases from the system. The bag filters are designed to de-dust the gases to eliminate the build-up of particulates in the ducts and pipes and preventing emission of gases with too much dust in the air. The bag filters has guaranteed efficiency of 99.99% in eliminating the dust. The bag filters are provided with a fan, driven by an electric motor, to regulate volumetric flow, gas temperature, and static pressure.

34 **Table 1-5** enumerates the bag filters that will be installed in the cement plant.

Table 1-5: Location and Specification of Bag Filters

Location of Bag Filters	Capacity
Main Dedusting system	720,000 m^3/hr at 250 deg. C
Clinker Cooler	600,000 m^3/hr at 250 deg. C
Clinker Storage	36,000 m^3/hr at 150 deg. C
Cement Storage	36,000 m^3/hr at 150 deg. C
Bulk Silo	36,000 m^3/hr at 150 deg. C

Water Spray System

35 The correct temperature of flowing gas into the bag filter is assured further with the aid of water spray system. Water injection not only reduces the temperature of the gas but also increases the conductivity of the dust laden gas that enhances the efficiency of the bag filter as a dust collector. The system is controlled and triggered automatically based on the temperature reading of the outlet gases from the mill. Raw meal is fed into the mill at a rate and amount based on the differential pressure over the grinding chamber.

Electrostatic Precipitators

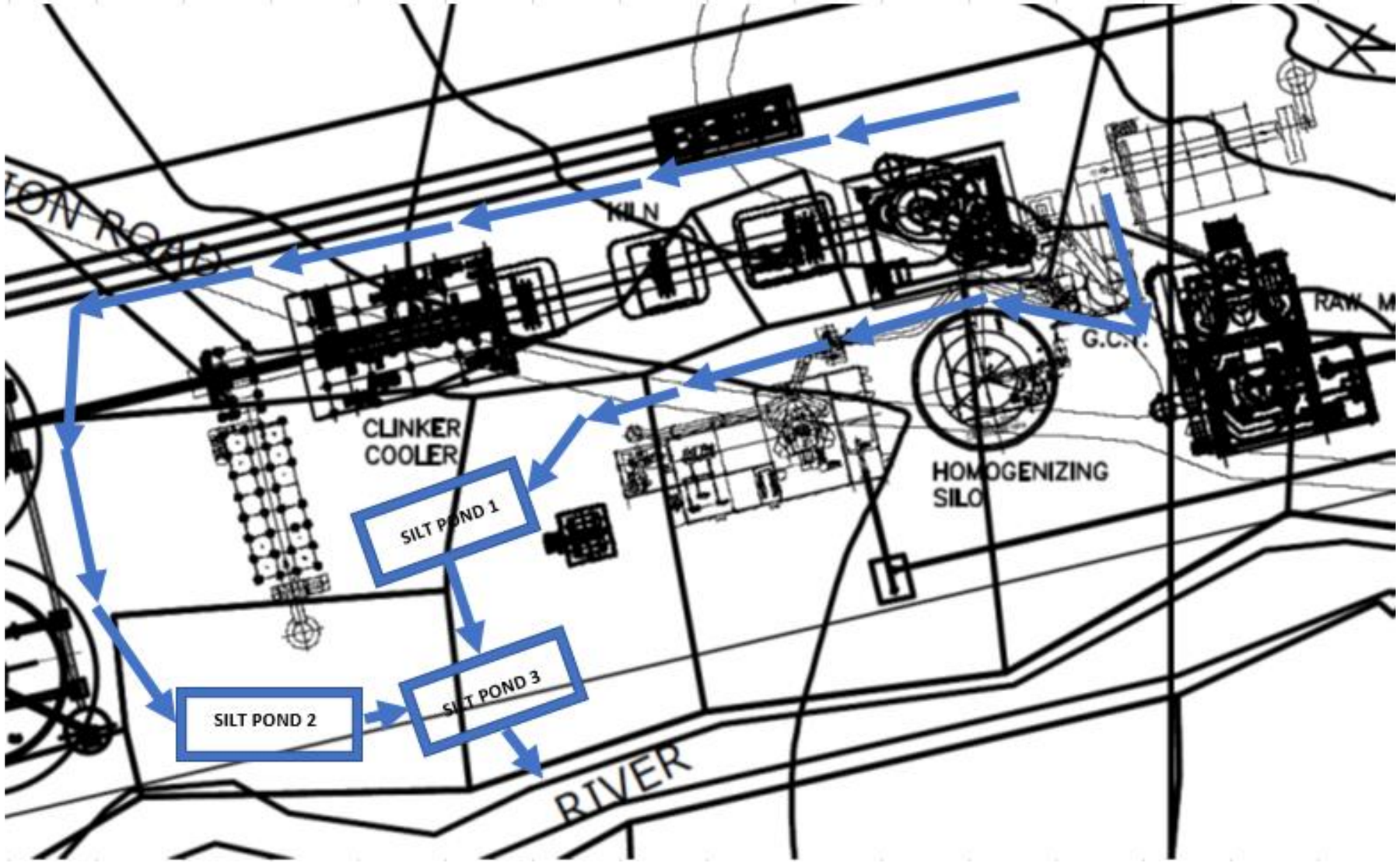
36 Electrostatic precipitators will also be installed to control and minimize emission of dust and particulate matter.

1.4.4.2 Water Pollution Control

37 The cement plant employs a dry process; hence, the wastewater generated by the plant is limited from domestic sources and run-offs from drainage. The main effluent of the cement plant comes from the quarry's surface run off. The run-off coming from the quarry site is only observed during the wet season, and there is no discharge during the dry season.

