ENVIRONMENTAL PERFORMANCE REPORT AND MANAGEMENT PLAN (EPRMP)

MABUHAY CEMENT PROCESSING PLANT EXPANSION

BRGY. SOUTH POBLACION, SAN FERNANDO, CEBU ECC REF. NO. 0809-026-2620

PREPARED FOR



PREPARED BY

HYDRONET CONSULTANTS INC.

AUGUST 2019



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ES1. PROJECT FACT SHEET

The tables below show the Basic Project Background and Information, Project Components and Area Distribution for the Mabuhay Cement Processing Plant Expansion.

Project Name	Mabuhay Cement Processing Plant Project
Project Location	Brgy. South Poblacion, Municipality of San Fernando, Cebu
Nature of Project	Cement Processing Plant
Proponent's Name	Mabuhay Filcement Incorporated
Office Address	Doňa Emilia Benedicto Building, No. 7 E. Benedicto St., Cebu City
Authorized Signatory	Enrison L. Benedicto Chief Executive Officer
Landline	(032) 255 3201, (032) 255 8200
email	enrison@mfcement.com, lito.palacio1@gmail.com inotlysa04@gmail.com, frenzyalfeche@gmail.com
EIS Preparers	Hydronet Consultants, Inc.
Address	DOST Compound, Gov. Cuenco Ave., Apas, Cebu City, Cebu, Philippines 6000
Contact Details	(032) 416 2510, (+63) 917 324 6428 c/o Joan Jaque

With the *"Build, Build, Build"* pronouncement of the President the demand for cement has been growing exponentially. Last April 10, 2019, the Philippine News Agency reported that the cement shortage seen to delay new construction projects. It was said current shortage of cement is likely to hold back the construction of new buildings particularly in Metro Manila. In addition, data from the Trade Department shows that cement imports increased from only 3,558 metric tons in 2013 to more than 3 million tons in 2017.

In response to this situation, Mabuhay Filcement Inc., an all-Filipino corporation, aimed at increasing their production capacity. Hence, there is a need to expand the plant's operation by improving their equipment and upgrading their facilities to accommodate the projected additional workload. As such, the plant's improvement is envisioned to carry on the promotion of countryside development by providing employment and livelihood opportunities to the locals and at same time generate revenue both for the local and national government. The operation of the cement processing plant will continually be solely Filipino with a competitive state-of-the-art technology that would bring about sustainable development.

This document is for the purpose of amending the approved Environmental Compliance Certificate docketed as ECC-CO-0809-026-2620 issued to Mabuhay FilCement Inc on February 19, 2009.

Amendment is due to the change in plant production capacity and additional equipment and facilities with the following matrix showing the former and new project components and modification.

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Component Previous with ECC		Proposed Expansion
AREA	55,491 sq.m. Density = 27.88%	No change = 55,491 sq.m. Density = 56.87%
LOCATION	Brgy. South Poblacion, San Fernando, Cebu Province	Same location
PRODUCTION Facilities	6,958 sq.m. Coal Stacker / Storage Limestone Stacker / Storage Limestone Crusher Raw Mill, Raw Mill Silo (2) Electrostatic Precipitator Pre-heater Tower Rotary Kiln AQC-Kiln Hood & Grate Cooler Unburn Clinker Silo Clinker Stacker / Storage Cement Silo 1 Packhouse 1 & 2 Finish Mill 1 & 2	14,000 sq.m. Same as previous, plus the following additional facilities: Pozzolan Storage, Gypsum Storage Clay Storage Copper Slug Storage Silica Storage Spray Tower Coal Mill, Coal Tube Mill Finish Mill Clinker and Additive Bin Finish Mill 3, 4, 5 Cement Silo 2, 3, 4, 5 Packhouse 3, 4, 5 Tonner Bag Storage
SUPPORT Facilities	8,380 sq.m. Electric Power Substations Machine Shop Building & Warehouse Waste Water Treatment Facility Solid Waste / MRF Canteen (2) Water Pump Parking Area Administrative Building Staff House	 17,559 sq.m. Same as previous, plus the following additional facilities: Water Reservoir 1, 2 CCR Building / QA Building Cement Bag Storage (6) Rainwater Catchment Tank (3) Truck Scale, Diesel Tank Area Main Station Building, CCR Room Switch Yard/Main Power Station, VECO Metering Station Motor Pool Area, MCC & Power Substation Satellite Nursery Air Compressor House Road Network, Drainage Systems Green Belt Area, Compost Area (6) Comfort Rooms with Septic Tanks Water Recycling Tank, Hazardous Waste Facility
PROCESS	Dry Process	Dry Process
	500,000 MTPY Clinker	1,200,000 MTPY Clinker
PRODUCTION	Include milling and	d crushing activities
RATE/CAPACITY	30,000 bags of cement per day (525,600 MTPY)	120,000 bags of cement per day (2,600,000 MTPY)
	PLANT DESCRIPTION	N
AREA DISTRIBUTION	Production Facilities (Main Component)	6,958 sq.m. (12.65%)
	Support Facilities	8,380 sq.m. (15.24%)
	Additional Production Facilities	7,042 sq.m. (12.8%)
	Additional Support Facilities	9,179 sq.m. (16.69%)
	Open Space	23,932 sq.m. (42.62%)
	TOTAL AREA	55,491 sq.m. (100%)

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CEMENT MILL INCREASE IN



CRUSHER **RAW MILL**

> PRODUCTION CAPACITY FROM 500,000 MTPY TO 1,200,000 MTPY



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LEGEND

COMPONENTS STIPULATED IN THE ECC				EXPANSION COMPONENTS			
	DESCRIPTION	AREA (sq.m.)		AREA (sq.m.)			
1	Coal Stacker / Storage	772.73	26	Pozzolan Storage	625.94		
2	Limestone Stacker /Storage	874.79	27	Gypsum Storage	752.8		
3	Limestone Crusher	777	28	Clay Storage	331.21		
4	Raw Mill	392.76	29	Copper Slug Storage	282.21		
5	Ray Meal Silo	260	30	Silica Storage	60		
6	Electrostatic Precipitator – Raw Mill	337.11	31	Diesel Tank Area	30		
7	Electrostatic Precipitator - AQC	245.32	32	Coal Mill	178.3		
8	Pre-heater Tower	200	33	Coal Tube Mill	75.8		
9	Rotary Kiln	681.03	34	Clinker & Additive Silo	187.82		
10	AQC-Kiln Hood & Grate Cooler	191.63	35	Finish Mill 3	800		
11	Unburn Clinker Silo	134	36	Finish Mill 4	800		
12	Clinker Stacker / Storage	207	37	Cement Silo 2	215		
13	Cement Silo 1	2015	38	Cement Silo 3	150		
14	Packhouse 1 & 2	306	39	Cement Silo 4	150		
15	Finish Mill 1 & 2	452	40	Packhouse 3	140		
16	Electric Power Substation	530	41	Packhouse 4	170		
17	Machine Shop & Warehouse	2100	42	Water Reservoir 1	288		
18	Materials Recovery Facility	208.61	43	Water Reservoir 2	47		
19	Canteen	233.74	44	CCR Building / QA Building	240		
20	Deep Well	8	45	Air Compressor House	86.6		
21	Parking Area	4000	46	Main Station Building	120		
22	Administrative Building	550	47	Switch Yard / Main Power Station	200		
23	Staff House	150	48	Veco Metering Station	240		
24	Wastewater Treatment Facility	47.46	49	Motor Pool	624		
25	(6) Comfort Rooms with Septic Tank	20	50	CCR Room	44.68		
			51	Compost Area	30		
			52	Satellite Nursery	184.28		
			53	Green Belt Area			
			54	(3) Truckscale	109		
			55	(6) Rainwater Catchment Tank	6		

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COMPONENTS STIPULATED IN THE ECC			EXPANSION COMPONENTS				
DESCRIPTION AREA (sq.m.)			DESCRIPTION	AREA (sq.m.)			
		56	Drainage System				
		57	Green Belt Area				
		58	Finish Mill 5	1000			
		59	Cement Silo 5	150			
		60	Packhouse 5	170			
		61	Tonner Bag Storage	200			
		62	Water Recycling Tank	6			
		63	Hazardous Waste Facility	20			





Environmental Performance Report and Monitoring Plan

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Figure 2: Cement Manufacturing Process Flow Chart with Pollution Control Devices in every stage

Environmental Performance Report and Monitoring Plan

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ES2. PROCESS DOCUMENTATION

The general approach in the conduct of an Environmental Performance Report and Monitoring Plan (EPRMP) follows the standard procedure as process, i.e., scoping, data collection, analysis, impact identification, development of management plans and recommendations. Presentation of the results and the preparation of report follows closely the annotated outline of the EIA for the preparation of the EPRMP.

The EIA study was structured such as to cover the requirements under DAO 2017-15 and related environmental laws and regulations such as RA 9003 "Ecological Solid Waste Management Act of 2000", RA 6969 "An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, RA 8789 "Philippine Clean Air Act of 1999", RA 9275 "Philippine Clean Water Act of 2004" providing penalties for violations thereof, and for other purposes".

EIA Process

The EIA steps conducted during this assessment are as follows:

Project Review and Desk Study. A review of the proposed project with particular interest on technology, construction methodology was done with consideration to environmental aspect. Issues concerning the technology were scope out and measures for mitigation were also gathered.

Scoping. During this initial stage, the Consultant evaluated the proposed project and project components and reviewed the guidelines of DENR DAO 2017-15. Public participation with Project Stakeholders was implemented through IEC activities and Public Scoping. Issues, concerns raised by the community representative and their recommendations were gathered and incorporated into the project review.

Gathering of Baseline Data. Primary and secondary data were gathered and observation were made on the baseline condition of the project site through site investigation, documentation, review, and laboratory tests. The following conditions of the area were established; Land, Water, Air and Socio-Economic.

Reporting. Specific issues covered in the project report include a) design and technology, b) project activities, c) materials and its sources, d) potential impact and its measures, e) socioeconomic impact and enhancement measures, f) environmental management plan and monitoring.

The environmental impact assessment was conducted by Hydronet Consultants Inc., a Cebu-based consultancy firm with more than twenty (20) years experience in conducting environmental impact assessment in Visayas and Mindanao.

EIA Public Participation Design

To ensure public participation in the process of applying for the ECC amendment for Mabuhay FilCement Inc., IEC and Public Scoping Activities were conducted to primarily inform the key stakeholders on the proposed additional production capacity of the plant. These activities were also done in order to hear from the



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stakeholders themselves their issues, concerns, suggestions and recommendation in relation to the operation of the plant in their community. These activities gave the proponent opportunities to hear and be able to relate with the community in matters related to the cement plant's positive and negative impacts to the community and be able to find solutions to the presented and identified problems. This dynamic and democratic practice helps in creating a harmonious relationship between the community and the plant where both parties can express their concerns and find common solutions that will benefit both. These public participation activities including the Public Hearing will contribute in improving the plant operation in a way that it will share its benefits to the people, the community and at the same time not causing adverse impact on the environment.

The following are the public participation activities that were conducted in the conduct of the whole EIA process:

- Posting of basic information about the proposed project in the Barangay Hall;
- Presentation of the project basic information to the Barangay Council as requested;
- Conduct of IEC and initial perception survey with key stakeholders;
- Conduct of Public Scoping
- Use of Suggestion/Comment/Concern Drop Box

 centralized collection point of suggestions in barangay hall of South Poblacion; flyers were given to sitio representatives to distribute with their constituents and then concerns were collected or deposited into suggestion drop box. The suggestion box will stay permanently in the Barangay Hall.
 Flyers containing the project and proponent information were also distributed to enable residents to directly contact Mabuhay FilCement Inc. for their concerns; and,

- Presentation of Environmental Impact Study Report prior to submission to EMB-DENR for comments particularly on the proposed mitigation measures;
- Strengthening of the Multi-partite Monitoring Team after the ECC amendment is issued.

Methods of Analysis of Issues Raised

All issues that were raised were collected at face value as presented by the community without prejudice. These were put on the table and were assessed and addressed objectively using qualitative and quantitative facts. For issues that can be addressed by the proponent, Mabuhay FilCement together with its technical advisers and consultants crafted the needed measures to address the issue as approved by the management. These measures was president initially during the Public Consultation and will be presented to the public during the Public Hearing. This will be their basis for monitoring its compliance and build public trust.

Meanwhile, for issues beyond the control or outside the jurisdiction of Mabuhay FilCement, it was documented and will be forwarded to the concerned parties, offices or agencies through the LGU and the barangay for appropriate action.

Issues and Concerns Raised During the Public Consustation and IEC Activity:

- Since the Zoning for Brgy. South Poblacion is Industrial III, is it possible that another cement plant be placed in the area? Two Cements Plants are more than enough.
- In relation to dust emission, the people are not sure which cement plant is producing the dust. When Taiheiyo is asked, they point to Mabuhay and vise versa. "Unfortunately, the dust has no label"
- Issued ECCs have a set of conditions. For every condition not complied with, how much is the penalty? Also, can we request a copy of the ECC so that we can monitor for any violation?
- What assurance can we get from the report of Mabuhay FilCement Inc.. that the information they are

disseminating is accurate and true?

- Can we also have a copy of the minutes of the meeting of the MMT?
- The mentioned penalties for the non-compliance of each condition seems too cheap for Mabuhay FilCement Inc.. Has the company paid any penalties so far? And how does the monitoring agency quantify the violation of the company in terms of, not only for the land, water and air, but for the people's health aspect?
- "Dust is causing us sickness such as coughs and also damaged our plants specifically our malunggay plant, we could no longer cook our horse raddish (malunggay) since it is covered with dust coming from cement plants"
- After the ECC is granted to the company, what other hold does the LGU have with respect to our say in the project, other than to raise our complaints and concerns to DENR EMB and other agencies?
- With regards to traffic management, Mabuhay FilCement Inc. does not provide or properly designate security guards to safely guide the ingress and egress of delivery trucks to signal incoming motorists on the highway. Also, delivery trucks have been parking along this road which we have prohibited.
- It was mentioned that the cement bag production per day would increase from 30,000 bags to 120,000 bags. This is four times the current amount. I have visited the plant of Taiheiyo and at their plant's expansion, the equipment and machines have become bigger and a whole lot noisier.
- What are the requirements for ECC? Why is it that even without the Mayor's Permit, the proponent can already acquire an ECC?

These issues and queries raised during were responded to during the public consultation. (See Chapter 5, Table 5.10)

EIA PREPARERS	
Dr. Danilo T. Jaque	Water and Environment Engineering, Civil Engineering
Mrs. Joan A. Jaque	Human Settlement/ Development Planning and Social Work
Engr. Danielle Anne A. Jaque	Civil Engineer/ Research Assistant
Engr. Joselito Palacio	Mechanical Engineering / EHS Manager / Technical Adviser
Engr. Rainier Estrada	Cement Plant Operation / Plant Manager / Technical Adviser
Engr. Lysa Inot	Chemical Engineering / Pollution Control Officer / Study Team Member
Engr. Frenzy Alfeche	Chemical Engineering / Research Associate / Study Team Member

EIA TEAM

EIA STUDY SCHEDULE

The conduct of EIA study covers baseline data collection, review of the project development, impact assessment and preparation of EIA report. Below is the detailed chronological activity with project timeline and schedule.

N	Activities	4Q 2017	1Q 2018	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019	4Q 2019	1Q 2020
1	Project Discussion										
2	Analysis of expansion components										



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N	Activities	4Q 2017	1Q 2018	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019	4Q 2019	1Q 2020
3	Project site inspection										
4	Site assessment										
5	Conduct of IEC										
6	Submission of IEC Documentation										
7	Conduct of Public Scoping with EMB										
8	Preparation of Public Scoping Report										
9	Technical Scoping										
10	Primary data collection										
11	Secondary data collection										
12	Preparation of EPRMP										
13	1 st Submission of EPRMP										
14	1 st Screening Checklist										
15	Revisions /Additional Information										
16	2 nd Submission and Screening										
17	Payment and Scheduling of RevCom review										
18	1st Review by Review Committee and Scheduling of Public Hearing										
19	Revisions /Additional Information										
20	3 rd Submission and Screening										
21	2 nd Review by Review Committee and Scheduling of Public Hearing										
22	Public Posting in preparation to Public Hearing										
23	Presentation of EPRMP to proponent, stakeholders, EMB (Public Hearing)										
24	Preparation of Public Hearing Documentation /EPRMP										
25	2 nd Review by Review Committee and ECC Drafting										
26	Revision and final packaging										
27	Finalize Comments from Review Committee										
28	Submission of EPRMP to EMB										
29	Final Review and Endorsement by Review Committee										
30	Endorsement by EMB Director										
31	Clearance from DENR Secretary										
32	ECC Release										

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<u>STUDY AREA</u>

The study area is located at the existing plant site at Brgy. South Poblacion, Municipality of San Fernando, Cebu. The project impact is within 1~3 kilometer radius. While the whole of the municipality of San Fernando is considered as indirect impact area.



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ES3. EIA SUMMARY

Previous to the operation of the Mabuhay Cement Processing Plant, the area has existing structures since it was previously utilized by two industrial plants; first was by Goodfound Engineering and Construction Corp. from 1999-2004, followed by Grand Steel Inc. (GSI) as a smelting plant and rolling mill from 2004-2008, which has never been commissioned until the assumption of Mabuhay FilCement Inc., the plant site was non-operational in 2009.



Philippines cement demand likely to grow

Source: CEMEX estimates

CEMEXDAY 2017 10

Since 2009, the demand for cement continued to increase. With the increasing demand for cement as discussed previously, it is only logical for MFI to increase its production capacity and to maximize the potential of their plant. This will be done by improving its equipment, facilities and the technology needed for cleaner cost-effective production. In addition, the plant would need to revive the clinker manufacturing component using its very own raw materials.

In the efforts to continuously provide for the growing demand of cement, Mabuhay was issued a Notice of Violation. According to the report, on July – December 2017, the cement processing plant was found to have exceeded the allowable production capacity. This penalty raised the concern of the company to move to amend the existing ECC.

Aside from continuing the operation of the plant within the industrial zone of San Fernando, there is no foreseen project alternative best suited for area at this point.