38 A siltation pond will receive the run-off, which is mostly from drainage and road washing during rains. The pond retains the water until most of the dust particulates and suspended solids settle at the bottom of the pond. Most of the time, this pond is dry. After heavy downpour, water from the drainage system within the cement plant accumulates in the pond. Under normal precipitation, the pond can retain the water until it evaporates. During heavy downpour, there is excess rainwater being discharged to the drainage leading to the nearby creek. In order to maintain the efficiency of the pond, a more frequent desilting must be implemented (i.e., from the existing 2x a year, this may be increased to once every quarter). The domestic wastewater will be treated by a sewage treatment plant that will also be constructed inside the plant.

Figure 1-7: Drainage Plan



PROJECT PROPONENT: **South Western Cement Corporation**	FIGURE TITLE: **DRAINAGE PLAN**	FIGURE NO.: **1-7**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: PROJECT PROPONENT

1.4.4.3 Solid Waste Control

39 A temporary solid waste storage area will be provided in the site during construction. All solid wastes will be properly segregated and disposed. Designated spoil disposal area will also be provided. All of these will be located inside the project site

40 Solid wastes from the office, dormitory/kitchen and other facilities will be segregated as to bio-degradable or not and will be disposed of accordingly with the help of the municipal government.

1.5 Process/Technology

41 The amount of raw materials that the cement plant will be utilizing to produce 3.6 MMTPY of clinker is summarized in **Table 1-6** and with the additives to produce a maximum cement capacity of up to 5.0 MMTPY**.** The limestone requirement will be supplied by the SWCC quarry operation.

Table 1-6: Raw Material Requirements of the Cement Plant

Minerals	Mineral Requirement (MTPY)
Limestone	6,000,000
Silica	296,740
Pyrite	178,044
Additives :	
Pozzolan	500,000
Fly Ash	500,000
Gypsum	250,000

1.5.1 Quarry Area

1.5.1.1 Limestone Excavation

42 The excavation of limestone will be done using Air Trac Drill to a desired depth and applying the mining technique called 'benching'. With this method, the overburden, the soil and rocks that are covering the limestone and shale deposits, will be removed by creating a series of step levels or 'staircases', one top of each other. After the quarry has progressed, the mine site will resemble a terraced surface. This procedure reduces the risks of sudden landslides and uncontrolled erosions. The overburden shall be stored in Plant's holding facility, which then will be returned to the mined surfaces after the deposits have been gathered.

43 The excavated limestones will be transferred to the loading area by a bulldozer. Using a shovel or backhoe, these boulders will be loaded to dump trucks and hauled to the crushers.

1.5.1.2 Explosives Blasting

44 Explosives blasting will be carried out for ore sites that are too difficult to extract by conventional drilling and excavation methods. The explosive force breaks large boulders into smaller and more manageable sizes that can be transported by trucks. This method hastens the ore extraction process, and while also decreasing the wear and tear on major quarrying equipment.

45 However, this method of ore extraction will be done in an exceptionally calculated, secured, and carefully handled procedure. To prepare a mine site for blasting, holes will be drilled in the soil, evenly spaced, where the explosives will be placed in. After the explosives are settled, electrical detonators will be placed, and wired to the main control switch. Prior to the blasting, all systems shall be double-checked, then an alarm will be ensued and all personnel near the blast zone will be evacuated. A duly trained blasting operator, with direct supervision, shall induce an electrical

current to detonate the explosives. The explosion will take place in a moment. The exposed overburden and ore will be hauled into the main production facility.

1.5.1.3 Limestone Crushing and Conveying

46 From the quarry site, the extracted limestone will be transported to the crushing system of the plant. The mined limestone is dumped in the receiving hoppers through open trucks; one for low grade limestone and a one for high grade limestone. Using apron feeders, limestone will be fed to the crushers. The limestone will undergo two stages of crushing. The primary crusher has a capacity of 1,000 MT/hr. The size of the crushed stones from the primary crusher will be further reduced using the secondary crusher which has a capacity of 500 MT/hr. Both the crushing stages will be using single rotor hammer crushers.

1.5.1.4 Limestone Pre-blending and Conveying

47 The crushed limestone is transported, via belt conveyor, to the limestone pre-blending circular storage with capacity of 60,000 tons. The crushed limestone will be pre-blended by means of a stacker with capacity of 1,000 tons/hr. The pre-blended limestone will then be transported to the hopper bin via belt conveyor. The limestone is extracted from the circular pre-blended bed by means of a reclaimer of 800 tons/hr capacity.

1.5.1.5 Additive Crushing & Conveying

48 The additive materials required will be crushed using a single rotor hammer crusher with a capacity of 500t/h. The additive materials are dumped in the receiving hopper through open trucks and are fed to the crusher via apron feeder. A heavy-duty apron feeder is located under the receiving hopper. The crushed additive materials and spillage from apron feeder are discharged to a belt conveyor and are transported to the storage bins by means of other belt conveyors.

1.5.2 Cement Processing Plant

49 The general process diagram of the cement production is shown in **Figure 1-8**. The following subsections will discuss further each process.

1.5.2.1 Raw Material Storage

50 The table below shows the capacity of the storage bins of the crushed raw materials (limestone, shale, silica and pyrite) that will be constructed for the proposed cement plant. The storage bins are in a rectangular store yard together with the cement additives.

Storage Bins	Capacity (tons)
Limestone	10,000
Silica	10,000
Pyrite	5,000

51 The bins are mounted on load cells for exact determination of the filling level. Extraction of materials from the bin is done via dosing belt weigher. All raw materials are proportioned in requisite quantity through weigh feeders. The weigh-feeders make up the raw mix based on the actual set point. A collecting belt conveyor receives the material from the different dosing belt weighers and conveys the raw mix to the raw mill system.

1.5.2.2 Raw Material Grinding

52 The proportioned raw materials are transported by belt conveyor to the raw mill for grinding into fine powder. The raw materials will be dried and grinded using roller press system to produce the raw meal. Two (2) units of 200 tph roller press will be used for the raw material grinding. The size reduction of the materials takes place under high pressure between the two rotating rollers.

53 A high efficiency classifier is installed in the mill in order to reach the necessary raw meal fineness. A belt conveyor transports the coarse material rejected from the mill to a recirculation bucket elevator for its reintroduction to the mill feed conveyor. The raw meal product is transported by means of air slides and bucket elevator to the raw meal homogenizing silo. On the raw mill output, before the raw meal elevator, a continuous sampling device is installed to allow checking of the product quality in the laboratory.

54 Drying also takes place in the mill by using the exit gas of the pre-heater. The raw mill system and the kiln system are in close balance in terms of the waste gas from the pre-heater. A three-fan system, consisting of raw mill fan, kiln ID fan and filter fan will be envisaged for the raw mill system. Ductwork configuration will be installed to allow hot gas by-pass between mill inlet, mill filter, and circulating air between mill outlet and inlet ducts. Water is injected into the mill and all the necessary equipment are installed to stabilize the grinding bed if necessary and to cool down the hot gas.

1.5.2.3 Raw Meal Homogenizing

55 The raw meal will be transported to the corrective silo or the homogenizing silo by means of air slides, bucket elevator (belt) and one distribution system where blending will take place. The raw meal homogenizing silo will have a capacity of 15,000 tons. The fluidization/extraction air for the homogenization is supplied by the air blowers.

56 The homogenized raw meal will be fed to the kiln fee bin for pre-heating. Two bucket elevators will be set for transporting raw meal into pre-heater. The kiln feed bin is located underneath the homogenizing silo. The raw meal is extracted from the homogenizing silo by means of discharge air slides and dosing valves for emergency shut off and flow regulation. The kiln feed bin has a capacity of 400 tons/hr. At the feed bin discharge, a dosing impact flow meter controls the raw meal feed rate to the pre-heater. A discharge on the kiln feed bin will be installed to bypass the dosing system in case of maintenance or failure. The kiln feed bin will be mounted on the load cells to keep it at a constant weight level.

57 On the kiln feed transport line, before the elevator, a continuous sampling device will be installed to allow checking of the raw meal quality. Transport of samples to the laboratory will be done manually. For kiln start and emergency reason it will be possible to divert the raw meal from the pre-heater feeding on top of the pre-heater back to the homogenizing silo (Raw Meal Recirculation).

1.5.2.4 Pre-heater Exhaust Gas Treatment

58 Kiln gas from pre-heater top stage is sucked through down comer by kiln pre-heater fan and is given through raw mill or mill bypass to the main bag filter and filter fan to main stack and to coal mill also. The pre-heater fan is equipped with hydrodynamic coupling as variable speed device in order to save power energy. Kiln vent gas is used during compound operation (raw mill on) for the drying of raw material in raw mill. Depending on required drying of raw material in mill, the hot gas flow to mill is controlled; the rest are bypassed at mill.

59 During direct operation (raw mill off), all kiln gases are transported via mill bypass direct to main bag filter and stack. Cooling of the kiln gas in a dedicated air conditioning tower is done in that case down to approx. 150°C— so as to use not very expensive filter bags.

60 Emergency fresh air intake before main filter is installed to cool down the pre-heater exhaust gas during direct operation and up-set conditions. The main filter is of jet-pulse design with the possibility of on-line maintenance. The main filter exhaust fan, which is ducted to a steel stack of enough height, emits gases to atmosphere. It is equipped with variable speed device in order to save power energy. The main stack is supported to the pre-heater structure.

61 The kiln dusts collected in the kiln bag filter are transported by a series of drag chain conveyors to a common drag chain conveyor. The kiln dusts, coming from air conditioning tower after the pre-heater fan, where the hot gas are cooled down by water spraying, collected by an open screw conveyor and discharged either to the dust transport of the kiln filter via a series of drag chain conveyors, or in case of temperatures problem in the air conditioning tower, the slurry is discharged to a second outlet of the screw conveyor and then to a truck or container. An electric slide gate will close the system to prevent incoming of false air during normal operation

1.5.2.5 Kiln Feeding System & Pre-heater Tower

62 Cement clinker is made by pyro-processing of kiln feed into the preheater-kiln system. The system consists of a multi-stage cyclone pre-heater, combustion chamber, riser duct, rotary kiln and grate cooler. Presented in **Figure 1-9** is the diagram for the cement clinker processing.

63 The pre-heater system consists of a string five stages pre-heater cyclones fitted with a pre-calciner fired with ground coal. The raw meal feeding pre-heater at the gas inlet of cyclone 1# inlet or cyclone 2# inlet are made via a bucket elevator, an air slide and rotary valve. Under each rotary valve, slide gates are installed in order to protect them against overheating. Material ducts between the pre-heater stages are equipped with pendulum flaps and splash box. The raw meal enters into the pre-calciner from stage 4. Tertiary air is fed into the sides of the pre-calciner. The pre-calciner ensures a complete combustion of the pulverized coal. The tertiary air comes from the kiln hood. The air quantity is adjusted by the damper installed in the TAD (Tertiary Air Duct). A staircase and a service/good lift for passengers and maintenance (handling of bricks and spare part) are included in the pre-heater structure.