In relation to the conduct of this Environmental Impact Assessment, below are the studies conducted for the proposed expansion as to its feasibility according to its environmental impacts:

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CONDUCTED STUDIES/ TEST	
Marine Ecosystem Survey Report	L. Manguilimotan, Marine Biologist (Marine Ecosystem Expert) E. Ruizo, Marine Biologist (Coral Reef Ecosystem Expert) J. Villamor, Marine Biologist (Mangrove Ecosystem Expert) D. Licayan, Marine Biologist (Mangrove Ecosystem Expert)
Water Quality	Ostrea Mineral Laboratory, Inc. F.A.S.T. Laboratories-Cebu Talisay Water Lab University of San Carlos – Water Laboratory
Ambient Air	Ostrea Mineral Laboratory, Inc. F.A.S.T. Laboratories Environair Asia
Ambient Noise Quality	Mabuhay FilCement Inc.
Air Dispersion Model Report	Engr. Nazario Sabello
Air Dispersion Model Report EIA Method	Engr. Nazario Sabello In accordance to the procedures directed by the DENR Administrative Order 2017-15
Air Dispersion Model Report EIA Method Scope of Study	Engr. Nazario Sabello In accordance to the procedures directed by the DENR Administrative Order 2017-15 Based on the conducted Technical Scoping with the Review Committee Members and 1 st Review Committee Meeting (See attached Scoping and Procedural Scoping Checklist)
Air Dispersion Model Report EIA Method Scope of Study Study Period	Engr. Nazario Sabello In accordance to the procedures directed by the DENR Administrative Order 2017-15 Based on the conducted Technical Scoping with the Review Committee Members and 1 st Review Committee Meeting (See attached Scoping and Procedural Scoping Checklist) October 2017 – May 2019
Air Dispersion Model Report EIA Method Scope of Study Study Period Study Area	Engr. Nazario Sabello In accordance to the procedures directed by the DENR Administrative Order 2017-15 Based on the conducted Technical Scoping with the Review Committee Members and 1 st Review Committee Meeting (See attached Scoping and Procedural Scoping Checklist) October 2017 – May 2019 Brgy. South Poblacion, San Fernando, Cebu
Air Dispersion Model Report EIA Method Scope of Study Study Period Study Area Date of Technical Scoping	Engr. Nazario Sabello In accordance to the procedures directed by the DENR Administrative Order 2017-15 Based on the conducted Technical Scoping with the Review Committee Members and 1 st Review Committee Meeting (See attached Scoping and Procedural Scoping Checklist) October 2017 – May 2019 Brgy. South Poblacion, San Fernando, Cebu April 16, 2018, Tuesday

Key Impacts and Environmental Measures

Key Impacts	npacts Key Environmental Measures							
Noise generation	Enclosure/Proper fencing and buffering of property from outsidersUtilization of noise-reducing technology							
Wastewater generation	 Use of close-loop system, recycling of water Application of recycling scheme and conservation methods Installation of septic tanks for domestic wastewater Monitoring through SMRs and CMR submissions 							
Solid Waste Generation	 Implementation of integrated solid waste management Application of 3Rs (reduce, reuse and recycle) Management of hazardous wastes in partnership with third party treaters Proper solid waste disposal in coordination with the Local Government Unit Regular monitoring of activities 							
Ambient Air Pollution	 Regular monitoring / conduct of emission test regularly at least quarterly Regular and proper maintenance and monitoring of equipment Installation of CEMs and other air pollution control devices 							

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Key Impacts
People (Health and Safety)

Adverse Findings and Non-compliance

During the operation of the cement processing plant, violations were made and penalties were incurred. Notices were released on March 8 and July 31, 2018, for three different violations. These were:

- Violation of R.A. 6969, Non-submission of CMRs. However, the notice for non-submission of CMRs was withdrawn since EIAMD reports showed compliance as of March 22, 2018.
- No designated HazWaste Shed March 22, 2018
- Exceedances of annual production rate (July December 2017).

In line with this violation, MFI constructed its HazWaste Facility. Submission CMRs are currently being monitored and submitted on time (see annex D1) and this ECC amendment application is being applied to acquire permit for the increase the production capacity.

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Environmental Performance Rating

N	Key Aspects	Remarks	Performance Rating (1 - 5)
1	Cement Plant Operation	4.0	
2	Contingency Program (safety, health and emergency response)	5.0	
3	Information, Education and Communication (IEC) Drive	- Complaints Management and Information Dissemination	3.5
4	Environmental Aspect: Ambient Air	 No clinkering activity since June 2016 Has emission exemption certificate from EMB (stack) Regular tree planting activities Regular dust mitigation activities 	4.0
5	Environmental Aspect: Ambient Noise	4.5	
6	Environmental Aspect: Water	 Had a discharge exemption (below 5 cu.m. discharge); currently applying for a discharge permit Clean-up drive for Sabang River / Adopt-A-River Program participation Practicing Recycling / Water Conservation 	4.5
7	Environmental Aspect: Land	 Waste Management (segregation, composting) Implementation of recycling in coordination with NGOs and LGU / Materials Recovery Facility Regular housekeeping 	4.5
8	Environmental Aspect: Hazardous Wastes	- Regular collection and treatment of hazardous waste - Late construction of Hazardous Waste Facility	4.0
9	Environmental Aspect: People	- Active SDP programs - Support NGO Programs - Local employment opportunities	4.5
10	Transportation Management	 Local complaints on parking along highway despite provision of parking lots within plant site rules Abiding to truck ban Compliance to General Hauler Policies 	4.0
11	Formation of MRFC & MMT, Establishment of CLRF & EGF	-Currently requesting assistance from MGB & EMB on the reconstitution and re-establishment of MMT	4.0
12	Monitoring Reports / MMT	3.5	
		AVERAGE RATING	4.1

Note: 1 – Low Rating, 5 – High Rating

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ACRONYMS

3R Program	Reduce, Reuse, Recycle Program
CPR	Cardio-Pulmonary Resuscitation
CSR	Community/Corporate Social Responsibility
DAO	Department Administrative Order
dBA	Decibels
DENR	Department of Natural Resources
DENR-EMB	Department of Natural Resources Environmental Management Bureau
DOLE	Department of Labor and Employment
DPS	Department of Public Services
ECC	Environmental Compliance Certificate
EGF	Environmental Guarantee Fund
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EMF	Environmental Monitoring Fund
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EMT	Environmental Monitoring Team
EQPL	Environmental Quality Performance Levels
ERA	Environmental Risk Assessment
ERP	Emergency Response Policy
HSC	Health and Safety Committee
IEC	Information Education Communication
IPP	Independent Power Producer
LGU	Local Government Unit
MFI	Mabuhay FilCement Inc.
MMT	Multi-partite Monitoring Team
MRF	Materials Recovery Facility
NOX	Nitrogen Oxides
N02	Nitrogen Dioxide
OHS	Occupational Health and Safety
OHSAS	Occupational Health and Safety Advisory Services
0&M	Operation & Maintenance
PAGASA	Philippine Atmosphere Geophysical and Astronomical Services

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Administration

PCO	Pollution Control Officer
PD	Presidential Decree
PEMAPS	Procedural Environmental Monitoring and Audit Prioritization Scheme
PPE	Personal Protective Equipment
PWD	Persons With Disability
RA	Republic Act
SDP	Social Development Plan
SPCO	Safety and Pollution Officer
SOX	Sulfur Oxide
SO ₂	Sulfur Dioxide
TSD	Treatment/Storage/Disposal
TOR	Terms of Reference

ENVIRONMENTAL PERFORMANCE REPORT AND MONITORING PLAN (EPRMP)

FOR THE PROPOSED MABUHAY CEMENT PROCESSING PLANT EXPANSION

PREPARED FOR



JULY 2019



Mabuhay Cement Processing Plant Expansion • Mabuhay FilCement Inc.

1.0 PROJECT DESCRIPTION

Basic project background and information is shown in the table below. Other pertinent information are described in the subsequent sections.

Table 1.1: Basic Project Background and Information		
Project Name	Mabuhay Cement Processing Plant Project	
Project Location	Brgy. South Poblacion, Municipality of San Fernando, Cebu	
Nature of Project	Cement Processing Plant	
Proponent's Name	Mabuhay Filcement Incorporated	
Office Address	Doňa Emilia Benedicto Building, No. 7 E. Benedicto St., Cebu City	
Authorized Signatory	Enrison L. Benedicto Chief Executive Officer	
Landline	(032) 255 3201, (032) 255 8200	
Email	enrison@mfcement.com, lito.palacio1@gmail.com inotlysa04@gmail.com, frenzyalfeche@gmail.com	
EIS Preparers	Hydronet Consultants, Inc.	

1.1 **Project Location and Area**

The project site is within the political jurisdiction of Barangay South Poblacion, San Fernando province of Cebu. It is located along the National Highway going to Cebu South. The area is classified as Special Industrial Zone or Industrial Zone III by the Sangguninag Bayan of the municipality. The existing plant is approximately within geographical coordinates: 10° 9'42.59"N North latitude and 123°42'16.54"E East longitude. The area is approximately 350 aerial meters going south from San Fernando Municipal Hall along the Natalio B. Bacalso S National Highway. The proposed expansion project will be established within the same existing project location, Lot 3, Psu007-01-000057, containing an area of approximately 5.5 hectares The site location map is shown in the figure below.

LANDMARK	DISTANCE
San Isidro Labrador Church	340 m
San Fernando Municipal Hall	350 m
Taiheiyo Cement Philippines, Inc.	390 m
Taiheiyo Cement Philippines Port	650 m


Map 1.1: Location Map of Existing Mabuhay Cement Processing Plant

Environmental Performance Report and Monitoring Plan

Mabuhay Cement Processing Plant Expansion • Mabuhay FilCement Inc.

Mabuhay Cement Processing Plant Expansion • Mabuhay FilCement Inc.

CORNER	LATITUDE	LONGITUDE
1	N 10°09'53.211"	E 123°42'13.723"
2	N 10°09'45.326"	E 123°42'16.854"
3	N 10°09'39.368"	E 123°42'13.123"
4	N 10°09'49.724"	E 123°42'09.256"
	Table 1.3: Project Area Carrying Cap	acity
	Area	% of Area

Table 1.2: Geographical Coordinates of Property Perimeter

	Area	% of Area
Lot Area	55,491 sq.m.	100%
Original Facilities	15,338 sq.m.	27.64%
Expansion Facilities	31,559 sq.m.	56.87%

With the expansion facilities, the density of the plant's lot area will increase by 29.23%.

Original Facilities

Expansion Facilities



1.2 Project Rationale

The infrastructure development in the Philippines is on the rise and is expected to continue to rise in the coming years. This is in adherence to President Duterte's pronouncement and said "Build, Build, Build." As both the government and the private sector are expected to embark on several infrastructure projects, the demand for cement will increase. In 2015, the demand for cement reached to 24.0 million metric tons and this will continue to rise as projected by the Cement Manufacturers Association.



Philippines cement demand likely to grow

Figure 1.1: Cement Demand Growth (2015-2020) (Cemex, 2017)

With the ongoing and on-the-pipeline infrastructure projects in Cebu, the local demand for cement will likewise continue to increase in the coming decades. In response to this, Mabuhay FilCement Inc. (MFI), a Filipino corporation which manufactures cement products, would take part to this nation-building undertaking by providing affordable and good quality cement. Hence, MFI will need to increase its production capacity to help sustain the increasing demand for cement. MFI also aims to promote countryside development by establishing the plant at San Fernando Cebu, which is one of the growing municipalities in Cebu. The plant operation will also provide employment and livelihood to the locals and at same time generate income for both local and national government. Such development will also address the industrial needs of the growing countryside.

The cement plant has been operating for almost six years now and, is continually developing and improving its processes, capacity and structures and at the same time pursuing environmental friendly and sustainability. From the feasibility study that was conducted, expanding its components and capacity was found to be viable especially with the growing market of cement. This expansion component will be set up and incorporated with the existing structures, as outlined in the following sections.

1.3 Project Alternatives

As a response to the growing supply demand for cement materials in the local and national scene, Mabuhay FilCement Inc., an all-Filipino corporation with its Chairman of the Board, Consul Enrique L. Benedicto, plans to increase their production capacity in the said processing plant. Given that the existing plant can accommodate the proposed capacity increase, Mabuhay moved to amend the existing ECC of the cement processing plant without the increase of development area. With the demand for the production of cement, there are no foreseen project alternatives seen for the project site other than to continue and expand the operation to meet the growing need for cement. Change in the nature of the plant business would be costly as the project components are solely exclusive for cement manufacturing.

Previous to the operation of the Mabuhay Cement Processing Plant, the area has had existing structures since it was previously utilized by two industrial plants; first was by Goodfound Engineering and Construction Corp. from 1999-2004, followed by Grand Steel Inc. (GSI) as a smelting plant and rolling mill in 2004. The smelting plant was never commission until the assumption of Mabuhay FilCement Inc.

Since the commissioning of the cement plant in 2016, most of the operation has only involved physical mixing and packaging of cement. The production of clinker has since stopped from May 28, 2016. From this date to present, the cement plant has been sourcing out clinker from local providers and other countries such as China, Japan, Thailand, Vietnam, Indonesia and Taiwan.

With the increasing demand for cement as discussed previously, it is only logical to make necessary expansion and modification changes in terms of technology used for the foreseen increased capacity needed in the same cement processing plant. In the same way, the plant also plans to revive the clinker manufacturing component using its very own raw materials. Currently, the same proponent is applying for an ECC for a two-block quarry area covering Brgy. Lantawan, Brgy, Basak and Brgy. Greenhills, in the same municipality, about 5-9 kilometers from the cement processing plant.

In the efforts to continuously provide for the commercial demand of cement, Mabuhay was issued a Notice of Violation. According to the report, on July – December 2017, the cement processing plant was found to have exceeded the allowable production capacity. This penalty raised the concern of the company to move to amend the existing ECC.

Should the ECC not be issued for the expansion, the project will continually operate at the same production capacity. It will be the loss for both Mabuhay FilCement Inc. and LGU in dismissing the future opportunities of employment, increased LGU revenue, and increased competence in the rising industry of cement production.

1.4 **Project Information**

1.4.1 Project Components

Below is the matrix of project component covered in this project:

Table 1.4: Project Components

Major Components	Previous:	Expansion:	
	Coal Stacker / Storage	Pozzolan Storage	
	Limestone Stacker / Storage	Gypsum Storage	
	Limestone Crusher	Clay Storage	
	Raw Mill	Copper Slug Storage	

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	Raw Mill Silo (2) Electrostatic Precipitator Pre-heater Tower Rotary Kiln AQC-Kiln Hood & Grate Cooler Unburn Clinker Silo Clinker Stacker / Storage Cement Silo 1 Packhouse 1 & 2 Finish Mill 1 & 2	Silica Storage Spray Tower Coal Mill Coal Tube Mill Finish Mill Clinker and Additive Bin Finish Mill 3, 4, 5 Cement Silo 2, 3, 4, 5 Packhouse 3, 4, 5 Tonner Bag Storage			
Support Facilities	Previous: Electric Power Substations Machine Shop Building & Warehouse Waste Water Treatment Facility Solid Waste / MRF Canteen (2) Water Pump Parking Area Administrative Building Staff House	Expansion: Water Reservoir 1, 2 CCR Building / QA Building Cement Bag Storage (6) Rainwater Catchment Tank (3) Truck Scale Diesel Tank Area Main Station Building Switch Yard/Main Power Station VEC0 Metering Station Motor Pool Area CCR Room Compost Area, Satellite Nursery MCC & Power Substation Air Compressor House Road Network Green Belt Area Drainage Systems (6) Comfort Rooms with Septic Tanks Water Recycling Tank Hazardous Waste Facility			
Pollution Control Device	S				
Domestic Effluents	Septic Tanks / Storage Facility				
Ambient Air Pollution	CEMs, Electrostatic Precipitator, Spray Tower, Air Box Pulse Bag Filter, Dust Collector Fans				
Solid Wastes	Solid Waste Storage Facility / Materials Recovery Facility				
Hazardouse Waste Generation	Hazardous Waste Storage Facility / Collection and Treatment by accredited third-party collectors and treaters				
Noise Generation	Physical Buffers (fencing, trees, etc.) ar silencers)	nd noise-reducing equipment (mufflers,			
Net Area for Development	5.5 hectares / 55,491 sq.m.				

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AIR POLLUTION CONTROL DEVICES							
Air Pollution Source Equipment	Air Pollution Control Device	Specification / Capacity					
Limestone Crusher	Air Box Pulse Bag Filter	24 t/h; Efficiency up to 99.9%					
Raw Mill	Electrostatic Precipitator-EP150	Dust Collection Efficiency: 99% with one (1) unit 250 kw ID fan (Air flow: 30,000 m^3/hr)					
Raw Meal Silo	Dust Collector Fan	Capacity: 9,600-19,200 m^3/hr with one (1) unit 55 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Coal Mill	Dust Collector Fan	(Air Volume: 20,736 m^3/hr with (2) units filter fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Pre-heater	Spray Tower	(Air Volume: 320,000 m^3/hr); Efficiency 90% (≻5 µg) and 60%-80% (3~5 µg)					
Grate Cooler	Electrostatic Precipitator-EP80	(Air Volume: 240,000 m^3/hr); Collection Efficiency 92%~99%					
Finish Mill 1	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 185 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Finish Mill 2	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 185 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Finish Mill 1 & 2 additives	Dust Collector Fan	55 Kw Blower fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Clinker Storage	Dust Collector Fan	37 kw blower fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Cement Silo 1	Dust Collector Fan	Air Volume: 9,600 -19,200 m^3/h); Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Cement Silo 2	Dust Collector Fan	(Air Volume: 9,600 -19,200 m^3/h); Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					
Packhouse 1 & 2	Dust Collector Fan	(Processing Air: 23,000-46,000 m^3/h) with two (2) units 37 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)					

Table 1.5: Pollution Control Equipment Specifications

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ADDITIONAL POLLUTION CONTROL DEVICES						
Air Pollution Source Equipment	Air Pollution Control Device	Specification / Capacity				
Finish Mill 3	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 315 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				
Finish Mill 4	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 315 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				
Finish Mill 4 Additive	Dust Collector Fan	18.5 kw; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				
Packhouse 3	Dust Collector Fan	(Processing Air: 23,000-46,000 m^3/h) with one (1) unit 55 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				
Packhouse 4	Dust Collector Fan	(Processing Air: 23,000-46,000 m^3/hr) with one (1) unit 37 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				
Cement Silo 3	Dust Collector Fan	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				
Cement Silo 4	Dust Collector Fan	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)				

Table 1.6: Project Components Matrix (Major Components, Support Facilities and Corresponding Pollution Control Devices)

FACILITIES	NO OF UNIT	AREA (sq.m)	TOTAL AREA (sq.m)	CAPACITY	REMARKS	AIR POLLUTION CONTROL DEVICE	SPECIFICATION / CAPACITY	REMARKS
A. MAJOR COMPONENTS		· · · · · · · · · · · · · · · · · · ·						
Coal Stacker	1	772.73	772.73	8,000 tons	Approved ECC, Existing			Existing
Limestone Stacker	1	874.29	874.29	2,000 tons	Approved ECC, Existing			Existing
Limestone Crusher	1	777	777	180 tons / hr	Approved ECC, Existing	Air Box Pulse Bag Filter	24 t/h	Existing
Rawmill	1	392.76	392.76	120 tons / hr	Approved ECC, Existing	Electrostatic Precipitator-EP150	Dust Collection Efficiency: 99% with one (1) unit 250 kw ID fan (Air flow: 30,000 m^3/hr)	Existing
Raw meal Silo	1	260	260	4,500 tons	Approved ECC, Existing	Dust Collector	Capacity: 9,600-19,200 m^3/hr with one (1) unit 55 kw dust collector fan	Existing
Electrostatic Precipitator - Raw Mill	1	337.11	337.11		Approved ECC, Existing			Existing
Electrostatic Precipitator - AQC	1	245.32	245.32	240,000 m^3 / hr	Approved ECC, Existing			Existing
Pre-heater Tower	1	200	200	2,200 tons / day	Approved ECC, Existing	Spray Tower	(Air Volume: 320,000 m^3/hr)	Existing
Rotary Kiln	1	681.03	681.03	2000 tons / day	Approved ECC, Existing			
AQC - Kiln Hood & Grate Cooler	1	191.63	191.63	83.33 tons / hr	Approved ECC, Existing	Electrostatic Precipitator-EP80	(Air Volume: 240,000 m^3/hr)	Existing
Unburn Clinker Silo	1	134	134	950 tons	Approved ECC, Existing			
Clinker Stacker / Storage	1	707	707	8,000 tons	Approved ECC, Existing	Dust Collector	37 kw blower fan	Existing
Cement Silo 1	1	215	215	4,500 tons	Approved ECC, Existing	Dust Collector	Air Volume: 9,600 -19,200 m^3/h)	Existing
Packing Area 1 & 2 / Packhouse	2	153	306	90-120 tons / hr	Approved ECC, Existing	Dust Collector	(Processing Air: 23,000-46,000 m^3/h) with two (2) units 37 kw dust collector fan	Existing
Finish Mill 1 & 2	2	226	452	30-35 tons / hr	Approved ECC, Existing	Dust Collector	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 185 kw dust collector fan	Existing
						Dust Collector	55 Kw Blower fan	Existing
Pozzoland Storage	2		625.94	4,000 tons	For Expansion, Existing			Existing
Gypsum Storage	2		752.8	4,000 tons	For Expansion, Existing			Existing
Clay Storage	1	331.21	331.21	2,000 tons	For Expansion, Existing			Existing
Copper Slug Storage	1	282.21	282.21	2,000 tons	For Expansion, Existing			Existing
Silica Storage	1	60	60	2,000 tons	For Expansion, Existing			Existing
Limestone Crusher Line 2	1	262.5	262.5	80-120 tons / hr	For Expansion			Proposal
Coal Mill	1	178.3	178.3	30-60 tons / hr	For Expansion, Existing	Dust Collector	(Air Volume: 20,736 m^3/hr with (2) units filter	Evicting
Coal Tube Mill	1	75.8	75.8	10-15 tons / hr	For Expansion, Existing		fan	LXISUIIG
Clinker & Additive Silo	1	187.82	187.82	126 tons (90 m^3)	For Expansion, Existing	(1) Common Conveyor Dust Collector Top (2) Common Conveyor Dust Collector Below	(1) 55Kw,440V,89 Amps, 1782 rpm (2) 18.5Kw,440V,30.7Amps, 1770 rpm	Existing
Finish Mill 3	1	800	800	55-60 tons / hr	For Expansion, Existing	Dust Collector	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 315 kw dust collector fan	Existing
Finish Mill 4	1	800	800	55-60 tons / hr	For Expansion, Existing	Dust Collector	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 315 kw dust collector fan	Existing
						Dust Collector	18.5 kw	Existing