64 A sufficient number of air blasters are provided to all the necessary air blasting points to avoid blockages and to provide nominal stable kiln system operation. The air blasters are fed from a dedicated air buffer tanks connected to the plan compressed air network and by a specific distribution system. A sufficient number of air blasters are provided to all the necessary air blasting points to avoid blockages and to provide nominal stable kiln system operation. The air blasters are fed from a dedicated air buffer tanks connected to the plan compressed air network and by a specific distribution system.

65 The kiln system consists mainly of inlet chamber, kiln pipe, kiln hood, sealing systems, kiln drive and supports. The rotary kiln size will be Φ4.8×72m with capacity of 6,000tons/day, designed for the solid fuel coal, fitted with variable speed girth gear and pinion drive. Kiln maintenance is done by mobile crane. The kiln shell surface in the area of sintering zone will be cooled by forced air ventilation system.

66 The main burner and pre-calciner burners are fed by pulverized coal continuously and without pulsations. The pulverized coal bins are equipped with one discharge outlet for each set of burners for the pre-heater and kiln. The ground pulverized coal is sent by weight feeders and roots blowers

systems to the burners. A kiln shell scanner is installed for kiln shell (full length) temperature monitoring.

1.5.2.6 Clinker Cooling

67 The grate cooler to be used has a capacity of 5,000tons/day. The clinker temperature from clinker cooler outlet is about +65°C above ambient temp. In order to crush big size clinker, there is a roll crusher at the cooler outlet and the crushed clinker particle size is less than 25mm. Cooled clinker is conveying to clinker silo by pan conveyor.

68 Part of the high temperature exhaust gas from the grate cooler is used as secondary air for kiln firing, part of them is dragged to AQC future, another part of them is used as combustion-supporting air in pre-calciner through tertiary air duct; the rest exhaust gas shall be led into the atmosphere after treating with heat-exchanger and bag filter. The dust emission is less than 30mg/Nm^3.Dust collected by bag filter is conveyed to clinker silo through chain conveyor together with clinker from cooler.

1.5.2.7 Clinker Transport and Storage

69 An inclined deep pan conveyor will be installed under the clinker cooler crusher discharge, for transporting of the clinker to the clinker silo. Two (2) units of clinker silo with 25,000 metric ton capacity each will be constructed

70 This deep pan conveyor will feed a distribution box, which feeds the cooled clinker to the clinker silo. Clinker silo will have extraction galleries underneath which will take the clinker with belt conveyors system to the cement mill. All transfer points at this area will still be properly de-dusted by enough bag filters.

1.5.2.8 Cement Additive Storage

71 Pozzolan and gypsum as cement additives are transported to the same storage yard of the raw additives via belt conveying system. The storage bins for the pozzolan and gypsum have capacities of 5,000 tons each. Materials shall be discharged in ratio and conveyed to cement grinding system by belt conveyor.

1.5.2.9 Cement Grinding

72 Two (2) units of ball mills with capacities of 250 tons/hr each will be installed as cement grinder system. Materials from cement proportion station with materials from V-type separator will be fed to the feeding weighing bin and discharged to the roller press. The materials will be pre-grinded by the roller press and transported to the V-type separator by means of bucket elevator. The gas extracted from the V-type separator will be fed to O-type separator and be separated. Coarse grain from O-type separator will be sent to the cement mill inlet. The gas flow exited the O-type separator will be de-dusted in a process bag filter. Part of gas coming out bag filter goes back by bag filter exhaust fan and another part goes into V-type separator and O-type separator. Material grinded in ball mill will be fed to O-type separator for separating through bucket elevator and air slide. Finished product will be sent into bag filter by air and be collected. Others shall be circulating back to ball mill for grinding.

1.5.2.10 Cement Transport & Storage

73 The cement from the cement mill will be extracted by an appropriate system and transported to the cement silo by means of bucket elevator and air slides. The cement silo will have a storage

capacity of 15,000 MT. The silos are equipped with an internal cone and a fluidization system at the bottom of silos to extract the cement. The fluidization system will be done by means of relative roots blowers.

74 Dispatching out of silos will be possible to existing packing plant according to flow sheets. Cement silo will have its own de-dusting system (top and bottom sections), and it's to proof will be equipped with a control pressure valve.

1.5.2.11 Cement Packaging and Bulk Storage

75 The product can be purchased either by bulk loading or by packed bags. The final product will be transferred into the packhouse for packaging and to two silos for bulk storage. Four (4) units of packing machines with capacity of 90 ton/hr each will be installed in the packhouse. The bagged cement will be transported to the truck loader by flat belt conveyor after passing the bag remover and bag cleaner. Two steel structure silos will be constructed for the bulk storage, each with a capacity of 1,500 tons. The silos will allow the product to be purchased and stored in bulk.

1.5.2.12 Coal Unloading and Conveying

76 Coal is stored in longitudinal coal storage unit with 50,000 tons capacity. The coal is stacked by means of a 300 tons/hr capacity stacker and reclaimed by a 100 tons/hr reclaimer.

1.5.2.13 Coal Grinding System

77 Coal from storage yard is transported to the raw coal feed bins via belt conveyor. Weigh feeders under the feed bins will extract the coals to the pulverizing system. Vertical roller mill with capacity of 40 tons/hr will be used to grind the raw coal. The product fineness for fine coal is less than or equal to 12%.