Environmental Performance Report and Monitoring Plan

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FACILITIES	NO OF UNIT	AREA (sq.m)	TOTAL AREA (sq.m)	CAPACITY	REMARKS	AIR POLLUTION CONTROL DEVICE SPECIFICATION / CAPACITY		REMARKS
A. MAJOR COMPONENTS								
Finish Mill 5	1	1000	1000	55-60 tons / hr	For Expansion	For ExpansionDust Collector(Capacity: 90 tons/hr, Processing Air 110 m^3/hr) with one (1) unit 315 kw dust co fan		Proposal
Cement Silo 2	1	215	215	4,500 tons	For Expansion, Existing	Dust Collector	Air Volume: 9,600 -19,200 m^3/h)	Existing
Cement Silo 3	1	150	150	2,200 tons	For Expansion, Existing	Dust Collector	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan	Existing
Cement Silo 4	1	150	150	1,900 tons	For Expansion, Existing	Dust Collector	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan	Existing
Cement Silo 5	1	150	150	2,200 tons	For Expansion	Dust Collector	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan	Proposal
Packhouse 3	1	140	140	90-120 tons / hr	For Expansion, Existing	Dust Collector	(Processing Air: 23,000-46,000 m^3/h) with one (1) unit 55 kw dust collector fan	Existing
Packhouse 4	1	170	170	90-120 tons / hr	For Expansion, Existing	Dust Collector	(Processing Air: 23,000-46,000 m^3/hr) with one (1) unit 37 kw dust collector fan	Existing
Packhouse 5	1	170	170	90-120 tons / hr	For Expansion	Dust Collector	(Processing Air: 23,000-46,000 m^3/hr) with one (1) unit 37 kw dust collector fan	Proposal
Tonner Bag Storage	1	200	200		For Expansion			Proposal
B. SUPPORT FACILITIES	1		1		1			
Electric Power Substations	5	106	530		Approved ECC, Existing			
Warehouse/ Machine Shop Building	1	2,100	2,100		Approved ECC, Existing			
Materials Recovery Facility	1	208.61	208.61		Approved ECC, Existing			
Canteen	1	233.74	233.74		Approved ECC, Existing			
Deep Well	2	4	8	0.5 m^3 / min	Existing			
Parking Area	1	4,000	4000		Approved ECC, Existing			
Administrative Building	1	550	550		Approved ECC, Existing			
Staff House	1	350	350		Approved ECC, Existing			
Waste Water Treatment Facility	1	47.46	47.46	180 m^3/min	Approved ECC, Existing			
Solid Waste / MRF	1	350	350	850 cu.m.	Approved ECC, Existing			
Water Reservoir 1	1	288	288	1,344 m^3	For Expansion, Existing			
Water Reservoir 2	1	47	47		For Expansion, Existing			
CCR Building / QA Building	1	240	240		For Expansion, Existing			
Rainwater Catchment Tank	6	2.25	13.5	5 m^3	For Expansion, Existing			
Truckscale	3				For Expansion, Existing			
Diesel Tank Area	1	30	30	25,000 Liters	For Expansion, Existing			
Main Station Building	1	120	120		For Expansion, Existing			
Switch Yard / Main Power Station	1	200	200		For Expansion, Existing			
Veco Metering Station	1	240	240		For Expansion, Existing			
Motor pool	1	624	624		For Expansion, Existing			
CCR Room	1	44.68	44.68		For Expansion, Existing			
Compost Area	2	15	30	45 m^3	For Expansion, Existing			
Satellite Nursery	1	184.28	184.28		For Expansion, Existing			

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FACILITIES	NO OF UNIT	AREA (sq.m)	TOTAL AREA (sq.m)	CAPACITY	REMARKS	AIR POLLUTION CONTROL DEVICE	SPECIFICATION / CAPACITY	REMARKS
B. SUPPORT FACILITIES								
Air Compressor House	1	83.6	83.6		For Expansion, Existing			
Drainage System					For Expansion, Existing			
Water Recycling Tank	1	6	6	294 m^3	For Expansion			
Hazardous Waste Facility	1	20	20		For Expansion			
Comfort Rooms with Septic Tank	6	6	36		For Expansion, Existing			
Green Belt Area					For Expansion, Existing			
Road Network					For Expansion, Existing			

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LEGEND

	COMPONENTS STIPULATED IN T	HE ECC	EXPANSION COMPONENTS		
	DESCRIPTION	AREA (sq.m.)		DESCRIPTION	AREA (sq.m.)
1	Coal Stacker / Storage	772.73	26	Pozzolan Storage	625.94
2	Limestone Stacker /Storage	874.79	27	Gypsum Storage	752.8
3	Limestone Crusher	777	28	Clay Storage	331.21
4	Raw Mill	392.76	29	Copper Slug Storage	282.21
5	Ray Meal Silo	260	30	Silica Storage	60
6	Electrostatic Precipitator – Raw Mill	337.11	31	Diesel Tank Area	30
7	Electrostatic Precipitator - AQC	245.32	32	Coal Mill	178.3
8	Pre-heater Tower	200	33	Coal Tube Mill	75.8
9	Rotary Kiln	681.03	34	Clinker & Additive Silo	187.82
10	AQC-Kiln Hood & Grate Cooler	191.63	35	Finish Mill 3	800
11	Unburn Clinker Silo	134	36	Finish Mill 4	800
12	Clinker Stacker / Storage	207	37	Cement Silo 2	215
13	Cement Silo 1	2015	38	Cement Silo 3	150
14	Packhouse 1 & 2	306	39	Cement Silo 4	150
15	Finish Mill 1 & 2	452	40	Packhouse 3	140
16	Electric Power Substation	530	41	Packhouse 4	170
17	Machine Shop & Warehouse	2100	42	Water Reservoir 1	288
18	Materials Recovery Facility	208.61	43	Water Reservoir 2	47
19	Canteen	233.74	44	CCR Building / QA Building	240
20	Deep Well	8	45	Air Compressor House	86.6
21	Parking Area	4000	46	Main Station Building	120
22	Administrative Building	550	47	Switch Yard / Main Power Station	200
23	Staff House	150	48	Veco Metering Station	240
24	Wastewater Treatment Facility	47.46	49	Motor Pool	624
25	(6) Comfort Rooms with Septic Tank	20	50	CCR Room	44.68
			51	Compost Area	30

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COMPONENTS STIPULATED IN THE ECC			EXPANSION COMPONENTS		
DESCRIPTION	AREA (sq.m.)		DESCRIPTION	AREA (sq.m.)	
		52	Satellite Nursery	184.28	
		53	Green Belt Area		
		54	(3) Truckscale	109	
		55	(6) Rainwater Catchment Tank	6	
		56	Drainage System		
		57	Green Belt Area		
		58	Finish Mill 5	1000	
		59	Cement Silo 5	150	
		60	Packhouse 5	170	
		61	Tonner Bag Storage	200	
		62	Water Recycling Tank	6	
		63	Hazardous Waste Facility	20	

GEOGRAPHICAL COORDINATES								
CORNER	LONGITUDE	LATITUDE						
1	E 123° 42' 13.723"	N 10° 09' 53.211"						
2	E 123° 42' 16.854"	N 10° 09' 45.326"						
3	E 123° 42′ 13.123′	N 10° 09' 39.368"						
4	E 123° 42' 09.256"	N 10° 09' 49.724"						



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1.4.2 Process and Technology

1.4.2.1 Capacity and Facility Expansion

The proposed expansion project will increase the plant's production rate to 1,200,000 Metric Tons per year on milling and crushing activities, and having a total output of 2,600,000 Metric tons per year of Finished Cement or 120,000 bags of cement per day.

The proposed project involves purchase and installation of a Spray Tower, Coal Mill, Coal Tube Mill, Finish Mill Clinker and Additive Bin, Finish Mil 3, 4 & 5, Cement Silos 2, 3, 4 & 5, and Packhouses. It will also involve the construction of additional facilities such as Pozzolan, Gypsum, Clay, Silica and Tonner Bag Storage rooms.

Additional Support Facilities shall also be installed and constructed, mainly utilities such as water reservoirs, office buildings, Rainwater Catchment tanks, Truck Scales, among others. Expansion of facilities will also be implemented for seedling nurseries, green belt areas, compost areas additional road network, drainage, water meters, and monitoring(CCR) rooms.

1.4.2.2 Existing Technology

The above-mentioned capacity expansion project will be in addition to the existing 500,000 Metric Tons per year Clinker including milling and crushing activities which is approximately 525,600 MTPY finished cement or 30,000 bags of cement plant production rate. The previous project components used in the facility are the ff:

Main Components

- Storage/Stacker: Coal, Limestone, Clinker
- Limestone Crusher
- Raw Mill
- Two (2) Electrostatic Precipitator
- Pre-heat Tower
- Rotary Kiln
- AQC- Kiln Hood and Grate Cooler
- Silo: Raw Mill, Unburn Clinker, Cement Silo 1
- Packhouse 1 & 2
- Finish Mill 1 & 2

Support Facilities

- Electric Power Substations
- Machine Shop Building and Warehouse
- Wastewater Treatment Facility
- Materials Recovery Facility
- Canteen
- Two (2) Water Pump
- Parking Area
- Administrative Building and Staff House

These installations are covered under ECC-CO-0809-026-2620 issued on 19th February 2009.

Additional Facilities for the project expansion are the ff;

- Storage: Pozzolan, Gypsum, • Clay, Copper Slug, Silica, Tonner Bag Storage
- Areas: Diesel Tank Area, Compost Area, Greenbelt Area
- Mills: Coal Mill, Coal Tube Mill, Finish Mill 3,4&5
- Silos: Clinker and Additive Silo, Cement Silo 2, 3, 4 & 5
- Packhouse 3, 4, & 5 ٠
- Water Reservoir 1 & 2
- Building: CRR building / QA Building, Main Station Building
- Air Compressor House
- Station: Switch Yard / Main Power Station
- **Production Material Balance**

- Motor Pool
 - CRR Room
 - Satellite Nursery
 - Truckscale
 - Tanks: Rainwater Catchment Tank, Water Recycling Tank
 - Drainage System
 - Hazardous Waste Facility
 - Limestone Crusher Line 2

The following figures are to demonstrate the material balance in the cement processing. Key components are input materials and the output or processed materials from the said production process.

Note: Raw Materials (AFRS) will not be utilized in the cement co-processing as of this application. This is due to the fact that the equipment installed for the processing will not be able to accommodate this alternative. This alternative will have to undergo pre-treatment due to its quality requirement, hence, more expensive than the presently used materials.

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Mass Balance of 1 kg of Portland and Blended Cement

Figure 1.3: Material Balance for 1kg Portland and Blended Cement



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CEMENT PRODUCTION CAPACITY: 2,600,000 MT/Year BASIS:

PRODUCT SHARE

 40% PORTLAND
 = 1,040,000 MT/Year

 60% BLENDED CEMENT
 = 1,560,000 MT/Year

NOTE

1) 967,200 MT of clinker for Portland + 1,092,000 MT of clinker for Blended = 2,059,200 MT/Year clinker needed

(Proposed Production of Clinker is only 1,200,000 MT/Year) - (2,059,200 MT/Year clinker needed) = - 859,200 MT/Year This will be sourced from other countries such as China, Japan, Thailand, Vietnam, Indonesia and Taiwan)

2) Cement proportioning will vary depending upon the quality of its raw materials.



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Pollution Control Devices (PCDs) and Waste Management System (WMS)

During operation, PCDs will be strategically placed at locations of dust-emitting equipment / processes. The following are the PCDs and their corresponding locations:

Existing:

•	Air Box Pulse Box Filter	- Limestone Crusher
•	Electrostatic Precipitator	- Raw Mill (EP150) and Grate Cooler (EP80)
•	Dust Collectors	- Raw Mill Silo, Coal Mill, Finish Mill 1 & 2, Finish Mill 1 & 2 Additives, Clinker Storage, Cement Silos 1 & 2, Packhouse 1 & 2

Expansion:

Dust Collector
 - Finish Mill 3 & 4, Finish Mill 4 Additive, Packhouse 3 & 4, Cement
Silo 3 & 4

For the waste management system, waste shall be classified into domestic waste, hazardous waste, recyclable materials, industrial waste and wastewater. The following are the facilities for each kind of waste:

- Domestic
 Materials Recovery Facility, Compost Area
- Hazardous Hazardous Waste Facility
- Recyclable
 Aterials Recovery Facility
- Industrial Waste
 Materials Recovery Facility, Hazardous Waste Facility
- Wastewater Wastewater Treatment Facility

Table below suggests methods for disposal of various types of common waste materials from **MABUHAY FILCEMENT INCORPORATED**. This table is not exhaustive and there will be certain exceptions from the methodology suggested. All maintenance personnel and plant staff and workers should attempt to adhere to these guidelines, but should set their own procedures for maintenance wastes not included in the table or those that need to be handled differently to that suggested. Waste management is detailed in Chapter 3 of this report.

Waste Material		Handling
Piedea	radabla Wasta	Disposed of in general waste, skips or bulk bins and
biouey		deposited into compost pits
Decualable Wests		Disposed of in general waste, skips or bulk bins and
Recy		sent for recycling, sale or auction as appropriate
In art Weata		Disposed of into skips or bulk bins and sent for
Iner t waste		recycling or to landfill as appropriate
Electrical	Recyclable	Sold or auctioned to scrap dealers
and	Worthloop	Disposed of into skips or bulk bins and sent for
Electronic	WUI UIIIESS	reprocessing or to landfill as appropriate
Waste	Reusable / Valuable	Label as Obsolete Equipment
Com	agaita Maata	Disposed of into skips or bulk bins and sent for
composite waste		recycling or to landfill as appropriate
	azardaus Wasta	Contact Waste disposal facilities for proper handling or
		label as Toxic Waste and send to separate storage.

Table 1.7: Waste Handling Scheme

Waste Material	Disposal Site
Biodegradable Waste	Mabuhay Cement Processing Plant Site Compost Pit
Recyclable Waste Junk yard, NGO (ecobag, etc.), Reuse in plant	
Residual, Composite Waste	LGU Collection to Landfill Sites: Naga Landfill – operated by FDRCon Inc., now FDR-IRRM Consolacion Sanitary Landfill – Asian Energy Systems Corp.
Toxic / Hazardous Waste	RRDS Petro-Chemical Industries, Inc. Mandaue City, Cebu

Table 1.8: Waste Disposal Scheme

1.4.2.3 Mode of Operation

The existing cement processing plant operates at a demand-supply basis. At present the plant operates only the fourth phase of the cement processing, eliminating the crusher, raw mill, and pyro-processing steps by tapping overseas source for clinker material. With the current capacity and the continuous improvement of the facility, the initial steps is yet to be utilized as soon as there is the availability of sources, and the installation of additional facilities and utilities is done, in line with the application for permits.

The diagram below shows the different processing phases and the corresponding major expansion details for ECC application.



Figure 1.6: Cement Processing Plant Expansion Process Flow

1.4.2.4 Maintenance

The following tables show the corresponding activities for the inspectors and safety managers on the check up of mechanical components of the plant operation for each process. Should there be parts that are not at par with the working standards, use of the particular equipment shall be stopped until repair or replacement of equipment/part.

A) Mechanical Maintenance

Mill Fans

Daily	Weekly	Monthly	Yearly
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.
2. Check oil level.	2. Check oil level.	2. Check oil level.	2. Check oil level.
3. Check noise and vibration.3. Check noise and vibration.		3. Check noise and vibration.	3. Check noise and vibration.
	4. Check fan casing and structure.	4. Check fan casing and structure.	4. Check fan casing and structure.
	5. Check manhole cover.	5. Check manhole cover.	5. Check manhole cover.



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Daily	Weekly	Monthly	Yearly	
		6. Check oil quality.	6. Check oil quality.	
			7. Check impeller condition.	
			8. Check fan base for cracks.	
			9. Check anchor bolts.	
			10. Check coupling alignment.	
			11. Check bearings, replace if needed.	
			12. Check suction damper.	

Bucket Elevators

Daily	Weekly	Monthly	Yearly	
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	
2. Check reducer oil level.	2. Check reducer oil level.	2. Check reducer oil level.	2. Check reducer oil level.	
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	
	4. Check fan casing and structure.	4. Check fan casing and structure.	4. Check fan casing and structure.	
		5. Check reducer oil quality.	5. Check reducer oil quality.	
		6. Check bucket cans.	6. Check bucket cans.	
		7. Check pulley bearings.	7. Check pulley bearings.	
		8. Check pulleys.	8. Check pulleys.	
		9. Check coupling alignment.	9. Check coupling alignment.	
		10. Check reducer and pulley base bolts.	10. Check reducer and pulley base bolts.	
		11. Check roller chain and sprocket drive.	11. Check roller chain and sprocket drive.	
			12. Check bucket cans alignment.	
			13. Check reducer gears and bearings.	

Table 1.10: Bucket Elevators Maintenance

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Separators

Daily	Weekly	Monthly	Yearly	
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	
2. Check reducer & circulating oil level.	2. Check reducer & circulating oil level.	2. Check reducer & circulating oil level.	2. Check reducer & circulating oil level.	
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	
	4. Check fan casing and structure. 4. Check fan casing and		4. Check fan casing and structure.	
		5. Check manhole cover.	5. Check manhole cover.	
		6. Check circulating oil quality.	6. Check circulating oil quality.	
	7. Check reducer oil quality.		7. Check reducer oil quality.	
	8. Check fresh air damber.		8. Check fresh air damber.	
			9. Check coupling alignment.	
			10. Check base bolts.	
			11. Check reducer gears and bearings.	
			12. Check rotor condition.	
			13. Check rotor bearings.	

Table 1.11: Separators Maintenance

Belt Conveyors

Table 1.12: Belt Conveyors Maintenance

Daily	Weekly	Monthly	Yearly
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.
2. Check reducer oil level.	2. Check reducer oil level.	2. Check reducer oil2. Check reducer oillevel.level.	
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.
4. Check belt alignme		4. Check belt alignment.	4. Check belt alignment.
5. Check belt rollers.		5. Check belt rollers.	5. Check belt rollers.
6. Check belt cleaners.		6. Check belt cleaners.	6. Check belt cleaners.
	7. Check reducer oil quality.	7. Check reducer oil quality.	7. Check reducer oil quality.
		8. Check reducer oil	8. Check reducer oil

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Daily	Weekly	Monthly Yearly	
		quality.	quality.
		9. Check pulleys.	9. Check pulleys.
		10. Check belt adjuster.	10. Check belt adjuster.
			11. Check pulley bearings.
			12. Check reducer gears and bearings.
			13. Check belt condition.

<u>Ball Mill</u>

Table 1.13: Ball Mill Maintenance

Daily	Weekly	Monthly	Yearly	
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	
2. Check reducer circulating oil level.	2. Check reducer circulating oil level.	2. Check reducer circulating oil level.	2. Check reducer circulating oil level.	
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	
4. Check water cooling systems.	4. Check water cooling systems.	4. Check water cooling systems.	4. Check water cooling systems.	
	5. Check reduce base frame.	5. Check reduce base frame.	5. Check reduce base frame.	
	6. Check trunnion bearing base frame.	6. Check trunnion bearing base frame.	6. Check trunnion bearing base frame.	
		7. Check reducer circulating oil quality.	7. Check reducer circulating oil quality.	
		8. Check trunnion bearing oil quality.	8. Check trunnion bearing oil quality.	
	9. Check reducer bolts and base bolts.		9. Check reducer bolts and base bolts.	
		10. Check trunnion bearing bolts and base bolts.	10. Check trunnion bearing bolts and base bolts.	
		11. Check girth gear bolts.	11. Check girth gear bolts.	
			12. Check coupling alignment.	
			13. Check reducer gears and bearings.	
			14. Check girth gears and bearings.	
			15. Check ball mill liner bolts and trunnion bolts.	

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Dust Collectors

Daily	Weekly	Monthly	Yearly	
1. Check air pressure.	1. Check air pressure.	1. Check air pressure.	1. Check air pressure.	
2. Check purging.	2. Check purging.	2. Check purging.	2. Check purging.	
3. Check exhaust stack.	3. Check exhaust stack.	3. Check exhaust stack.	3. Check exhaust stack.	
4. Drain condensate.	4. Drain condensate.	4. Drain condensate.	4. Drain condensate.	
	5. Check pulse valves.	5. Check pulse valves.	5. Check pulse valves.	
	6. Check air pressure regulator.	6. Check air pressure regulator.	6. Check air pressure regulator.	
7. Check solenoids.		7. Check solenoids.	7. Check solenoids.	
	8. Check dampers valves.	8. Check dampers valves.	8. Check dampers valves.	
		9. Pneumatic cylinders.	9. Pneumatic cylinders.	
		10. Check air lines.	10. Check air lines.	
		11. Check air slides and dampers.	11. Check air slides and dampers.	
			12. Check weldments.	
			13. Check steel structure.	

Table 1.14: Dust Collector Maintenance

B) Electrical Maintenance

MV Switchgear (up to 36 kV)

Table 1.15: MV Switchgear Maintenance

Туре	Description	Interval	Extent
1. INSPECTION	General external condition.	1 y	
	Cable boxes internal.		
	Circuit breakers internal.	4 y	All
	Fused contactors internal.		
	Busbar compartments (1) internal.	8 y	
	<u>Metering:</u> - Correctness of main voltmeters. - Correctness of main ammeters. - Correctness of other measuring systems.	4 y	All
2. TEST AND MEASUREMENT (3)	<u>Circuit breakers in/outgoing and fused</u> <u>contactors (3):</u> – Operating mechanism. – Draw-out system/interlocks. – Control equipment. – Insulation resistance	4 y	All
	Dielectric strength across open contacts.	8 y	

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Туре	Description	Interval	Extent
	Ductor test across closed contacts.	h vi	
	Electrical protection/tripping (2).	4 y	
	Certified Ex'e' thermal protection (4).	3 у	
	Contact distance.	4 y	Vacuum, SF6
	Dielectric test oil.	4 y	Oil-immersed
	Insulation resistance of cable (incl. motor if applicable).	4 y	All
	Restart system.	4 y	Motors
	<u>Busbar systems:</u> - Torque bolts (1). - Insulation resistance. - Dielectric strength. - Continuity (ductor).	8 y	All
	Correctness of kW, kVAr, max.	hy	
	demand of measuring systems (5).	4 y	
3. RESTORATION	Greasing of operating mechanisms.	4 y	
	Oil filtering/replacement.		All
	Component replacement.	AS HECESSELY	

LV Switchgear

Table 1.16: LV Switchgear Maintenance

Туре	Description	Interval	Extent
1. INSPECTION	General external condition.	1 y	
	Motor starters and outgoing feeders, internal.	4 y	
	Incomers, internal.		
	Busbar compartments (1).	8 y	All
	<u>Metering:</u> - Correctness main voltmeters. - Correctness main ammeters.	4у	
	General internal condition of outdoor equipment (5).	2 y	
2. TEST AND MEASUREMENT (3)	Incoming feeders, bus section, switches: – Operating mechanism. – Interlocks. – Control equipment. – Electrical protection/tripping (2).	4 y	All

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Туре	Description	Interval	Extent
	<u>Busbar systems:</u> - Torque bolts (1). - Insulation resistance. - Continuity (ductor).	8 y	
	<u>Motor feeders:</u> – Draw-out system/interlocks. – Cable connection tightness.	4 y	
	Thermal and earth fault protection.	4 y	10%
	Certified Ex 'e' thermal protection (4).	3 у	All
	Restart system.	4 y	10%
	Insulation resistance of motor + cable.	4 y	Selected
	<u>Plain feeders:</u> – Draw-out system/interlocks. – Cable connection tightness.	4 y	All
	Protection/tripping. (2)	4 y	10%
	R.C.D. for fixed load (e.g. trace heating).	4 y	All

Induction Motor Inspection

Table 1.17: Induction Motor Inspection

Туре	Description	Interval	Extent					
	General external condition.	3 y	All					
1. INSPECTION	Winding and rotor condition (2).	lition (2). 4 - 6 y started essential						
	Vibration (1) (8).	/ibration (1) (8). 1 Month						
2. TEST AND	Insulation resistance (with cable). (9) (8) Polarisation index.	2 - 4 y	Selected					
MEASUREMENT	Bearing insulation.	2 - 4 y						
	White metal bearing clearance and condition.	4 - 6 у	All					
	Bearing lubrication (5).	As specified	All					
3. RESTORATION	Rolling bearing replacement (4, 6 and 7).	4 - 6 у	Selected and essential drives					
	Cleaning/re-insulating/rewinding (3).	As determined by inspection and tests						

1.5 Project Size

The expansion components will mainly come from the increase of production capacity. The area of the plant will remain the same (55, 491 sq.m.) and the plant density will increase to 56.87%. Below are the major expansion components.

Component	Previous	Expansion
Clinker Production Capacity	500,000 MTPY	1,200,000 MTPY
Cement Mill Production Capacity	525,600 MPTY	2,600,000 MTPY

1.6 Description of Project Phases

The land development, construction, and installation of the expansion project will take about six (6) months, depending on the construction scheduling of the activities, delivery and installation of mechanical equipment. Local available resources will be utilized for the construction. The execution of the project during the construction will be done following the Environmental Management Plan with utmost concern to safety, environment, quality and community responsibility. Sources of materials will be from the accepted suppliers in the infra-construction industry.

The proponent shall ensure that activities from site clearing, to ground preparation, and installation of the system and structures and amenities (civil, mechanical and electrical installations) will be supervised by competent personnel to ensure high standard and ensure safety to environment.

1.6.1 Pre-construction

The pre-construction phase consists in general of the *a*) *planning and project study* and *b*) *securing of permits* form various government agencies. These are discussed in the sections below.

<u>Planning and Project Study.</u> The planning and project study consists of the preparation of feasibility study, site planning and detailed engineering design. It also includes preparation of project cost estimate, financial study and securing of investors who will undertake the implementation of the project.

Permitting and other Legal Documentation. The proponent will also secure the necessary permits such as Environmental Compliance Certificate (ECC) from the EMB - Central Office. Other permits will be obtained from the local government such as building permit, electrical permit, mechanical permit, etc.

Plans and Design Preparation. Plans and drawings such as structural, mechanical, electrical single line diagrams and plant layout are prepared by Mabuhay FilCement Inc. engineers after selection of mechanical and electrical equipment are finalized. The building extension, control room extension and the concrete foundation block for the storage and spray tower and other facilities are to be designed.

<u>ECC</u> Application and Approval. The endorsements have to be secured first from the Local Government Units of the municipality of San Fernando. The application for the amendment of the Environmental Compliance Certificate (ECC) shall then be submitted to the Environmental Management Bureau (EMB), Central Office for approval.

<u>Procurement of Equipment</u>. The equipment for the additional clinker production capacity, cement milling and packing house shall be ordered from accredited suppliers.

1.6.2 Construction and Installation phase

1.6.2.1 Civil and Structural Works

The civil and structural works are involved mainly in the construction of storage facilities and utilities. Remaining proposed construction will be for the tonner bag storage, water recycling tank and hazardous waste facility. Whereas the pack house, finish mill and cement silo are mainly mechanical installations within the existing plant building.

1.6.2.2 Mechanical and Electrical Installation Works

Installation works will comprise mainly of the mechanical and electrical machinery such as truck scale, switch yard and main power station, metering stations, motor pool, CCR rooms, and MCC and Power substations.

Below is the project expansion gantt chart to show specific construction and installment activities and their timeframe.

								YE	A	۲1									YE	AF	2								Ì	/E/	٩R	3				
ACTIVITIES	DURATION	START	FINISH					2	01	8									2	201)									20)20					
				1	2	3 1	4 5	6	7	8	9	10	11	12	1	2	3	4	5	6	8	9	10	11 1	2 '	1	2 3	5 4	5	6	7	8	9	10	11	12
PRE-CONSTRUCTION STAGE	10 months & 2 weeks	April 2018	2nd week Feb 2019																																	
CONSTRUCTION STAGE	1 year & 6 months	February 2019	July 2020																																	1
OPERATION STAGE	5 months	July 2020	October 2020																																	
COMMERCIAL OPERATION	N	ovember	2020																																★	

Table 1.19: Project Expansion Timeframe

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 Table 1.20: Project Expansion Timeframe and Activities

MABUHAY FILCEMENT INC.																														
		PRO	POSED EXPAN	ISIO	N PR	OJE	СТ	PHA	\SE	S																				
ACTIVITIES	DURATION	START	FINISH		YEAR 1 YEAR 2 YEAR 3 2018 2019 2020							EAR 3 2020																		
				12	34	56	5 7	8	9 1	0 11	12	1	2	3 1	i 5	6	78	3 9	10	11	12 '	1 2	3	4 !	56	7	8	9 10	<u>) 11</u>	12
OVER-ALL PROJECT SCHEDULE	3 years & 5 months	April 2018	October 2020																											
	10 mars with a 0 0										1	1 1			-	П			1			_	1 1	-		T		_		
A. PRE-CONSTRUCTION STAGE	weeks	April 2018	2nd week of Mar 2019																											
1. Developing and Initial Project Briefing	1 month	April 2018	April 2018																											
2. Carrying out Feasibility Studies	2 months	May 2018	June 2018																											
 Undertaking project risk assessment, planning, programs and procurement strategy 	1 month	July 2018	July 2018																											
4. Social preparation works	2 weeks	1st week of Aug 2018	2nd week of Aug 2018																											
 Application for other necessary National and Local Government Permits 	6 months	3rd week of Aug 2018	2nd week of Feb 2019																											
							_								_															
B. CONSTRUCTION STAGE	1 year & 6 months	January 2019	July 2021																											
1. Civil Works	12 months	February 2019	January 2020																											
2. Mechanical Installations	6 months	August 2019	January 2020																											
3. Electrical Installations	4 months	November 2019	February 2020																											
Construction of cement plant expansion support facilities	4 months	January 2020	April 2020																											
5. Construction of pollution control devices	3 months	March 2020	May 2020																											
6. Construction of waste water treatment facility	2 months	April 2020	May 2020																											
7. Construction of rain water cistern tank	2 months	May 2020	June 2020																											
8. Air and Water Pipping Installation	3 months	May 2020	July 2020																								\square	\perp		
	6 months	lulu 2020	Databar 2020																		-	_	1 1			1			-	
1.Buffer/Tree Planting	2 months	july 2020	August 2020																											
2. Commissiong Stage	3 months	August 2020	October 2020																											

1.6.3 Operation Phase

The expansion of the plant will use the manufacturing technology and engineering design that employs dry process / technology. This is operated with one (1) Central Room using the Programmable Logic Controllers (PLC) and adopting the different kinds of Analog Measuring Sensing Instruments, where the plant can attain 99% efficiency for the production output, as well as for the pollution control equipment. The technology can be considered efficient, environment-friendly and brings about sustainable development.

The following are the major steps in cement manufacturing:

- Crushing Materials in the form of boulders brought to the crushing plant should not exceed 600
 mm in diameter to avoid problems in handling. The materials will be crushed down to the particles
 with maximum diameter of 75 mm using a hammer mill. Crushed materials will be transported to
 silos for storage. The materials containing high moisture are fed into the roller mill through a
 triple flap gate to prevent air leakage into the mill.
- 2) Raw Milling Hot gas for drying the raw materials are supplied from the suspension pre-heaters or from hot generators. A variable speed will induce draft fan that pulls the pulverized materials from the mill passing through a separator to attain the desired fineness then through a bank of cyclones. The cyclones underflow will then be conveyed to the raw meal silo for storage and homogenization. The cyclone overflow goes to the electrostatic precipitator (EP) for collection. The collected materials are then conveyed to the kiln feed bin or the raw meal silo for blending.
- 3) Kiln Heating Kiln feed is withdrawn from the raw meal silo through air slides across a flow control gate and is routed to a bucket elevator which supplies the kiln feed bin. The first stage in Kiln process is the Pre-heating and pre-calcining of the raw meal. The fuel used in the riser duct is coal. Industrial fuel oil will only be used as back-up or during startups. Alternative fuel will not be used for this process because it is expensive and because the current technology used can only accommodate traditional fuels. Although this may be considered in the future. Oxygen for combustion is provided by a tertiary air source of hot air that has been recuperated from the clinker cooler. The material is 90% calcined at its levels with the pre-heaters and the kiln. The product from the Kiln process is termed Clinker.

The pre-heater exhaust gas exits through a duct induced by a draft fan and passes through a conditioning tower fitted with a water spray system prior to entering the electrostatic precipitator.

4) Clinker Cooling - The clinker drops from the kiln into a stepped gate and into the reciprocating grate cooler. Clinker temperature at the inlet is approximately 1370 degrees centigrade and outlet temperature is 60 degrees centigrade above ambient.

The hot recuperated air from the cooler is routed to a riser duct as tertiary air and the remainder is vented to the electrostatic precipitator for dusting.

Clinker is conveyed by grate plates and crushed by a clinker crusher to a maximum particle size of 30 mm.

5) Finish Milling – The clinker material as well as other cement additives will pass through a proportioning weigh feeder, then the proportioned materials will then be routed to a common belt

conveyor into the bucket elevator feeding the ball mills. The pulverized material will then pass through a separator then a series of cyclones. The reject fine particles will be thrown in the dust collector system and the product material will pass through the product airslide into the bucket elevator going to cement silos storing the finished product cement.

6) Cement Packing - Cement is withdrawn from the cement silos through an air slide going to the bucket elevator and routed to the pack house. The transported materials are distributed to different packing bins prior to dispatching. Cement is dispatched by bulk truck, big bags (1 Ton) and 40-kilogram cement bags.

Packing of 40-kilogram cement bags is done by automatic roto-packing machine then down to a receiving belt conveyor and a telescopic conveyor for dispatching. Packing machine overflow is reclaimed by screw conveyor through a bucket elevator and returned to the distributing bins. Transfer points are equipped with a de-dusting system to the bag house. Collected materials from bag houses are returned likewise to the bins.

7) Loading and Unloading Operations – Bags of cement (40 kilogram or 1 tonner) will be transported through trucks stockpiled in a pallet going to the local market. For Bulk loading, Cement is withdrawn from cement silos and transported in a belt conveyor fully covered.

Env Mabuhay Cement



Environmental Performance Report and Monitoring Plan

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1.6.4 Abandonment Phase

With the nature of the project, abandonment is unlikely to happen. The cement processing plant intends to continuously cater to the continually rapidly incresing demand for cement nationwide. However in extreme cases, where major and destructive natural calamities take place, the project may need to be abandoned particularly when irrepairable damages on the plant will take place or should the government declare to abandon all cement plant projects which is unlikely to happen as well. In the event of such unwanted or unlikely scenario, the management of Mabuhay FilCement. Inc. in coordination with third parties and Local Government units, have prepared to execute the following general activities :

- Cutting off of power and water lines
- Removal of debris or loose materials
- Removal of cement manufacturing machinery/components
- Disposal/Collection of Hazardous and Toxic material
- Dismantling of temporary or light weight structures
- Disassembling of equipment and machinery and this will include equipment /and machinery will be disposed and sold to interested buyers
- Demolition of building structure (optional; if structural integrity is not compromised)
- Hauling of construction debris (steel, concrete, roofing materials, etc.)
- Housekeeping/Clearing of area
- Replanting (within area)
- Setting up of perimeter fence to prevent illegal settlers to enter

Likewise, Mabuhay FilCement Inc. may have to do the following management plan to minimize the negative impacts of the abandonment to the environment. Detailed abandonment plan is found in Chapter 7 of this report.

Table 1.21: Abandonment Management Plan

Management/ Measure	Responsible Group	Projected Cost (at present cost)
Dust Generation		
Immediate hauling of debris and destroyed materials within the property	Mabuhay FilCement Inc. and hired material haulers	P 75,000-150,000
Use of personnel protective equipment (PPE) during dismantling or demolition activity	Mabuhay FilCement Inc. safety officers	P 50,000
Solid wastes		
Waste recovery and selling/ disposal of recyclable materials	Third party recyclers. (They can sell or give the recyclables)	No cost on the part of the project
Waste segregation and provision of temporary Material Recovery Facilty (MRF) and collection area	Mabuhay FilCement Inc. and third party recyclers	P 30,000
Disposal of residual wastes to the functional future sanitary landfill	Mabuhay FilCement Inc. and LGU	P700-P1000 per ton
Proper treatment and disposal of bulk and hazardous	Contracted hazardous waste treaters and bulk wastes managers	P5,000- 10,000/ton

1.7 Manpower

1.7.1 Construction Phase

The site development as well as construction and installation activities will require approximately 300 manpower resources and is summarized in the Table below. This manpower will come mainly from the locality, however, specific expertise needed during the construction and operation which could not be found in the locality will be sourced from other regions. The proponent shall coordinate with agencies to look for the required expertise to match the requirement. Gender sensitivity will be applied when recruiting workers. Jobs that are more suited to males will given to males or vise versa. Staff selection will largely be based on skills and capacity regardless of gender.