78 An auxiliary hot gas generator is used for the mill start up. Shut-off dampers on the hot gas ducts are provided in order to enable a safe maintenance of the mill while the kiln is in operation.

79 The qualified coal powder going out the mill with airflow is collected by anti-explosion dust collector and conveyed to the pulverized coal bins by screw conveyor. Considering the security, there will be explosion-proof housing valve, CO_2 fire-fighting system and water fire-fighting system.

1.5.2.14 Fly Ash Application and Bottom Ash Disposal

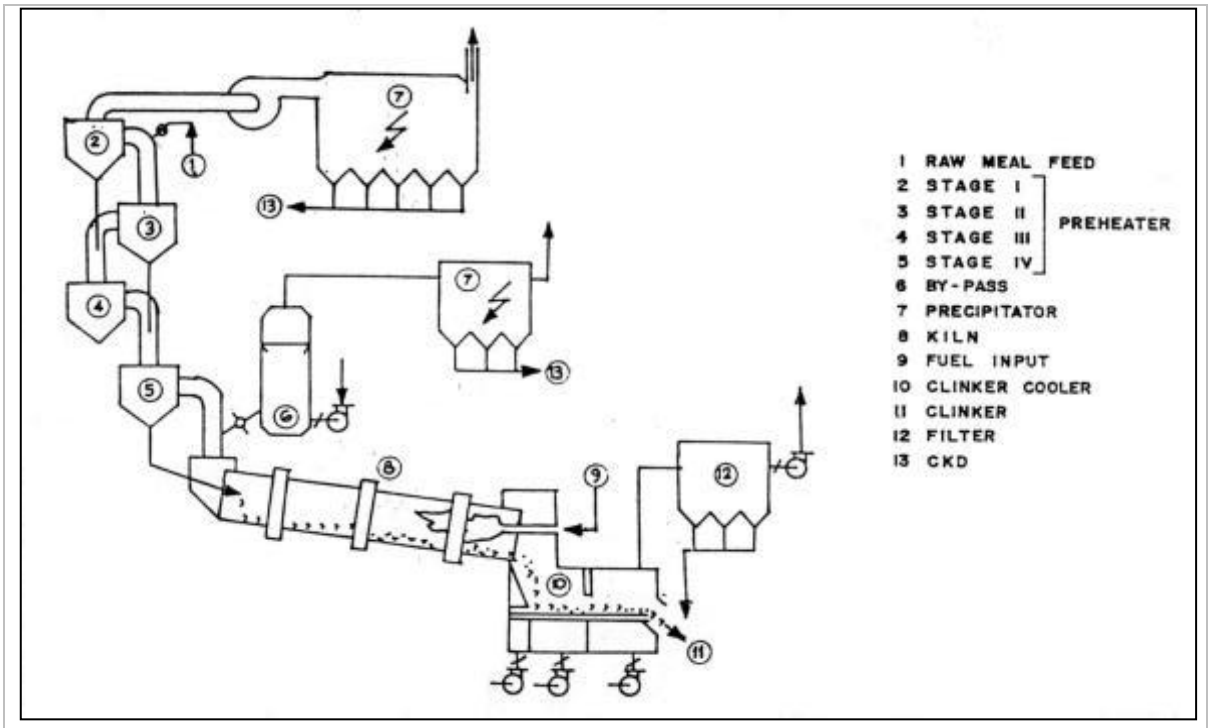
80 Fly ash that will be generated by the operation will be collected and recycled as substitute for clinker in the cement production. Fly ash addition will reduce clinker consumption per ton of cement and potential benefit of cement strength. Reduction of specific power consumption, potential capacity increase (fly ash feeding after mill) and subsequently reduction of production cost per bag is justification for fly ash addition. On the other hand, the bottom ash will also be collected and transported to the ash storage bins via trucks for disposal.

Figure 1-8: Process Diagram of Cement Production

PROJECT PROPONENT:	FIGURE TITLE:	FIGURE NO.:
South Western Cement Corporation	**PROCESS DIAGRAM OF CEMENT PRODUCTION**	**1-8**

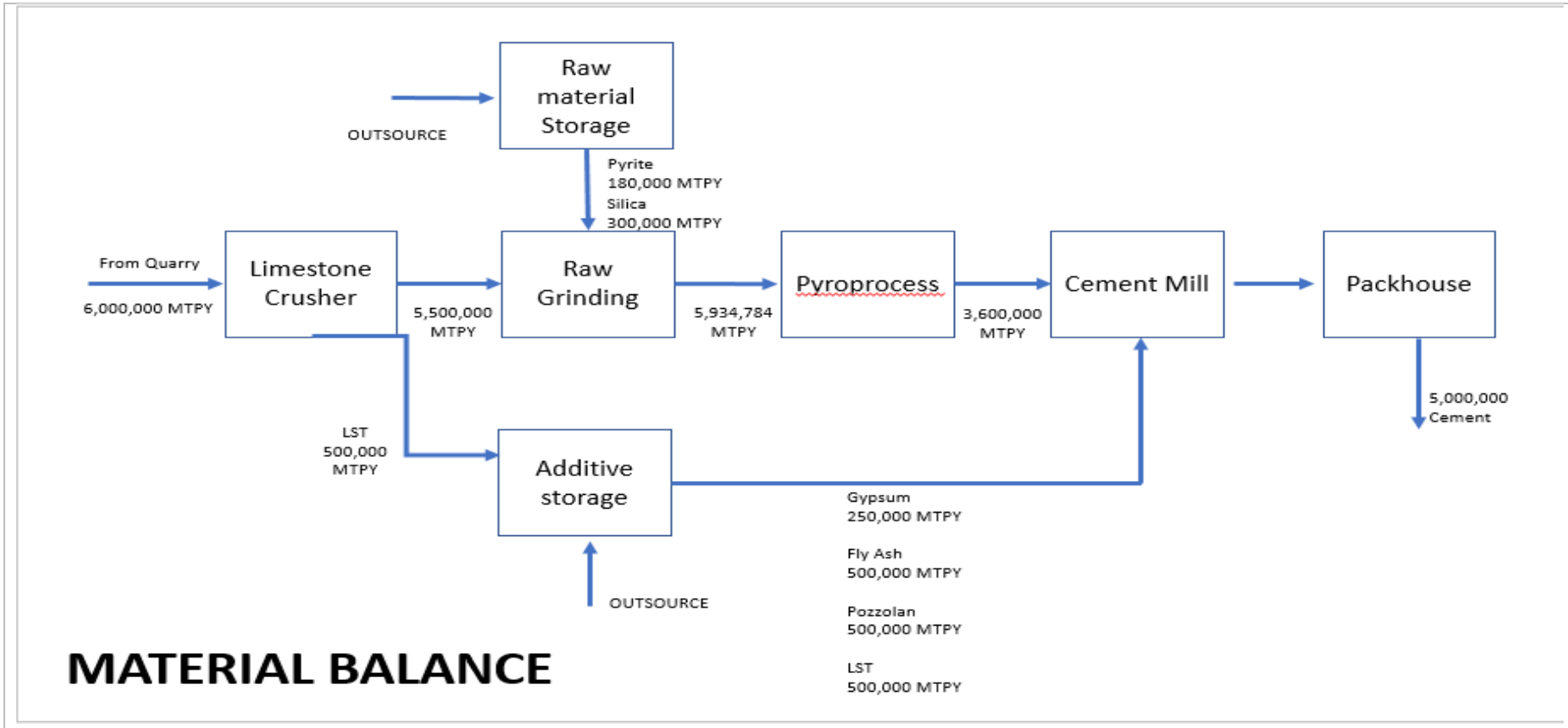
EIA REPORT PREPARER:	PROJECT TITLE & LOCATION:	SOURCE:
LCI ENVI CORPORATION	**SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	PROJECT PROPONENT

Figure 1-9: Normal Cement Kiln Co-Processing Diagram



PROJECT PROPONENT:	FIGURE TITLE:	FIGURE NO.:
South Western Cement Corporation	**NORMAL CEMENT KILN CO-PROCESSING DIAGRAM**	**1-9**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: PROJECT PROPONENT

Figure 1-10: Material Balance for SWCC Cement Plant



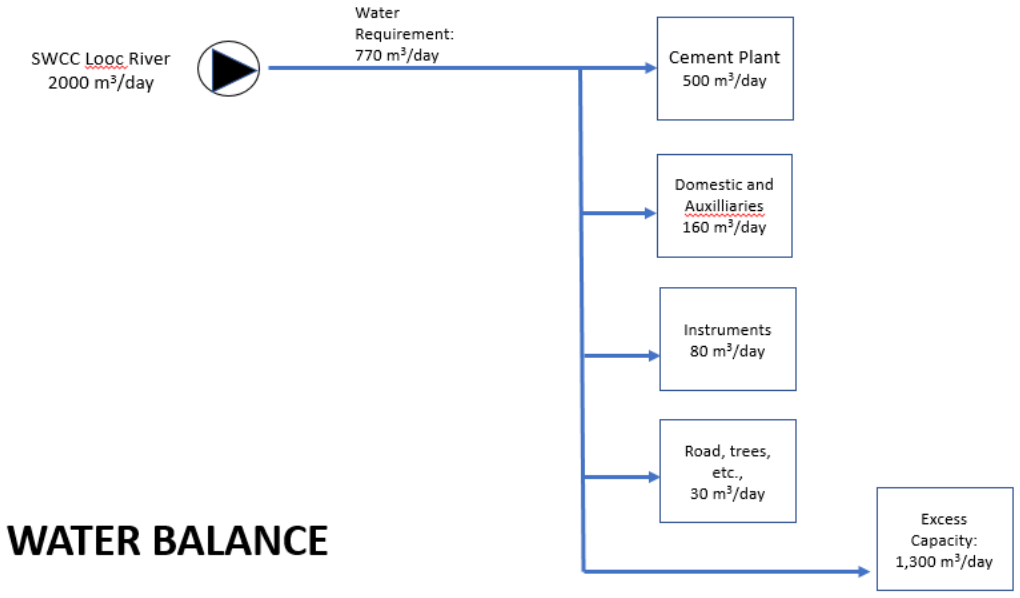
PROJECT PROPONENT: **South Western Cement Corporation**	FIGURE TITLE: **MATERIAL BALANCE FOR SWCC CEMENT PLANT**	FIGURE NO.: **1-10**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: PROJECT PROPONENT

1.6 Project Utilities

1.6.1 Water Supply and Demand

81 Water will be sourced from the nearest river in the project site. A water reservoir will be constructed for water storage. The proposed project is estimated to use 1,000 m^3/day of water. Since the cement plant employs a dry process, the water consumption during the operation will be limited for domestic use (**Figure 1-11**).