1.7.2 Operation Phase

One of the long term impact of the project is the generation of employment opportunities. As of this writing, there are around 94 workers in the existing cement plant. Once this expansion is operational, around twenty (20) additional personnel will be needed during the operation and maintenance of the cement processing plant, totaling to 114 staff and workers. This will involve security personnel that will be employed to look after the cement plant. Other sources of employment will involve direct technical service provision to the cement plant e.g. electrical engineers, mechanical engineers, chemical engineers, drivers and among others. Locals may be directly employed by the company when the qualification matches with the requirement.

Plant Expansion	Staff	Ski	lled	Unsk	killed	To	tal
Development Phase	Stall	М	F	М	F	М	F
1. Pre- construction	19	12	3	2	2	14	5
2. Construction	300	12	3	50	20	225	75
3. Operation Phase	114	74	29				

Table 1.22: Manpower Requirement (Construction) with Estimated Gender Proportion

1.8 Project Investment Cost

The estimated cost of the project is approximately **TWO HUNDRED MILLION PESOS (PhP 200,000.000.00)**. The project is planned to continually operate for a period of 20 years if not indefinitely.

1.9 **Project Schedule and Duration**

The total estimated project duration will be around 12 months. Around 1.5 – 3 years is allocated for the actual construction and installation of the facility. The planning and development of Mabuhay Cement Processing Plant Expansion started in the first quarter of 2016. After the acquisition of the development permits, the construction is targeted to be completed within 6 months and the start of operation is targeted to take place as soon as the prerequisite permits are acquired.

Table 1.23: Project Schedule

Schedule	Duration
PROJECT PREPARATION STAGE	
Developing an initial project briefing. This may include; considering	1 month

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Schedule	Duration
feedback from previous projects, defining overall spatial requirement,	
carrying out surveys and quantifying the budget.	
Carrying out feasibility studies	2 months
Undertaking project risk assessment, including; planning risks,	1 month
programs and procurement strategy	тпопат
Social preparation works	2 weeks
Application for other necessary national and local government	
permits once the project's Environmental Compliance Certificate will	6 months
be released	
PROJECT DEVELOPMENT STAGE	
Civil Works	12 months
Mechanical Installations	6 months
Electrical Installations	4 months
Construction of cement plant expansion support facilities	4 months
Construction of pollution control devices	3 months
Construction of wastewater treatment facility	2 months
Construction of rainwater cistern tank	2 months
Air and Water Installation	3 months
OPERATIONAL STAGE	5 months
Buffer / Tree Planting	2 months
Commissioning Stage	3 months

1.10 Summary of Comparison of Old and New Project

This document is for the purpose of amending the approved Environmental Compliance Certificate docketed as **ECC-CO-0809-026-2620** issued to Mabuhay FilCement Inc.'s Mabuhay Cement Processing Plant located in Brgy. South Poblacion, San Fernando, Cebu.

Amendment is due to plant capacity adjustment with the following detailed modifications:

Table 1.24: Summary Comparison of Old and New Project

	Previous ECC	Proposed Expansion
Area	5.5 hectares / 55,491 sq.m.	
Location	Brgy. South Poblacion, San Fernando, Cebu Province	
Production Facilities	6,958 sq.m.	14,000 sq.m.
Support Facilities	8,380 sq.m.	17,559 sq.m.
	Dry Process	
	500,000 MTPY Clinker	1,200,000 MTPY Clinker
Production Rate	Include milling and crushing activities	
	30,000 bags of cement per day (525,600 MTPY)	120,000 bags of cement per day (2,600,000 MTPY)

A number of additional production and support facilities will comprise of the expansion.

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	Previous ECC	Proposed Expansion
Equipment and	Production Facilities Area	Same as previous plus the following
Facilities	6,958 sq.m.	additional facilities:
	Loal Stacker / Storage	Production Facilities Area
	Limestone Stacker / Storage	14,000 sq.m.
		Pozzolan Storago
	Paw Mill Silo	Gynsum Storage
	(2) Electrostatic Precinitator	Clay Storage
	Pre-heater Tower	Copper Slug Storage
	Rotary Kiln	Silica Storage
	AQC-Kiln Hood & Grate Cooler	Spray Tower
	Unburn Clinker Silo	Coal Mill
	Clinker Stacker / Storage	Coal Tube Mill
	Cement Silo 1	Finish Mill Clinker and Additive Bin
	Packhouse 1 & 2	Finish Mill 3, 4, 5
	Finish Mill 1 & 2	Cement Silo 2, 3, 4, 5
		Packhouse 3, 4, 5
	Support Facilities Area	Tonner Bag Storage
	8,380 sq.m.	
		Support Facilities Area
	Electric Power Substations	17,559 sq.m.
	Machine Shop Building & Warehouse	
	Waste Water Treatment Facility	Water Reservoir 1, 2
	Solid Waste / MRF	CCR Building / QA Building
	Canteen	Cement Bag Storage
	(2) Water Pump	(b) Rainwater Latenment lank
	Parking Area	(5) Truck Scale
		Diesei Idlik Aled
		Switch Vard/Main Dower Station
		VECO Metering Station
		Motor Pool Area
		CCR Room
		Compost Area
		Satellite Nursery
		MCC & Power Substation
		Air Compressor House
		Road Network
		Green Belt Area
		Drainage Systems
		(6) Comfort Rooms with Septic Tanks
		Water Recycling Tank
		Hazardous Waste Facility

Table 1.25: Comparison of Existing and Additional Facilities
CHAPTER 2 ASSESSMENT OF ENVIRONMENTAL IMPACTS

그때때때

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2.0 ASSESSMENT OF ENVIRONMENTAL IMPACTS

2.1 Land

2.1.1 Land Use Classification

The Municipality of San Fernando, where the project is situated, consists of 21 barangays and has a total land area of 69.39 km. sq.m.. Of this, 14.34% or 1,061.9048 ha. is zoned for industrial use, this based on the Municipality's Comprehensive Land Use Plan (CLUP). These industrial areas are located in barangays Panadtaran, Greenhills, Balud, Sangat and some parts of South Poblacion. About 22.85 ha. of these industrial zones are situated in an urban area largely in South Poblacion. The proposed Mabuhay FilCement plant expansion site is situated in South Poblacion and accessible to public transport. where the zoning classification is Industrial III. Thus, establishment of Mabuhay FilCement is within allowable usage of the area. In addition, another bigger cement plant is located in the adjacent property. On the other hand there are also residential area in close proximity to the plant who are directly affected by the project. The nearest community is about 10-20 meters away from the property line and the Barangay Hall is situated next to the property.

Land Use	Area (hectares)	% To Total
1.Built Up	389.83	5.26
2. Industrial	1061.9048	14.34
3. Agricultural	2528.19	34.14
4. Mining Area	86.96	1.17
5. Tourism	20	0.27
6. Agro-Forest	2824.21	38.14
7. Roads	420.8862	5.68
8. Fishponds	14	0.19
9. Swamps/Mangroves	24.63	0.33
10. Rivers / Creeks	34	0.46
Total	7,404.61	100%

Table 2.1:San Fernando Zone Classification

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2.1.2 Geology/ Geomorphology

Topography. The Mabuhay Cement Plant is located at about 200~300 m from the municipality center of San Fernando and about 15 m above sea water level. The general topography of the site is flat based on the topographic map below. The expansion of the plant will not alter the topography of the area since there will be no earth movement activity. For the proposed expansion the same area of the plant will be used. No additional land area will be required.

Geology and Soils. San Fernando's geology is basically of Carcar limestone formation. Carcar Formation is transgressive limestone of tertiary percentage which occupies the coastal lowlands of Cebu Island. This formation is characterized by imperfectly developed plain topography, broken only by occasional undulating areas.

Carcar limestone is typically coralline and poorly bedded. However, it is rubble, marl or wellbedded locally. This limestone formation has an average of about 300 meters in thickness and is seldom less than 150 meters thick. It is highly porous and facilitates water percolation that favors the formation of water springs in slopes and dips of the formation. (Arregadas, 2012)

The geology of the area favors the formation of certain soil formation that relates to the basic geological formation of the island. Soils are critical components of landscapes and terrestrial ecosystems. The interactions between the biotic and abiotic components of ecosystems coupled with anthropogenic influences are important factors in soil formation. Due to the fact that soil formation is a very slow process of natural breakdown, weathering and decomposition, soils are deemed as non-renewable natural resource and a fragile component of the ecosystems. [Arregadas, 2012]

Soil characterization is based on moisture storage capacity, fertility, acidity and such related physical and chemical attributes that defines the soil formation in the island. The municipality of San Fernando has two (2) soil types: Carcar Limestone and Barili Formation Marl (See geologic map below).





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Local Hazard. Brgy. South Poblacion is classified under Low Susceptibility to Landslide. Again, as mentioned in the previous sections, the location of the plant site is at a flat terrain area and at a safe distance from rolling hills.



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Map 2.4: Lowland Hazard Area (Less than 2m) and Tsunami-Prone Areas

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Map 2.5: Flood and Slope Hazard Areas



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Local Hazard. From the hazard maps shown above, the location of the cement plant in relation to the hazards identified is: Prone to Liquefaction and Outside the Earthquake Faultlines (Active Faults and Liquefaction), mainly of Limestone formation (Geology Classified by Softness), classified as Low Susceptibility to Earthquake-Triggered Landslides (Earthquake-Triggered Landslides), Prone to Tsunamis (Tsunami-Prone Areas), not within lowland areas (Lowland Hazard Areas, less than 2m), Has slope between 0-6% by 50m Grid (Slope Hazard Areas), Low Susceptibility to Flood Hazards (Flood Hazard Areas), and Low Landslide Hazard (Landslide Hazard Area).

Local Geology. Brgy. South Poblacion, San Fernando, where the cement plant is situated, has geographical coordinates of 10° 9'42.84"N latitude and123°42'16.87"E longitude. The property can be accessed from Natalio B. Bacalso National Highway and is in an Industrial Zone of flat terrain. The location of the project area is currently existing as a cement plant but is surrounded by and buffered by local trees.

With the proposed expansion activities, there is little to none earthwork activities since the proposed expansion is mainly to improve the current capacity of the equipment in the plant. This will then have no impact on the pre-existing geologic hazards in the surrounding areas specifically on landslides and flooding. There will be no added vulnerability or exposure of geologic hazards from these activities on top of the fact that the area is already built-up and flat.

2.1.3 Pedology

The proposed expansion site will be in the same plant site with no increase in land area. The plant site is essentially all built-up with open space for greeneries. The set up of the expansion area will only take up the existing concrete-covered areas.

Soils. The municipality of San Fernando has three (3) general types of soils which are the Faraon Clay Steep Phase (4,372.28 ha. Or 59.05%), Faraon Clay (1,522.58 ha. or 20.56%) and Bolinao Clay (1,509.75 ha. or 20.39%).

Faraon Clay Steep Phase is the prevalent type of soil in the area. This type differs from the Faraon Clay in topography with very steep slopes reaching as high as 100 percent. The hill tops are narrow and sharp. It is generally more elevated than the Faraon Clay type. These hills are united together to form a long range. There is rarely part in this soil type which does not have an undulating surface. Like the other types of the Faraon Series, this type is also well-drained.

Faraon Clay is the second largest soil type in town. This black soil type is derived from the decomposition of coralline limestone. Internal and external drainage occur, but the main bulk of water is drained externally. This makes the surface soil very plastic and sticky when wet and ranging from 10 - 15 cm. in depth. Its slightly acid and alkaline reaction makes it a good soil for sugarcane and legumes. Coconut, however, is the principal crop grown on this soil type, for it helps protect the soil from erosion. Since it prefers a slightly acidic soil with PH from 5.5 to 6.0, it does not grow well on this type of soil.

Bolinao's Clay's surface soil is clayey, red to bright red and ranges in depth from 15 to 20 cm. It is moderately friable, granular when dry, slightly sticky when wet, but does not shrink or crack in open drying. It is fairly rich in organic matter and probably contains exceeding large amounts of iron. It can be widely cultivated to economic crops. Coconut on this type of soil, unless grown near the seashore do not produce well.

The soil analysis inside and outside of the project location is shown in table below. It can be observed that only the Pb content shows an elevated concentration inside the project location due to the previous activity in the Area.

Lab. Code	2008-05-0588	2008-05-0589	2008-05-0590	2008-05-0591
Client's Code	Inside Property	Outside Property	Shooting Range	Tongo Area
PARAMETERS				
Lead (µg/g)	5240	36.23	6.61	14.06
Cadmium (µg/g)	BDL	BDL	BDL	BDL
Antimony (µg/g)	BDL	BDL	BDL	BDL
Mercury (µg/g)	BDL	BDL	BDL	BDL

Table 2.2: Results of Heavy Metal analysis in Soils (F.A.S.T. Laboratories, 2008)

*BDL means Below Detection Limit

Erodability, Sediment Sources Riverbank Stability. The existing land area of the plant can accommodate the expansion facilities given that the added facilities will not require additional land area and major earthmoving activities, thus no loss of topsoil or overburden stripping. There will be no effect to local erosion, soil loss, change in soil quality and fertility.

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2.1.4 Terrestrial Ecology

N		Previous Er	vironment (2009)					Current Env	ironment (2019)			
1	Vege	tation Removal of	and Loss of	Habitat									
	A fe manz trees	ew trees of Aca zanitas trees, Nem s, bamboo species	cia aurea n trees, India and very do	is in the an trees, ba minant are g	area, nana jrass	Few bir residing	ew birds are still seen flying in the area. The fauna located in the periphery of the property are stray d Asiding in the area.					ay dog	
	speci Birds	ies. I can also be obser	rved around t	he vicinity.		Sixty pe landsca Some o were re	Sixty percent of the plant is covered with roof and the greeneries within the property are mainly for andscaping. (see photos below) In addition, the cement plant is surrounded with trees to serve as buffe Some of the trees in 2009 were destroyed due to the road expansion project infront the cement plant bu were replaced with new ones. Replanted trees include neem and indian trees.						
2	Threa	at to Existence of I	Important Lo	cal Species	/ Sum	mary of Endemicity/ Conservation Status							
	There it had The plant Coco agric idle.	e no agricultural c d been classified a properties outsic ed with some corr s nucifera]). Th ultural crops in th	rops in the p nd used as a le the prop a and coconu ese lots a le time being	proposed sit n industrial posed plant ts (Zea mays re utilized p that the ar	e for area. are and for ea is	With th maintai The add added h	e proposed chang ned. ditional component nabitat loss/degrad	es in the pla s will only b lation, fragme	nt, the exist e built and i entation and	ing greeneries and land nstalled at currently ce loss of species.	dscape and mented are	buffer trees eas. There wil	will b
	There the a	e are no endemic rea.	species four	id or observ	ed in								
5	Threa	at to Abundance. F	to Abundance. Frequency and Distribution										
	The abun lands impo	proposed area b dance, frequency scaped plants n rtance.	peing landsc and distri nay not be	aped for y bution of t e of econ	ears, hese omic	The pla plant si maintai strateg	nt has a maintaine te being landscape ned and some sp ic locations to pro	ed landscape d for years, a pecies are a pvide shade,	. There are r bundance, fr dded. The fl to serve aes	no endemic species fou equency and distributio ora inventory are distr sthetic purposes, to se	nd or obser n of these la ributed arou rve as natu	rved in the ar Indscaped pla und the prop ral buffer alo	rea. Th ints ar perty i ong th
		Species	Frequency	Abundance		propert	y perimeter and pla	aced at a saf	e distance fr	om machinery as not to	be a fire ha	zard.	•
		1. <u>Aca<i>cia aurea</i></u>	random	0.01				1_					
		2. Manzanitas	random	0.01			Species	Frequency	Abundance	Species	Frequency	Abundance	
		3. Neem Trees	random	0.01			1. <u>Acacia aurea</u>	random	0.01	7. Grasses	random	0.01	
		4. Indian Trees	random	0.01			2. Manzanitas	random	0.01	8. Magtalisay Trees	random	0.01	
		5. Banana Trees	random	0.01			3. Neem Trees	random	0.01	9. Mahogany Trees	random	0.01	
		6. Coœnut Trees	random	0.01			4. Indian Trees	random	0.01	10. Albor de Santa Maria	random	0.01	
	I	7 Bamhoo	random	0.01			5. Coconut Trees	random	0.01	11. Tipo Trees	random	0.01	
		7. Darmooo	1 I di laoni										

Photos of the site are shown below.



Figure 2.2: View of old Machine Shop and Warehouse of Grand Steel vs Now Administration Office and Mabuhay Warehouse





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Figure 2.3: View of Old Office vs Now Plant Office



Figure 2.4: View of Grand Steel Asia Warehouse vs Now Mabuhay Warehouse



Figure 2.5: View of Grand Steel Asia Road Network vs Now Mabuhay FilCement Road Network



Figure 2.6: Sidewalk and Perimeter Buffer Trees



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Figure 2.7: Site Office Landscape Greenery



Figure 2.8: Buffer Trees at Plant Front/Entrance





Figure 2.9: Seedling Nursery and Planter Strips





2.1.5 Solid Waste and Land Management

According to the Municipality of San Fernando Executive Order No. 14 Series of 2018, with title *"Mandating the Creation of Barangay Solid Waste Management Committee, (BSWMC) in Every Barangay Within the Municipality of San Fernando, Cebu and to Strictly Implement Waste Segregation at Source"* states that all establishments shall segregate their wastes and categorize it to: biodegradable, recyclable and reusable. Each barangay is mandated to have their Materials Recovery Facility as temporary storage for sorted materials before the residual wastes are collected for disposal while the recyclable materials will be sold to third-party buyers, and biodegradable wastes for composting.

By practice, Mabuhay Cement Processing Plant does all the sorting from within the plant's own Materials Recovery Facility. Compostable wastes from the canteen is disposed at the on-site composting areas. Reusable materials are upcycled into other products like bag filters and cement bags into market bags with the help of a local NGO and women's group. Hazardous wastes are properly collected and disposed by an accredited hazardous waste collector. Residual wastes are collected and disposed in coordination with the LGU to a designated landfill. The industrial plant does not use the barangay MRF and its vermiculture composting facility as to not create competition for use of the facility. Also, it is done so that industrial wastes are properly handled by trained workers to avoid exposing the general public to the plant's fugitive dust and hazardous materials.

As for land management, the project site is continuously maintained as it is operated. Housekeeping personnel are assigned to conduct regular sweeping and road sprinkling at the plant's roads to remove silt and avoid spreading of fugitive dust especially during windy days. This is also implemented as to avoid generating mud paddles and soil the delivery truck wheels that may spread it on the public road as they go.

2.2 Water

2.2.1 Hydrology / Hydrogeology

Drainage Morphology

Given that the project expansion will mainly consist of the installation of facilities, the drainage layout of the existing plant site will remain the same. Thus, there is no expected change in the current drainage morphology, and with the project activities, there is no increased inducement of flooding, and no significant reduction of stream volumetric flow particularly that the surface of the plant will not be altered. (see drainage layout below)

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Map 2.6: Plant Drainage Layout



Historical Flooding, Watershed.

The location of the property is not susceptible to flooding. However, along the highway there were reports of flooding particularly in the nearby Pitalo River causing waist deep flood. The flooding was primarily caused by clogging of garbage in November 2016. *(https://cebudailynews. inquirer.net/110895/naga-san-fernando-roads-impassable-due-floods*)

The area is also not situated within the proximity of protected watershed. Thus, it is not critical (see location of protected area as covered in National Integrated Protected Area System (NIPAS)

Change in Stream Water Depth

The proposed expansion project has no significant impact on the morphology of the stream and its water flow and depth. The water extraction, as further explained in the next sections, is only a small fraction of the aquifer yield. Furthermore, the plant implements water recycling to further reduce the water consumption.