Figure 1-11: Daily Process Water Balance



PROJECT PROPONENT:	FIGURE TITLE:	FIGURE NO.:
South Western Cement Corporation	**DAILY PROCESS WATER BALANCE**	**1-11**
EIA REPORT PREPARER: LCI ENVI CORPORATION	PROJECT TITLE & LOCATION: **SWCC QUARRY OPERATION AND CEMENT PLANT PROJECT** Brgy. Looc, Malabuyoc, Cebu	SOURCE: PROJECT PROPONENT

1.6.2 Power Supply and Demand

82 The proposed project is expected to consume about 60 MW of electricity to operate the whole plant.

1.7 Project Size

1.7.1 Quarry Operation

83 The quarry of the project is estimated to have an area of ~60 hectares and is within the company's property with Mineral Production Sharing Agreement (MPSA) No. of 059-96-VII and 060-96-VII with aggregate areas of 306.46 and 505.7929 hectares, respectively, both located at Barangay Lo-oc, Malabuyoc, Cebu.

84 The primary mineral that will be extracted in the quarry area is limestone. The annual requirement of limestone for the operation of the cement plant is 6.0 MMTPY. The total amount of limestone reserve in the area is 318 million metric tons. With this, the estimated mine life is ~53 years.

1.7.2 Cement Production Capacity

85 The Proposed SWCC Cement Plant will have a rated capacity of 3,600,000 tons of clinker per year or a maximum of 5,000,000 tons of cement per year.

1.8 Development Plan, Description of Project Phases and Corresponding Timeframes

1.8.1 Pre-Construction

86 The pre-construction includes geotechnical investigation, feasibility study preparation, detailed engineering design and permitting. Site preparation and clearing will be done prior to the construction phase. Initial development of the area includes the enhancement of road networks for increased accessibility and easier transport of materials and supplies. This phase of the proposed project will also involve the acquisition of the necessary documents before actual construction, such as ECC (New or Amendment), Building Permits, and PTO Application.

1.8.2 Construction Phase

87 Immediately thereafter, the development of the area shall follow. This involves construction/installation of the cement plant facilities and other support facilities. The equipment to be used would be purchased and assembled on site. Proper occupational safety and health procedures would be implemented to ensure the welfare of the workers. Mine development planning will also be done during this phase.

88 The construction activities are estimated to start by 3rd Quarter of 2020 and will end by 2nd Quarter of 2022.

1.8.3 Operations

89 Major activity of the plant will involve 24/7 operation of the clinker & cement production. Skilled workers will be employed. The same strict observation of occupational health and safety during construction would be followed.

90 Operation of the quarry will also commence.

91 After construction, start-up and commissioning will happen on 2nd Quarter of 2022 and the commercial operation will start on 1st Quarter 2023.

1.8.4 Abandonment

92 According to past geological surveys, the proposed quarry area and its contingent areas have limestone reserves that could last to 53 years based on normal production capacities. However, abandonment of the quarry operation and the cement plant may be necessary, due to the following potential scenarios:

- Depletion of limestone reserves in the approved MPSA (most unlikely);
- Unsustainable business operations due to economic downturns;
- Changes in zoning and other related ordinances of the Municipality of Malabuyoc, Cebu;
- Transfer of operations to other sites;
- Accidents and emergencies, either natural or man-made, that resulted to severe facility damage and loss of human life; and
- Closure order from government agencies.

93 As such, if the abovementioned scenarios happen and result to the partial or total closure of the proposed Project, an Abandonment Plan (which will be submitted to the Mines and Geosciences Bureau as a Final Mine Rehabilitation/Decommissioning Plan) will be initiated by SWCC. If the cement plant operations shall cease, all plant equipment and machineries will be dis-assembled and hauled out and disposed of accordingly by the owners, as these are economic assets. All scrap materials will be re-used or sold to recyclers.

Table 1-7: Indicative Timeline of Activities

Activity/Milestone	2019				2020				2021				2022				2023			
1. Pre-feasibility study & ECC application																				
2. Detailed Engineering																				
3. Construction (Civil works)																				
4. Installation of equipment including pollution control devices																				
5. Start-up & Commissioning																				
6. Commercial Operation																				

1.9 Manpower

94 **Table 1-8** summarizes the manpower requirements throughout the development phases of the proposed project. SWCC will give priority hiring to locals whose skills and experience match the project's specific needs. The proponent will also provide the necessary training of locals for possible hiring as the need arises. Around 1,000-1,500 workers will be employed for the construction of all necessary project components and facilities. The proponent will then hire an estimate of 250-300 personnel, inclusive of engineers and skilled workers, that will operate the facility on a 24/7 operation.

Table 1-8: Manpower Requirement

Project Phase	Estimated Manpower Requirements	Tasks to Perform	Skill Requirement/s
Construction	1000-1500	• Civil works, architectural, and electro-mechanical works.	Engineers, project managers, skilled and non-skilled laborers
Operation	250-300	• Oversee the entire operations of the proposed Project, including emergency situations; Ensuring the safety and welfare of its personnel • Maintain conformity of the proposed Project to relevant government regulations, including tax payments, ECC compliance, etc. • Promote and uphold a harmonious relationship with the host community	Management and administration skills; over-all knowledge on the operation including key environmental, labor, and local ordinances
Abandonment	50	• Implement the abandonment plan	As required

1.10 Project Cost

95 Indicative cost for the proposed project is estimated to be **Php 7,000,000,000.00**. These will include the following:

- Detailed engineering studies and designs, including the feasibility study (FS) and acquisition of necessary government permits and licenses;
- Site preparation;
- Construction of project components and facilities;
- Procurement of necessary equipment and materials;
- Environmental management and protection, air pollution devices, and water treatment facilities; and
- Environmental monitoring activities.

PRELIMINARY IDENTIFICATION OF ENVIRONMENTAL IMPACTS

96 To address the potential environmental impacts of the proposed project, an environmental management plan will be prepared, presenting the proposed mitigation and/or enhancement measures that can be employed during the different phases of the project development. **Table 2-1** presents the preliminary environmental management plan.

Table 2-1: Preliminary Identified Environmental Aspects with corresponding Impacts and Prevention/Mitigation/Enhancement Measures

Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
PRE-CONSTRUCTION PHASE			
Institutional Arrangements	People	Convergence of different government and private agencies	▪ Regular meeting and or communications must be maintained to coordinate all activities and eventualities of the project.
Socio-economic	People	Employment opportunities	▪ Advance notice of hiring should be given to residents of host communities
Solid Waste	Land	Expected generation of construction debris and other solid wastes	▪ Identification of a designated dumping site. ▪ Formulation of an effective solid waste management plan
CONSTRUCTION			
Site grading and earth moving Civil Works	Water	Surface water pollution and deterioration from solid and liquid wastes that have lodged into the body of water and suspended particles as transported by surface runoff and/or wind.	▪ Provide embankment to stabilize slopes prior to earth moving activities ▪ Constant watering of soil pile or providing cover to the soil pile such as tarpaulin or equivalent.
Influx of workers	Water	Ground and surface water contamination from improper disposal of wastes, percolated wastewater, sludge and fecal matter.	▪ Provision of temporary sanitation facilities, e. g., toilet and bathing facilities at the construction site. ▪ Provision of solid waste storage facilities such as steel drums and plastic bags which must be disposed regularly at designated placed approved by LGU
Mobilization of construction equipment and materials	Air and Noise	Degradation of air quality	▪ Formulation and implementation of construction impact management plan ▪ Ambient air quality and noise level monitoring
Mobilization of construction equipment and materials	Air and Noise	Noise pollution coming from machines and equipment	▪ Maintain motor engine and other mechanically moving parts in its prime condition
Mobilization of construction equipment and materials	Air and Noise	Vibrations	▪ Conduct construction activities during normal working hours ▪ Machines should be placed on shock absorbing mountings ▪ Reduce working hours/days by proper scheduling of construction activities
Hiring of workers	People: Local Employment	Increase in local employment	▪ Prioritized hiring of qualified local residents; GAD sensitivity

Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
Increase in taxes and revenues	People: Local Economy	Improvement in local infrastructure and social services	▪ Diligent imbursement of taxes and revenues
Accidents	People: Public Safety	Possible occurrence of construction-related hazards	▪ Provision of environmental health and safety training prior to construction
OPERATIONS			
Accidental oil spill	Land/Water	Soil/water contamination	▪ Formulation and strict implementation of emergency management plan ▪ Soil quality monitoring
Cement Plant Operations	Water	Soil erosion caused by rainwater runoff in cement plant site and quarry site	▪ Operate and maintain sedimentation ponds to prevent particulates to be washed out by rainwater ▪ Maintain rainwater drainage systems and siltation ponds ▪ Constant and periodic monitoring of ground and surface water
Cement Processing	Air	Dust generation during cement processing Increased levels of TSP, SO_2, NO_x brought about by vehicle and equipment emissions	▪ Operate and maintain filter bags and separators in the equipment ▪ Proper maintenance should be done for the vehicles and equipment
Generation of domestic wastewater/ oily wastewater	Water	Degradation of groundwater quality	▪ Provision of oily wastewater treatment system ▪ Formulation and strict implementation of waste management plan ▪ Water quality monitoring
Influx of workers	People: Waste Management	Generation of sewage/solid waste	▪ Formulation and strict implementation of waste management plan
Influx of workers	People: Population	Change in population size and distribution	▪ Prioritized hiring of qualified local residents ▪ Coordination with the local public employment service office
Influx of workers	People: Social Services	Overburdening of public social services	▪ Prioritized hiring of qualified local residents
Influx of workers	People: Health	Introduction of disease between migrant and local workers	▪ Medical certificate as part of employment requirements ▪ Formulation and implementation of safety and health program ▪ Provision of health and sanitation facilities within the plant site ▪ Monitoring of occurrence of unusual health problems that may be associated with the project
Influx of workers	People: Public Safety	Fire hazard	▪ Provision of fire protection system

Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
ABANDONMENT			
Decommissioning	Land	Soil contamination	▪ Formulation and strict implementation of Abandonment Plan with emphasis on control of sedimentation and prevention of soil contamination
	Land	Increase in biodiversity due to rehabilitation activities	▪ Positive impact; No mitigation required
Disposal of wastes	Land	Possible occurrence of spills and contamination	▪ Formulation and implementation of waste management plan
Demolition and abandonment activities	Air	Generation of dust and noise	▪ Watering during dismantling activities to minimize dust generation ▪ Proper vehicle maintenance ▪ Limiting noise-generating activities during daytime ▪ Ambient air quality and noise level monitoring
Decommissioning activities	People	Possible local disturbance or damage through increased road traffic, noise, etc.	▪ Formulation and implementation of decommissioning impact management plan
Hiring of workers for demolition and abandonment activities	People	Increase in local employment during abandonment; Development of new skills	▪ Prioritized hiring of qualified local residents
Loss of jobs/employment	People	Reduction in service opportunities for local contractors with established contracts with the project (e.g., maintenance service providers, site transport services, etc.)	▪ Formulation and implementation of Abandonment Plan ▪ Effective human resources management through consultative planning and communication
	People	Out-migration of affected project staff to seek job opportunities elsewhere	