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Map 2.7: Location of National Integrated Protected Areas System (NIPAS) Areas

National Integrated Protected Areas System (NIPAS) Areas

Source: JICA Study Team based on GIS Database for Roadmap Planning, 2014.



The maps below shows the Rivers and the Riverbasins of Metro Cebu and the Sabang River adjacent to the existing plant.





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Map 2.9: Sabang River adjacent to Existing Mabuhay Plant

2.2.2 Water Balance and Demand-Supply Analysis

A water balance analysis is presented in the subsequent section to determine the sustainability of supply to water users (domestic and industrial), its impact to the water resource system. The study covers the catchment area of the project site as the main boundary condition.

2.2.2.1 Site Analysis

Catchment area and its geomorphology

The project site is located in Sabang Catchment with a total area of 10.1 sq. km. Delineation of catchment is shown below.

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Map 2.10: San Fernando Watershed Catchment

Based on the NWRB Hydrogeologic Report, the catchment is sitting on an area with a geomorphologic feature known as Quaternary Alluvium (25%), while the upper portion or upstream of the catchment is known as Carcar formation (75%). This types of aquifer exhibit higher water yield generally ranges from 25 to 150 L/s. Thus, wells provide a good source of water. Map below is the location of existing deep wells in the area.



Map 2.11: Deep Well Location

Rainfall Data

The source of water that sustains the groundwater aquifer is the rainfall. Rainfall data from PAGASA Station in Mactan was used in the analysis due to its length of record and reliability. The data provided monthly rainfall from year 2000 to 2018. The average monthly rainfall is shown in the table below. From this data, the annual average rainfall is estimated to be around 1,727 mm.

Table 2.3: Mactan S	Station Average	Monthly Rainfall Data	(PAGASA, 2000-2018)
	ocación / worago		

YEA	2	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
RAINF	٩LL	146.0	96.1	64.1	50.3	116.1	185.5	224.3	154.4	193.5	192.6	134.4	169.7	1727

It can be seen that the month of April is the most critical period during the year due to low rainfall. While the rest of the year from June to December, the rainfall is abundant.

Recharge

Since the project utilizes groundwater source, it is essential that a study on recharge in the area serves as the basis for calculation. Fortunately, a study was recently completed by the NWRB (2018) made an estimates of recharge in various area and of varying geomorphologic formation. Table below shows the monthly recharge in Metro Cebu.

Table 2.4: Monthly Recharge Volume per Geomorphologic Formations in Metro Cebu (2018)

RECHARGE	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Alluvial	46.6	10.9	.8	.6	17.9	0	26.1	24.6	19.7	50	20.6	33.0	250.8
Limestone	66.7	19.3	2.5	3.3	20.6	44.7	80.1	46.3	54.8	72.5	29.3	49	489.1

Source: NWRB Development of Groundwater Management Plan for Highly Urbanized Water Constraint Cities (Study Area: Metro Cebu and Surrounding Areas)

2.2.2.2 Water Demand

Existing Water Demand

The water supply of the cement plant is mainly sourced from its deep wells. The pumped water in the deep well is then stored to the water reservoirs. From the water reservoir, the water is pumped going to a treatment tank (softener) to remove its water hardness. The treated water is then utilized in the plant operations. The spent water in the cooling process is then recycled and is pumped going to a water tank. The water in the tank is allowed to cool before returning it back to the process. Other uses of water in the plant site is for domestic purposes, equipment wash water, civil works & construction use, road sprinkling, plant watering, and cleaning/hygiene purposes. As a result, the daily water demand is **only 33 m³/day**. This is made possible due to the recycling program of the facility. Shown below is the process flow of water usage.

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Figure 2.10: Current Plant Operation Water Balance

Note: Since the cement processing uses the Dry Process Technology, no industrial waste water is generated from the system. The water is continuously recycled in the closed system and losses and spent water is about 33 cu.m./day. This volume loss is replenished from the water sourced from the deep well.

Projected Water Demand

The projected water demand for the expansion of the project is 45 cubic meters per day. This small increase of fresh water is made possible due to recycling. Shown below is the flow chart of water utilization. A tabulation of water usage comparing the existing with the new is also provided.

N	ITEM	CURRENT	EXPANSION				
IN		VOLUME (cu.m. / day)					
	Source Water	327	450				
1	Top-Up Water (actual daily demand)	33	45				
2	Recycled Water	294	405				
	Primary Usage	327	450				
3	Laboratory Washing		1.5				
4	Finish Mill	204	295				
5	Raw Mill, Coal Mill & Clinkering	294	142				
6	Losses from Finish Mill, Raw Mill, Coal Mill and Clinkering Evaporation		1.5				
7	Road and Plant Watering	31.34	5				
8	Equipment Washing						
9	Domestic Use and Washing		5				
10	Domestic Use	1.66					

Table 2.5: Current and Proposed Plant Expansion Water Consumption



Figure 2.11: Proposed Plant Expansion Water Usage

2.2.2.3 Water Balance

The general water balance equation presumes that the continuum are defined within the catchment. The water balance equation following the representation on the side figure can be represented as:

$$P = ET + RO + GWR + \triangle SMS + \triangle SWS + \triangle GWS$$

= precipitation.

where, P

ET = Evapotranspiration RO = Surface Run-off GWR = Groundwater Recharge △SMS, △SWS, △GWS = changes in soil storage, surface water and groundwater reservoirs, respectively.

In comparison to the magnitude of other values, the values for soil storage, surface water and groundwater reservoirs is near negligible and therefore, the water balance equation can be further simplified as:

P = ET + RO + GWR or GWR = P - RO - ET

Since the groundwater recharge have been calculated (NWRB 2018), Figure 2.12: Precipitation - Recharge – the volume of groundwater resource can be easily calculated using Consumption Diagram the continuum area. Shown in the table below is the calculation of groundwater resources.

MONTH	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
RECHARGE		•	•	•	•	•	•		•	•	•	•	
Alluvial (mm)	46.6	10.9	.8	.6	17.9	0	26.1	24.6	19.7	50	20.6	33.0	250.8
Limestone (mm)	66.7	19.3	2.5	3.3	20.6	44.7	80.1	46.3	54.8	72.5	29.3	49	489.1
Area 1 (sq.km.)	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	
Area 2 (sq.km.)	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	
Estimated Volume (cu.m.)	622817	173678	20949	26499	201229	338379	672390	412729	464677	675325	273919	454420	4337011
MFI Water Demand (cubic meter)	1395	1,260	1395	1350	1395	1350	1395	1395	1350	1395	1350	1395	16425

Table 2.6: Water Balance Analysis

Note: Total Area: 10.1 sqkm (Area 1= 7.57 sq.km., Area 2 = 2.53 sq.km.)

Hence, the total recharge to the catchment area is 4,337,011 cubic meters annually. Of the total recharge, MFI will utilize 16,425 cubic meters annually which is 0.37% of the water recharge. In terms of domestic

water demand, the estimated water demand for South Poblacion and the fringes of barangays (with estimated population of 17,315) is estimated at 3,030 cubic meter per day or 1,105,995 cubic meters annually or 25.5% of the total recharge.

Hence, utilization of ground water supply of the proposed expansion of the project would not deprive or compete the demand of the community.

2.2.3 Oceanography

The said project will not affect the oceanography of the area. The location of the project is inland and does not have jetty ports or offshore structures that will change the bathymetry of the area. The project site is surrounded by residential areas, institutional areas and another cement processing plant and is around 600 meters (nearest) from the river mouth adjacent to the Taiheiyo Port area. Therefore, there shall be no effect on coastal erosion and disruption of circulation pattern from the said activities.



Map 2.12: Distance of property from nearest waterbody

2.2.4 Water Quality

The project site is located at Brgy. South Poblacion, San Fernando, Cebu where Sabang Creek is situated. Water supply is derived from deep wells used for both domestic and industrial purposes. There was no reported issues concerning water quality as well as no scarcity of water in the area.



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Below are the sampling point locations for the water quality tests on the coastal, groundwater and surface waters.

Map 2.13: Water Sampling Stations



Table 2.7: Geographical Coordinates of Water Quality Sampling Points

SF Deepwell 1	10° 9′59.58″N	123°41′59.52″E	SFR 2	10° 9′55.68″N	123°42'0.05"E
SF Deepwell 2	10° 9'38.29"N	123°42′14.40″E	SFR 3	10°10'12.90"N	123°41′36.18″E
Plant Site Deepwell	10° 9'42.00"N	123°42'14.40"E	Luknay River	10° 9′39.72″N	123°42'10.38"E
Manugas Residence	10° 9′50.58″N	123°42′15.90″E	Sabang River Mouth	10° 9′24.09″N	123°42'32.14"E
SFR 1	10° 9'48.06"N	123°42′13.74″E	Near Pier	10° 9′20.15″N	123°42'31.33"E

Groundwater

The following tables and figures show the Physico-Chemical characteristics of San Fernando Groundwater from 2008 to 2018.

Surface Water

The following tables and figures shows the result of the water quality tests conducted showing the Physico-Chemical and Bacteriological Characteristics of San Fernando Inland Surface Waters conducted by F.A.S.T. Laboratories on the dates shown in the table in the year 2008 for the baseline data and the succeeding years up to present for the cement processing plant.

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Map 2.14: Groundwater Sampling Stations

Figure 2.13: Groundwater Quality Levels





N	Sample Identification	Coordinates
1	SE Doopwoll 1	10° 09.993' N
I	SF Deepwell 1	123° 41.992' E
2	SE Doopwell 2	10° 09.866′ N
Z	SF Deepwell 2	123º 42.240' E
7	Diant Site Deenwall	10° 09.700' N
3	Plant Site Deepwell	123° 42.183′ E
4	Manugaa Daaidanaa	10° 09.843′ N
4	Manuyas Residence	123° 42.265' E

From the graphs shown for 2008-2018, parameter levels for Fecal Coliform, Total Coliform and Total Suspended Solids are within the standards of 400 MPN/100ml and 110 mg/L, respectively. However, It shows in one instance a spike of the Total Coliform Level at Deepwell 2 (as shown in the map) of 16000 MPN/100 ml for July 18, 2018.



Total Suspended Solids (TSS) Levels of Groundwater









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Note: Water Quality data presented below are based on the parameters in DAO 2016-08. Also, as suggested by the Review Committee during the Technical Scoping that for baseline data, basing from the first ECC application should suffice.

Lab. code	2008-04-0414	2018-GW-SFD1	2008-04-0415	2018-GW-SFD2	2008-04-0416	2018-GW-DPS	2008-04-0417	2018-GW-MR	
North	10° 09	9.993'	10° 0	9.866′	10° 0	9.700′	10° 0		
East	123° 4	1.992'	123° 42.240′		123°4	¥2.183′	123° <i>4</i>	42.265′	PNSDW 2007
Client's code	SF dee	epwell1	SF dee	epwell 2	Plant site	e deepwell	Manugas	Residence	
PARAMETERS	BASELINE	2018	BASELINE	2018	BASELINE	2018	BASELINE	2018	
Temperature (°C)	29.0	30.0	30.0	29.0	32.0	29.0	30.0	28.0	-
Ph	6.90	7.9	7.25	7.3	6.93	8.0	7.52	7.2	6.5 – 8.5
Total suspended solids (mg solids/L)	1.0	<3.0	1.3	<3	1.3	<3	BDL	3	-
Chloride (mg Cl ⁻ /L)	53.0	17.8	48.2	123.5	101.2	219.0	43.3	41.7	250
Total hardness (mg CaCO₃/L)	422	473.80	355	545.65	486	480.11	365	367.44	300
Nitrate (mg N/L)	11.5	1.86	5.75	2.31	2.14	2.62	7.60		50
Fecal Coliforms (Indicator Bacteria per 100 ml)	None detected	>8.0	None detected	<1.8	None detected	26	>200 ≤ 300	3.7	<1
Total Coliforms (Indicator Bacteria per 100 ml)	None detected	>8.0	None detected	<1.8	None detected	140	TNTC	11	< 1
Lead	* BDL (μg/ g)	<0.01 mg/L	BDL (μg/ g)	<0.01 mg/L	BDL (μg/ g)	<0.01 mg/L	BDL	<0.01 mg/L	0.01
Cadmium	*BDL (µg∕ g)	<0.003 mg/L	BDL (μg/ g)	<0.003 mg/L	BDL (μg/ g)	<0.003 mg/L	BDL	<0.003 mg/L	0.003
Antimony	* BDL (μg/ g)	<0.005 mg/L	BDL (μg/ g)	<0.005 mg/L	BDL (μg/ g)	<0.005 mg/L	BDL	<0.005 mg/L	0.005
Mercury	* BDL (μg/ g)	<0.0001 mg/L	BDL (μg/ g)	<0.0001 mg/L	BDL (μg/ g)	<0.0001 mg/L	BDL	<0.0001 mg/L	0.001
Arsenic	-	<0.001 mg/L	-	<0.001 mg/L	-	<0.001 mg/L	-	<0.001 mg/L	0.01

Table 2.8: Physico-Chemical and Bacteriological, Heavy Metals Characteristics of San Fernando Groundwater (F.A.S.T. Laboratories, 2008, 2018)

*BDL = Below Detectable Level

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N	Date Sampled	Sampling Location	Parameter	Parameter Level	Standard (APHA-AWWA, WEF 2005 / 2012) PNSDW 2007 PNSDW 2017	Test Method	Remarks
			Fecal Coliforms (per 100 ml)	None detected	400	Membrane Filtration Method	Failed
			Total Coliforms (per 100 ml)	None detected	400	Membrane Filtration Method	Failed
1	0/. /07 /09	CW/SE Deepwell 1	рН	6.9 @ 29°C	6.0-9.0	Glass Electrode Method	Passed
I	04/07/08	ow Sr Deepwell I	Total Suspended Solids (mg/L)	1	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	NA	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	NA	2	Winkler Method	Passed
			Fecal Coliforms (per 100 ml)	None detected	400	Membrane Filtration Method	Passed
			Total Coliforms (per 100 ml)	*None detected	400	Membrane Filtration Method	Passed
2	0// /07 /00	CW/SE Deenwell 2	рН	7.25 @ 30°C	6.0-9.0	Glass Electrode Method	Passed
2	04/0//08	GW SF Deepwell 2	Total Suspended Solids (mg/L)	1.3	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	NA	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	NA	2	Winkler Method	Passed
			Fecal Coliforms (per 100 ml)	None detected	400	Membrane Filtration Method	Passed
			Total Coliforms (per 100 ml)	*None detected	400	Membrane Filtration Method	Passed
7	0// /07 /00	CW Diant Site Deenwall	рН	6.93 @ 30°C	6.0-9.0	Glass Electrode Method	Passed
3	04/07/08	ow Plaint Site Deepweir	Total Suspended Solids (mg/L)	1.3	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	NA	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	NA	2	Winkler Method	Passed
			Fecal Coliforms (per 100 ml)	>200 ≤ 300	400	Membrane Filtration Method	Passed
			Total Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
1.	0// /07 /00	CW Manugaa Daaidanaa	рН	7.52 @ 30°C	6.0-9.0	Glass Electrode Method	Passed
4	04/0//08	Gw Manuyas Residence	Total Suspended Solids (mg/L)	BDL	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	NA	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	NA	2	Winkler Method	Passed
E	06 /07 /16	CW/ CE Deenwell 1	Total Coliforms (MPN/100 ml)	<1.1	<1.1		Passed
5	00/03/10	ow Sr Deepwell I	Fecal Coliforms (MPN/100 ml)	<1.1	<1.1		Passed
			Total Califorma (MDN/100 ml)	-1.0	.11	Multiple Tube Fermentation technique	Failad
6	07/18/18	GW SF Deepwell 1		<1.8	<1.1	Standard Total Coliform Fermentation Technique	e
			рН	7.1	6.5 - 8.5	Glass Electrode Method	Passed

Table 2.9: Ground Water Quality in San Fernando (2008-2018)

N	Date Sampled	Sampling Location	Parameter	Parameter Level	Standard (APHA-AWWA, WEF 2005 / 2012) PNSDW 2007 PNSDW 2017	Test Method	Remarks	
7	07/18/18	GW SF Deepwell 2	Total Coliforms (MPN/100 ml)	16 x 10^3 <1.1		Multiple Tube Fermentation technique	Failed	
						Standard Total Coliform Fermentation Technique		
			рН	7.2	6.5 - 8.5	Glass Electrode Method	Passed	
8	07/18/18	GW SF Deepwell 3	Total Califorma (MDN/100 ml)	<1.1	<1.1	Multiple Tube Fermentation technique	Passed	
						Standard Total Coliform Fermentation Technique		
			рН	7.01	6.5 - 8.5	Glass Electrode Method	Passed	
0	09/20/18	GW - Deepwell 1 Plant Site	рН	8.0 @ 29°C	6.0-9.0	Electrometric	Passed	
9			Total Suspended Solids (mg/L)	< 3	110	Gravimetric	Passed	
10	00/20/19	GW - Deepwell 2 Plant Site	рН	7.3 @ 29°C	6.0-9.0	Electrometric	Passed	
10	09/20/10		Total Suspended Solids (mg/L)	< 3	110	Gravimetric	Passed	
11	09/20/18	GW - Manugas Residence	рН	7.2 @ 28°C	6.0-9.0	Electrometric	Passed	
			Total Suspended Solids (mg/L)	3	110	Gravimetric	Passed	
12	00/21/10	GW SE Doonwoll 1	рН	7.9 @ 30°C	6.0-9.0	Electrometric	Passed	
12	12 UJ/21/10	ow or neepweir i	Total Suspended Solids (mg/L)	< 3	110	Gravimetric	Passed	

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Map 2.15: Surface Water Sampling Stations

Total Suspended Solids (TSS) Levels of Surface Waters







From the graphs shown, it is observed that from 2008 to 2018, the values for TSS, BOD and DO for Sabang River and Luknay Creek (as located in the map above) has, over the years, lowered. TSP and BOD levels being well within the DENR Standards of 110 mg/L and 15 mg/L, respectively. Also, DO levels are above the minimum standard requirement of 2 mg/L. This can be inferred that with the introduction of the cement plant activities from 2009 to present has no significant impacts as to surface water quality.

Dissolved Oxygen (DO) Levels of Surface Waters









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Note: Water Quality data presented below are based on the parameters in DAO 2016-08. Also, as suggested by the Review Committee during the Technical Scoping that for baseline data, basing from the first ECC application should suffice.

Table 2.10: Physico-Chemical, Bacteriological and Heavy Metals Characteristics of San Fernando Inland Surface Waters (F.A.S.T. Laboratories, 2008 and 2018)

Lab. code	2008-04-0410	2018-ISW- SFR 1	2008-04-0411	2018-ISW-SFR2	2008-04-0412	2018-ISW-SFR3	2008-04-0413	2018-ISW-L	DAO 2016-08
North	10° 09.801′		10° 09.928′		10° 10.215′		10° 09.662′		
East	123° 42.229′		123° 42.051′		123° 41.603′		123º 42.173'		Class B
Client's code	SFR 1		SFR 2		SFR 3		Luknay		
PARAMETERS	BASELINE	2018	BASELINE	2018	BASELINE	2018	BASELINE	2018	
Temperature (°C)	28.0	27.0	33.0	27.0	33.0	27.0	35.0	30.0	26-30
рН	7.70	7.8	8.07	7.9	7.90	7.8	8.10	8.0	6.5-8.5
Dissolved oxygen (mg O ₂ /L)	6.8	6.0	12.7	6.0	10.2	7.0	5.8	6.0	5.0
Biochemical oxygen demand (mg O ₂ /L)	3.2	2.0	2.8	2.0	3.6	2.0	2.9	3.0	5.0
Total suspended solids (mg solids/L)	1.0	7.0	6.3	11.0	6.3	6.0	3.8	4.0	65.0
Chloride (mg Cl ⁻ /L)	25.7	22.5	26.3	22.0	25.2	25.7	27.0	31.8	250
Oil and Grease <i>(mg/L)</i>	<1	<1	<1	<1	<1	<1	<1	<1	1
Fecal Coliforms (Indicator Bacteria per 100 ml)	TNTC	35x10 ²	TNTC	35x10 ²	TNTC	920	TNTC	540	100
Total Coliforms (Indicator Bacteria per 100 ml)	TNTC	92x10 ²	TNTC	54x10 ²	TNTC	54x10 ²	TNTC	54x10 ²	1000
Lead (mg/L)	*BDL	<0.01 mg/L	BDL (μg/ g)	<0.01 mg/L	BDL	<0.01 mg/L	BDL	<0.01 mg/L	0.01
Cadmium (mg/L)	*BDL	<0.003 mg/L	BDL	<0.003 mg/L	BDL	<0.003 mg/L	BDL	<0.003 mg/L	0.003
Antimony (mg/L)	*BDL	<0.005 mg/L	BDL	<0.005 mg/L	BDL	<0.005 mg/L	BDL	<0.005 mg/L	-
Mercury (mg/L)	*BDL	<0.0001 mg/L	BDL	<0.0001 mg/L	BDL	<0.0001 mg/L	BDL	<0.0001 mg/L	0.001
Arsenic (mg/L)	-	<0.001 mg/L	-	<0.001 mg/L	-	<0.001 mg/L	-	<0.001 mg/L	0.01
Nitrate (mg/L)	-	1.69	-	1.79	-	1.59	-	2.67	7
Phosphate (mg/L)	-	0.01	-	0.01	-	<0.01	-	0.05	0.5

*TNTC = >200 colonies/100 ml

*BDL = Below Detectable Level
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Table 2.11: Surface Water Quality in San Fernando (2008-2018)

Surface Water

N	Date Sampled	Sampling Location	Parameter	Parameter Level	Standard (APHA-AWWA, WEF 2005 / 2012) PNSDW 2007 PNSDW 2017	Test Method	Remarks
			Fecal Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
			Total Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
1	0// /07 /08	SW/ SED1	рН	7.7 @ 28°C	6.0-9.0	Glass Electrode Method	Passed
	04/07/08	3W 3I KI	Total Suspended Solids (mg/L)	1	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	3.2	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	6.8	2	Winkler Method	Failed
			Fecal Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
		SW SFR2	Total Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
2	04/07/08		рН	8.07 @ 33℃	6.0-9.0	Glass Electrode Method	Passed
2	04/07/00		Total Suspended Solids (mg/L)	6.3	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	2.8	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	12.7	2	Winkler Method	Failed
		SW/ SED2	Fecal Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
			Total Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
3	04/07/08		рН	7.9 @ 33℃	6.0-9.0	Glass Electrode Method	Passed
	04,07,00		Total Suspended Solids (mg/L)	6.3	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	3.6	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	10.2	2	Winkler Method	Failed
			Fecal Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
			Total Coliforms (per 100 ml)	TNTC	400	Membrane Filtration Method	Failed
4	04/07/08	SW Lukay Piyor	рН	8.10 @ 35°C	6.0-9.0	Glass Electrode Method	Passed
-	04,07,00		Total Suspended Solids (mg/L)	3.8	110	Gravimetric	Passed
			Biochemical Oxygen Demand (BOD) (mg/L)	2.9	15	5-Days Dilution Technique	Passed
			Dissolved Oxygen (DO) (mg/L)	5.8	2	Winkler Method	Failed

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N	Date Sampled	Sampling Location	Parameter	Parameter Level	Standard (APHA-AWWA, WEF 2005 / 2012) PNSDW 2007 PNSDW 2017	Test Method	Remarks
			рН	7.8 @ 27°C	6.0-9.0	Electrometric	Passed
5	00 /20 /19	Inland SW/ SED 1	Total Suspended Solids (mg/L)	7	110	Gravimetric	Passed
5	09/20/16		Biochemical Oxygen Demand (BOD) (mg/L)	2	15	5-Day BOD Test	Passed
			Dissolved Oxygen (DO) (mg/L)	6	2	Iodometric	Failed
			рН	7.9 @ 27°C	6.0-9.0	Electrometric	Passed
6	6 09/20/18 Inland SW SFR	Inland SW/ SED 2	Total Suspended Solids (mg/L)	11	110	Gravimetric	Passed
U			Biochemical Oxygen Demand (BOD) (mg/L)	2	15	5-Day BOD Test	Passed
			Dissolved Oxygen (DO) (mg/L)	6	2	Iodometric	Failed
			рН	7.8 @ 27°C	6.0-9.0	Electrometric	Passed
7	00 /20 /19	Inland SW SFR 3	Total Suspended Solids (mg/L)	6	110	Gravimetric	Passed
'	09/20/18		Biochemical Oxygen Demand (BOD) (mg/L)	2	15	5-Day BOD Test	Passed
			Dissolved Oxygen (DO) (mg/L)	7	2	Iodometric	Failed
			рН	8.0 @ 30°C	6.0-9.0	Electrometric	Passed
0	00 /20 /19	Inland SW Luknay	Total Suspended Solids (mg/L)	4	110	Gravimetric	Passed
0	09/20/16		Biochemical Oxygen Demand (BOD) (mg/L)	3	15	5-Day BOD Test	Passed
			Dissolved Oxygen (DO) (mg/L)	6	2	Iodometric	Failed
0	10 /26 /19	Effluent Doint 2	ph	7.61 @ 21.8°C	6.0-9.0	Electrometric	Passed
9	9 10/26/18		Total Suspended Solids (mg/L)	7	110	Gravimetric	Passed

Sabang river is the closest stream water body stretching the area within the proposed cement project and the *Luknay* creek in the opposite part of the proposed study area. Since the literature review showed no previous classification of the stream water body in San Fernando, this study aims to classify the stream water body according to DAO 34-90 guidelines. There are two stream water body that has been considered in the work, the *Sabang* river with sampling points SFR1, SFR2 and SFR3 and the *Luknay* Creek.

<u>Coastal / Marine Water</u>

The following table shows the Physico-Chemical characteristics of San Fernando Coastal Waters. It can be seen that so far the seawater in San Fernando didn't show any warning elevation of any parameters that can indicate pollution.

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Map 2.16: Marine Water Sampling Stations

Figure 2.15: Marine Water Quality Levels

N	Sample Identification	Coordinates
1	Sabang River Mouth	10° 9′24.09″N 123°42′32.14″E
2	Near Pier	10° 9'20.15"N 123°42'31.33"E

The graphs above show that the TSS and BOD levels of San Fernando Marine water are well within the DENR water quality standards from 2008 to 2018. However, the TSS levels have increased over the years. For Dissolved Oxygen, the trend has decreased from 2008 to 2018, but the levels are still above the required DO standard of 2 mg/L.





Note: Water Quality data presented below are based on the parameters in DAO 2016-08. Also, as suggested by the Review Committee during the Technical Scoping that for baseline data, basing from the first ECC application should suffice.

Table 2.12: Physico-Chemical, Bacteriological and Heavy Metals Characteristics of San Fernando Coastal Water (F.A.S.T. Laboratories, 2008, 2018)

Lab. code	2008-06-0750	2018-MW-SRM	2008-06-0751	2018-MW PII-NP	DAO 2016-08
Client's code	Point I Sabang River Mouth		Poi Nea	CLASS SC	
PARAMETERS	BASELINE	2018	BASELINE	2018	
Temperature (°C)	28.2	30.0	28.2	30.0	25-31
рН	7.87	7.6	7.95	8.1	6.5-8.5
Dissolved oxygen (mg O ₂ /L)	8.50	6.0	6.50	4.0	5.0
Biochemical oxygen demand (mg O ₂ /L)	2.79	3.0	2.85	3.0	-
Total suspended solids (mg solids/L)	4.50 (±1.00)	42.0	39.0 (±2.00)	50.0	80
Oil and Grease <i>(mg/L)</i>	BDL	<1	BDL	1	3
Fecal Coliforms (Indicator Bacteria per 100 ml)	TNTC	54x10 ²	TNTC	920	200
Total Coliforms (Indicator Bacteria per 100 ml)	TNTC	92x10 ²	TNTC	92x10 ²	-
Lead (µg/ g)	BDL	<0.01 mg/L	BDL	<0.01 mg/L	0.05
Cadmium (µg/ g)	BDL	<0.003 mg/L	BDL	<0.003 mg/L	0.005
Antimony (µg/g)	BDL	<0.005 mg/L	BDL	<0.005 mg/L	-
Mercury (µg/g)	BDL	<0.0001 mg/L	BDL	<0.0001 mg/L	0.002
Arsenic (µg/g)	-	<0.001 mg/L	-	<0.001 mg/L	0.02
Chloride (mg/L)	-	11698.5	-	2199.3	-
Nitrate (mg/L)	-	0.32	-	1.57	10
Phosphate (mg/L)	-	0.18	-	0.03	0.5

*TNTC = > 200 colonies/100 ml

*BDL = Below Detectable Level

Siltation and Wastewater Discharges from the Plant

Silt ponds and silt traps installed in the plant prevents silts from the property entering the river. The plant management is also actively involved in the Adopt-A-River program which has increased the awareness of river pollution among workers and employees in the plant.

On the other hand, sewage generated from the plant with around 5cum per day passes through septic tank system. It has been monitored and has met the requirement of DENR. See table below. However, however, test should also include other parameter such as BOD5 as one of the key parameter.

Table 2.13: Domestic Wastewater Discharge Quality Results

Sampling Location	Effluent Point 2								
Date Sampled	Parameter	Parameter Level	Standard	Test Method	Remarks				
10 /26 /10	ph	7.61 @ 21.8°C	6.0-9.0	Electrometric	Passed				
10/20/18	Total Suspended Solids (mg/L)	7	110	Gravimetric	Passed				

2.2.5 Freshwater Ecology

Table below shows the previous and current ecological condition of the area.

N	Previous Environment (2009)	Current Environment (2019)
1	Abundance of ecologically and ecolog	gically important species
	The creek along the project site is considered as a dry river wherein runoff water is only observed during heavy rains. Vegetation observed in the river are mostly grass, weeds and bushes. Moreover, the area is characterized by Type III Climate under Coronas Classification, there is no pronounced rainy season.	The creek along the project site is still considered as a dry river . Current river condition is similar to the previous condition as reported in 2009. NO CHANGE FROM PREVIOUS RIVER/CREEK DESCRIPTION.
2	Presence of Pollution Indicator Speci	es
	There are no pollution indicator species observed in the river.	There are no pollution indicator species observed in the river. NO IMPROVEMENT OR CHANGE FROM PREVIOUS RIVER/CREEK DESCRIPTION.
3	Threat to Existence or Loss of Specie	S
	No Statement	With no observed changes from 2009 to present. The expansion is not expected to change the river ecology or threaten the loss of the species in the river. Although this has to be monitored.

Previously (2009), no sampling map was provided. Below is the sampling map used in the MMT monitoring activities at present.

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Map 2.17: Freshwater Sampling Map



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Figure 2.16: Sabang River during Clean Up Drive in 2016



Figure 2.17: Sabang River during Clean Up Drive in 2018

2.2.6 Marine Ecology

Marine ecology is not affected by the project since the project does not involve activities, discharges and structures in marine waters. The total marine ecology shall not be affected in terms of the loss of local species, threat of abundance and frequency and distribution.

The Marine study covers the inventory of the Reef Condition, Coral Condition, Fish Visual Census (Reef Fishes), Seagrass Assessment and Mangrove Ecosystem Assessment. The following maps are the sampling locations for the Marine Study conducted last July 6-11, 2018. Additionally, the following figures show a representative marine condition. Further information on the discussion below can be found in the Marine Study in the annex of the same report.

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Map 2.18: Substrate composition along the coast in the northern part of the 1km impact areas of Mabuhay Cement Processing Plant covering the coastal waters of Brgy. San Isidro, Poblacion North and Poblacion South, San Fernando, Cebu during the Manta-Tow Survey (Reef Condition)



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Map 2.19: Substrate composition along the coast in the northern part of the 1km impact areas of Mabuhay Cement Processing Plant covering the coastal waters of Brgy. Panadtaran, San Fernando, Cebu during the Manta-Tow Survey (Reef Condition)



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Map 2.20: Monitoring stations of the corals and reef fishes surveys within the 1km radius impact area of Mabuhay Cement Processing Plant, San Fernando, Cebu

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Map 2.21: Map of seagrass beds surveyed along the 1km radius impact areas of Mabuhay Cement Processing Plant

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Figure 2.18: Heavy disturbance present in the mangrove area such as a building of houses (B & D) and garbage pollution (A, C, & D) evident in T1 sampling station, captures on July 6, 2018



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Figure 2.19: Reclamation for various developments in San Fernando, Cebu: (A, C &D) wharves, (B) Resort

Summary of Marine Conditions

- The coral reef in the coastal area within the 1km radius impact areas of Mabuhay Cement Plant is under poor condition (6-10% live coral cover).
- The reef fish abundance in Brgy. San Isidro and Brgy. Panadtaran is under poor (308 ind/500m2) and moderate (461.5 ind/500m2) conditions (Hilomen et.al, 2000).
- The reef fish biomass(kg) in Brgy. San Isidro and Brgy. Panadtaran is categorized under very poor (2.39 kg/500m2) and poor (4.43 kg/500m2) (Hilomen et.al, 2000).
- The reef fish species richness of the stations Brgy. San Isidro and Brgy. Panadtaran is both in moderate (35 sp/500m2 and 35.5 sp/500m2) condition (Hilomen et.al, 2000).
- Seagrass composition within the 1km radius impact areas of Mabuhay Cement Plant is diverse (based on Shannon-weiner diversity index) with a total of 8 seagrass species recorded (Cymodocea rotundata, Enhalus acoroides, Halodule pinifolia, Halodule, uninervis, Halophila minor, Syringodium filiforme, S. isoetifolium, Thalassia hemprichii).
- Seagrass beds in the surveyed area are under good condition with a total of 57% seagrass cover, however it is classified as disturbed because it occupy areas near human habitation that receive direct impacts from anthropogenic activities (Fortes, 1989).
- Mangrove area has a low diversity index (0.38) based on the Shannon-Weiner formula where a total of six (6) mangrove species recorded: Avicennia marina, Ceriops decandra, Bruguiera gymnorrhiza, Rhizophora apiculata, Rhizophora stylosa, Sonneratia alba.
- Mangrove environmental condition falls into the poor category due pronounced anthropogenic activities. However, mangrove stands (height) is not yet threatened and is under FAIR category.
- Overall, the status from the different marine ecosystem such as coral reef (corals and fish), seagrass beds, and mangrove ecosystem based on the surveyed results are poor and threatened by pronounced anthropogenic activities specifically household drainage, illegal cutting of

mangrove trees, land reclamation for various developments (port, houses), garbage pollution, and active port activities (local pumpboats, ships, and small vessels).

2.3 Air

2.3.1 Meteorology / Climatology

Meteorology

The weather in San Fernando, Cebu from March to May is hot and relatively dry with temperature ranging from 23.9 to 32.8 °C. From June to October is the typhoon season and it is generally rainy. From November to February, the climate is cooler with temperatures ranging from 23.9 to 24.7 °C. The average year-round humidity is 81%. Figure nos. 3.7to 3.9 shows the climatological normals, wind speed-direction distribution rose frequency and wind rose at San Fernando, Cebu, respectively.

						N	ORMA	L VA	LUES	1	_		_			
Station	Name :	MAC	TAN I	NTRN	L. AIRF	PORT, C	EBU			Latitu	de :1	0°17'48	" N	Elevati	on: 12	.8 m
Period	ŗ1	.981 -	2010							Longt	itude: 1	23°'57"-	48 E			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(1	(6)
	Rainf	all			Tempe	erature				-		Win	nd		No. D	avs w/
Month	Amount	No.	Max	Min	Mean	Dry	Wet	Dew	Vapor	Rel.	MSLP	DIR	SPD	Cloud	TSTM	LING
<u>1</u>	100000-001	of		(10)		Bulb	Bulb	Pt.	Pressure	Hum.	(1. mm)		A. 1	Amount		-
1	(mm)	KD	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(mbs)	75	(MBS)	(16 pt)	(mps)	(okta)		-
JAN	105.2	12	29.8	23.9	26.8	26.7	24.4	23.6	29.0	\$3	1011.7	NE	3	6	1	0
FEB	69.6	9	30.2	24.0	27.1	26.9	24.4	23.5	28.8	\$1	1011.9	NE	3	5	1	1
MAR	58.6	S	31.1	24.5	27.8	27.8	24.9	23.9	29.5	79	1011.7	NE	3	5	1	1
APR	48.1	б	32.3	25.4	28.8	28.9	25.6	24.5	30.5	77	1010.7	NE	3	4	3	2
MAY	95.0	8	32.8	25.8	29.3	29.3	26.1	25.1	31.6	78	1009.8	E	2	5	9	8
JUN	175.6	14	32.1	25.4	28.8	28.6	25.9	25.0	31.5	81	1009.5	SW	2	6	11	9
JUL	192.9	16	31.5	24.9	28.2	28.0	25.6	24.8	31.2	82	1009.4	SW	2	6	13	9
AUG	143.5	14	31.7	25.0	28.4	28.1	25.5	24.6	30.8	\$1	1009.3	SW	3	6	11	7
SEP	179.6	15	31.8	24.9	28.3	28.1	25.6	24.8	31.1	82	1009.7	SW	2	6	14	10
OCT	194.8	16	31.4	24.8	28.1	27.9	25.6	24.8	31.2	83	1009.7	NE	2	6	14	10
NOV	161.9	14	31.0	24.7	27.8	27.7	25.4	24.6	30.8	\$3	1010.1	NE	3	6	6	6
DEC	139.7	14	30.2	24.3	27.3	27.1	24.9	24.1	30.0	84	1010.9	NE	3	5	3	2
ANNUAL	1564.5	146	31.3	24.8	28.1	27.9	25.3	24.4	30.5	81	1010.4	NE	3	6	87	65

	Table 2.14:	Climatological	Norms,	Cebu
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Figure 2.20: Wind Direction, San Fernando



Windrose diagram generated using WRPlot view Version 5.8 software which utilizes SCRAM (.DAT) files. Wind direction was oriented in "Blowing from" configuration. Figure below presents the annual wind rose diagram at SAN FERNANDO, CEBU Synoptic Station.

The nearest synoptic meteorological observations were recorded by the Philippine Atmospheric Geophysical Astronomical Administration (PAGASA) located at approximately12 kilometers northeast of the plant. As per certified climatological data of PAGASA, the predominant annual average wind speed of around is 3.0 m/s. In Figure 3.9, WRplot ver. 5.9 windrose plotter gives prevailing wind direction at 59.9% occurs frequently between 0.1 to 2.1 m/s while 21.7% between 2.1 to 3.6 m/s tends predominantly to the South West and North East directions.



Figure 2.21: Wind Rose Diagram, San Fernando

<u>Climate</u>

The major factors that affect the climate of the project site are the air streams, its topography and geographic setting. Two principal air streams dominate the region, namely, the Northeast Monsoon which prevails from October to April and the Southwest Monsoon which is prevalent from May to September. Since the project site is located along the eastern part of Cebu province, it is exposed to the effects of the Northeast Monsoon. The climate at San Fernando, Cebu generally falls under Type III based on the Coronas Classification of Philippine Climate which means seasons are not very pronounced: relatively dry from November to April and wet during the rest of the year. The maximum rain period occurs from the month of June to December. The easter portion of the region is directly exposed to the open sea. The presence of this open sea consequently promotes additional amount of sea moisture over San Fernando, Cebu.



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Map 2.22: Climate Map in the Philippines

Tropical Cyclones

Some of the notable storms that have hit Cebu Province are listed in the table below –showing the date of occurrence and wind speed, among other data.

Name of Typhoon	Date of Occurrence	Date and Time of Passage	Max. wind recorded at station (kph)	24 hrs Rainfall (mm)	Lowest Pressure (msl)
AMY	Dec 5-19, 1951	12:30am, Dec 10, 1951	240	195.3	971.3
NITANG	Aug 31 – Sept 4, 1984	8:30am, Sept 2, 1984	176	42.2	982
UNDANG	Nov 3-6, 1984	8:30am, Nov 5 1984	90	70.6	1002.8
RUPING	Nov 10-14 1990	5:37am, Nov 13, 1990	205	276.1	971.1
PURING	Dec 23-27, 1993	9:15pm, Dec 26, 1993	120	105	984.7
BISING	Apr 1-6, 1994	4:45pm, Apr 14, 1994	120	174	998
GARDING	Dec 19-24, 1994	4:00am, Dec 21, 1994	60	16	1004.7
PEPANG	Oct 26-30, 1995	2:35pm, Oct 28, 1995	90	166.1	995.1
YOLANDA	Nov 3-11, 2013	4:40am, Nov 8, 2013	315	480	895
GLENDA	Jul 9-20, 2014	11:00pm, Jul 15, 2014	165	120	935
NINA	Dec 21-25, 2016	6:00am, Dec 25, 2016	260	152	915

Table 2.15: Significant Typhoons which Affected Cebu Province

Several other typhoons of lesser magnitude, not listed above have affected Cebu Province aside from what is presented in the table above. More than half of those came during the month of November and December. The typhoon "YOLANDA" with the maximum wind at 235 kph has caused major damage in Northern Cebu and devastated many areas in the Visayas.

2.3.2 Air Quality

The Municipality of San Fernando is generally experiencing more air pollution due to the presence of industries that emits air pollution, aside from the project itself.

With the presence of two cement plants coupled with with ongoing road construction and the presence of the nearby communities, air pollution will be considered as major concern during the construction and operation of the plant. Air pollution is injurious to human, plant, or animal life, or property, or which may unreasonably interfere with the comfortable enjoyment of life or property, or conduct of business. The characteristics of air pollution from the proposed cement factory are 'man-made sources' and the potential sources are the stacks from kiln and fugitive-dust emission from quarry site and bagging plant.

Under the Clean Air Act of 1999, the criteria air pollutants have been established. These values where set in the National Ambient Air Quality (NAAQ) Guideline Values (see table below). DENR-Environmental Bureau Management has been given the authority to monitor the concentrations of

these criteria pollutants. These pollutants include total suspended particulates (TSP), particulate matter 10 microns in diameter (PM_{10}); sulfur dioxide (SO_2); nitrogen dioxide (NO_2); carbon monoxide (CO); lead (Pb); and ozone (O_3).

Pollutants	Short Term	Long Term
TSP	230 µg/m	90 µg/m
PM10	150 µg/m	60 µg/m
Sulfur Dioxide	180 µg/m	80 µg/m
Nitrogen Dioxide	150 µg/m	
Photochemical	1/10 µg/m	
Oxidants/Ozone	140 µy/111	
Carbon Monoxide	35 µg/m	
Lead	1.5 µg/m	1 µg/m

Table 2.16: Philippine National Ambient Air Quality Guidelines Values

Source: Philippine Clean Air Act of 1999, Section 12

Note: Data presented below are based on the baseline data collected from the first ECC application of the said project. Also, as suggested by the Review Committee during the Technical Scoping that for baseline data, this should suffice. But for monitoring purposes, PM₁₀ shall be included along with TSP, SO₂ and NO₂.

The Mabuhay FilCement management requested a number of accredited laboratories to conduct air sampling within the area for baseline data and for monitoring. The following presents the sampling locations, the air quality trend from 2008 to presents and the laboratory test result.

Greenhouse Gas Emissions (GHG)

Carbon dioxide is produced during the production of clinker, an intermediate product from which cement is made. High temperatures in cement kilns chemically change raw materials into cement clinker. In a process called *calcination* or *calcining*, calcium carbonate is heated, forming lime and carbon dioxide. SO_2 emissions will originate from sulphur in the fuel and in the clay raw material. The fuel emissions are counted as energy emissions while the SO_2 from the clay should be counted as non-combustion emissions.

Because CO_2 is emitted during clinker production (rather than cement production itself), emission estimates should be based on the lime content and production of clinker. Estimation of CO_2 emissions from clinker production is accomplished by applying an emission factor, in tonnes of CO_2 released per tonne of clinker produced, to the annual clinker output.

Emission of CO₂ = Clinker Production x Emission Factor

Emission Factor (t CO2/t clinker) = 0.5701

Estimation of SO_2 emissions from cement production is accomplished by applying an emission factor, in terms of SO_2 released per tonne of cement produced, to the annual cement output. A

non-combustion emission factor of 0.3 kg SO₂/tonne cement has been calculated (see the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual* for sources).

Emission of SO₂ = Cement Production x Emission Factor

Emission Factor (kg SO_2 /ton cement) = 0.30

The table below shows the emission calculations for the present and the expansion of the plant's production process. The emission of the plant is considering an 11-month operation yearly and a 30-day operation monthly. *(Note: No clinkering activity since May 2016 to present)*

	Clinker Production	Cement Production	Emission Calculation
Current Operations	500,000 MTPY	650,000 MTPY	285,050 MTPY CO ₂ gas 195 MTPY SO ₂ gas
Future Operations	1,200,000 MTPY	2,600,000 MTPY	$684,120 \text{ MTPY CO}_2 \text{ gas}$ $780 \text{ MTPY SO}_2 \text{ gas}$

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Map 2.23: Ambient Air Sampling Stations

Ambient Air TSP Levels in South Poblacion, San Fernando



Date

Brgy. Luknay Basketball Court
 Near Sabang River
 Standard Allowable TSP
 Near Administration Building
 Near Guard House
 South Poblacion Barangay Hall
 Front of San Isidro Labrador Parish

Figure 2.22: Ambient Air TSS Results

The figures above shows that the TSP levels on four separate sampling occasions did not pass DENR ambient air standards. These occurred on the first quarter of 2008 (baseline data), the first quarter of 2014, the fourth quarter of 2015 and the fourth quarter of 2016. These exceedances were located in the sampling station of "Near Guard House" and Sitio Luknay Basketball Court. The guard house location is fronting the National Highway and the court's location is in the west side of the plant and in an open space between Mabuhay Cement Processing Plant and Taihaiyo Cement Plant. However, on other occasions, with the other sampling locations, north of the cement plant, the TSP levels are at par with the standard.



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N	Sample Identification	Coordinates				
1	Brgy. Luknay Basketball Court	10° 9′39.93″ N	123°42'13.55″ E			
2	Vacant Lot in Brgy. Kapangi-an, South Poblacion	10° 09' 51.6" N	E123° 42′ 14.1″			
3	Near Sabang River	10° 9'48.89" N	123°42'17.40" E			
4	Near Administration Bldg	10° 9'37.41″ N	123°42′16.94″ E			
5	Near Guard House	10° 9'37.14″ N	123°42′18.40″ E			
6	South Poblacion Barangay Hall	10° 9′35.05″ N	123°42'17.38" E			
7	Front of San Isidro Labrador Parish	10° 9′45.92″ N	123°42′24.76″ E			

Table 2..17: Ambient Air Sampling Locations Geocoordinates

Table 2..18: Ambient Air TSS Sampling Results

N	Date Sampled	Total Suspended Solids (TSP) (µg/Ncm)	DAO 2000-81, NAAQS Standards	Sampling Location	Method	Remarks
1		117.1	300	Near Administration Bldg		Pass
2		34.4	300	Near Guard House		Pass
3	April 2008	301.2	300	South Poblacion Barangay Hall		Fail
4		60.7	300	Front of San Isidro Labrador Parish		Pass
5	March 31, 2014	315	300			Fail
6	March 13, 2015	257	300			Pass
7	April 29, 2015	133	300	Sitio Luknay		Pass
8	July 27, 2015	27	300	Basketball Court		Pass
9	November 11, 2015	568	300		Gravimetric	Fail
10	November 11, 2016	513	300			Fail
11	January 27, 2017	91	300	Vacant Lot in Brgy.		Pass
12	March 15, 2017	247	300	Kapangi-an, South		Pass
13	June 7, 2017	16	300	Poblacion		Pass
14	May 9, 2018	86	300	Near Sabang River	High-Volume/ Filtration	Pass
15	May 11, 2018	64	300		Gravimetric	Pass
16	December 6, 2018	41	300		High-Volume/ Filtration	Pass
17	December 7, 2018	31	300		Gravimetric	Pass

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N	Date Sampled	Total Suspended Solids (TSP) (µg/Ncm)	DAO 2000-81, NAAQS Standards	Sampling Location	Method	Remarks
18	February 1, 2019	171	300		Gravimetric	Pass

Table 2..19: Ambient Air NO₂ and SO₂ Sampling Results

N	Date Sampled	Nitrogen Dioxide (NO ₂) (µg/Ncm)	Sulfur Dioxide (SO ₂) (µg/Ncm)	Sampling Location	Remarks
1		Not Detected	0.1	Near Administration Bldg	Pass
2		Not Detected	Not Detected	Near Guard House	Pass
3	April 2008	3.2	0.1	South Poblacion Barangay Hall	Pass
4		Not Detected	Not Detected	Front of San Isidro Labrador Parish	Pass

2.3.3 Air Pollution Sources and Emission Inventory

a) Point Source Pathway

Stack Emission (Point Source) were taken from Actual Stack Testing Results.

Eg. Kiln Stack Emission Strength_{PM} (g/s) = Conc(20.3mg/Nm3) X VFR(5,000 M^3 /Min) X Conversion = g/sec.

Using EF method:

Stack Emission Strength (g/s) = MT Raw Material/hr X 1000g/2210 lb X yr/288d X d/3600sec

Kiln	tons of Materials processed/hr	Operating Hours /day	"Diameter or Width (m)	Length (m)	Area, m²	(Nm3/min)	(m/sec)	РМ	со	NOx	Sox
Kiln Stack	neter or Widt	8,760	2.4	83	199.2	5,000	25	mg/Nm3			
				CONTROLLED		ACPD Eff(%)	90	20.3	2000	785	219
PM	CO	NOx	Sox	PM	CO	NOx	Sox				
	g/se	ec		g/sec							
1.7	166.7	65.4	18.3	0.17	16.67	6.54	1.83				

Table 2.20: Source Emission Inventory

Cement Raw Material, Product Processing and Handling	Tons of Materials processed/hr	PM Emission Strength (g/sec- m2)	PM10 Emission Strength (g/sec- m2)
Raw Mill	200	1.05E-05	7.86E-06
Raw Mill Feed belt	50	1.32E-07	9.92E-08
Raw Mill Air Separator	50	5.21E-07	3.91E-07
Finish Grinding Mill 1	30	1.07E-06	8.02E-07
Finish Grinding Mill 2	30	9.91E-07	7.43E-07
Finish Grinding Mill 3	55	3.69E-07	2.77E-07
Finish Grinding Mill 4	55	4.65E-05	3.48E-05
Finish Grinding Mill 4	55	1.74E-05	1.30E-05
Finish Grinding Mill	55	₹ ₹2E_07	2 //QE_07
Feed belts	55	0.02L-07	2.43L-07
Finish Grinding Mill	30	6.56E-07	4.92E-07



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Cement Raw Material, Product Processing and Handling	Tons of Materials processed/hr	PM Emission Strength (g/sec- m2)	PM10 Emission Strength (g/sec- m2)
Weigh Hopper			
Finish Grinding Air Separator	30	2.04E-05	1.53E-05
Limestone Crushing (primary /secondary)	120	2.92E-08	2.19E-08
Limestone screening (primary /secondary)		0.00E+00	0.00E+00
Limestone transfer (primary /secondary)		0.00E+00	0.00E+00
Finish Grinding Mill 4	55	4.32E-07	3.24E-07
Finish Grinding Mill Feed belts	55	1.05E-06	7.86E-07
Finish Grinding Mill Weigh Hopper	30	2.57E-07	1.93E-07
Cement Silo 2	55	2.57E-07	1.93E-07
Cement Silo 3	55	3.69E-07	2.77E-07
Cement Silo 4	55	3.69E-07	2.77E-07
Cement Silo 5	55	3.69E-07	2.77E-07
Packhouse 3	55	3.95E-07	2.96E-07
Packhouse 4	55	3.25E-07	2.44E-07
Packhouse 5	55	3.25E-07	2.44E-07
Pozzolan Storage	55	5.53E-08	4.15E-08
Gypsum Storage	55	1.52E-07	1.14E-07
Clay Storage Copper Slug Storage	55	1.23E-07	9.22E-08
Coal Mill	55	3.39E-07	2.54E-07
Coal Tube Mill	55	7.28E-07	5.46E-07
Finish Mill Clinker and Additive Bin	55	7.90E-07	5.93E-07

b) Area Source Pathway

Area Sources were calculated based on Activity Rate Data and AP42 Emission Factors for Cement Processing divided by its assumed area of area discharge.

Eg. Raw Mill (g/s-m2):

Process Rate: 200 MT/hr

Fugitive Particulate_{RAWMILL} = 200 MT/hr Raw Material X 0.012lb of Particulate /Ton X 1 Kg/2.21 lb X g /kg X Hr/60min X min/60sec X (1/ Area I m2) = 0.00000786 grams/ sec-m2

2.3.4 Flue Gas Material Balance

Particulate Material Balance is based on US-EPA AP 42 Emission Factors for Particulate Matter / **Fugitive Dust**

Table 2.21: Emission Factors for Portland Cement Manufacturing Raw Material and Product Processing and Handling

	Filterable ^b					
Process	PM	EMISSION FACTOR RATING	PM-10	EMISSION FACTOR RATING		
Raw mill with fabric filter (SCC 3-05-006-13)	0.012 ^c	D	ND			
Raw mill feed belt with fabric filter (SCC 3-05-006-24)	0.0031 ^d	E	ND			
Raw mill weigh hopper with fabric filter (SCC 3-05-006-25)	0.019 ^e	E	ND			
Raw mill air separator with fabric filter (SCC 3-05-006-26)	0.032 ^e	Е	ND			
Finish grinding mill with fabric filter (SCC 3-05-006-17, 3-05-007-17)	0.0080 ^f	Е	ND			
Finish grinding mill feed belt with fabric filter (SCC 3-05-006-27, 3-05-007-27)	0.0024 ^d	Е	ND			
Finish grinding mill weigh hopper with fabric filter (SCC 3-05-006-28, 3-05-007-28)	0.0094 ^e	Е	ND			
Finish grinding mill air separator with fabric filter (SCC 3-05-006-29, 3-05-007-29)	0.028 ^g	D	ND			
Primary limestone crushing with fabric filter (SCC 3-05-006-09) ^h	0.0010	Е	ND			
Primary limestone screening with fabric filter (SCC 3-05-006-11) ^h	0.00022	Е	ND			
Limestone transfer with fabric filter (SCC 3-05-006-12) ^h	2.9 x 10 ⁻⁵	E	ND			
Secondary limestone screening and crushing with fabric filter (SCC 3-05-006-10 + -11, 3-05-007-10 + -11) ^h	0.00031	Е	ND	10.00		

^a Factors represent uncontrolled emissions, unless otherwise noted. Factors are lb/ton of material processed, unless noted. SCC = Source Classification Code. ND = no data.
 ^b Filterable PM is that collected on or before the filter of an EPA Method 5 (or equivalent) sampling

train

Theoretical Example Calculation:



Stack height, Diameter, Temperature

Table 2.22: Chemical Reactions of Combustion

Combustible Substance	Reaction
Carbon to (CO)	$_2C+O_2 = _2CO$
Carbon to (CO ₂)	$_{2}C +_{2}O_{2} = _{2}CO_{2}$
Carbon Monoxide	$_2$ CO + O $_2$ = $_2$ CO $_2$
Hydrogen	$_{2}H_{2} + O_{2} = _{2}H_{2}O$
Sulfurto (SO ₂)	$S + O_2 = SO_2$
Sulfurto (SO ₃)	$_{2}S + _{3}O_{2} = _{2}SO_{3}$
Methane	$CH_4 + {}_2O_2 = CO_2 + {}_2H_2O$
Acetylene	$_{2}C_{2}H_{2} + _{5}O_{2} = _{4}CO_{2} + _{2}H_{2}O$
Ethylene	$_{2}C_{2}H_{6} + _{7}O_{2} = _{4}CO_{2} + _{6}H_{2}O$
Hydrogen Sulphide	$_{2}H_{2}S + _{3}O_{2} = _{2}H_{2}O + _{2}SO_{2}$

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		Combustic	on Calculation				
		by	/: nazi				
	% by			% by			
Proximate Analysis	mass		Ulimate Analysis	mass			
Moisture	3.65		Carbon	86.49	0.8649	86.49	
Volatile matter	9.2		Sulfur	0.6	0.006	0.6	
Ash	2.57		Nitrogen	3.2	0.032	2.79	
Total	100		Oxygen	6.03	0.0603	2.79	
			* Ash	2.57	0.0257	2.57	
			lotal	100	1	96.35	100
(Exhaust Gas Temperature) Ta-	302.1	°C	- Ironi proximate				
(Ambient Temperature), T ₂ =	28	°C					
Excess air. e =	30	%					
1. (H - O/8) = free hydrogen, also te	rmed availa	ble hydrogen. It is	the quantity of hydrogen t	hat needs o	oxygen for c	ombustion	from the
surrounding air		- 0 - 0/0					
 Combine moisture – All of the oxy Total moisture = free moisture + c 	ombined m	-0+0/8 noisture = M + (0 -	+ ()/8)				
4. Actual hydrogen = hydrogen on	ultimate ar	nalysis less (1/9)(fi	ree moisture)				
5. Actual oxygen = oxygen in ultim	ate analys	is less (8/9)(free n	noisture)				
Actual bydrogon %	0/	ka/ka fuol					
	/0	kg/kg luei					
$H_{2_{UA}} - (\frac{1}{9})_{PA} =$	2.79	0.0279					
Actual Oxygen, %							
$O_{2_{v_{4}}} - (\frac{8}{9})\% M \rangle_{PA} =$	2.79	0.0279					
Free hydrogen, %							
freehvdrog en = $(H - O_{A})$ =	2 4463	0.0245					
Combined moisture	2.4403	0.0243					
(0 + 0 ₈)=	3.1338	0.0313					
Total moisture							
$M_{PA} + \left(O + \frac{O}{8}\right) =$	6.7838	0.0678					
Dulong's Formula							
$HHV = 33820C + 144212(H - \frac{1}{8}) + 9304S$	32,834.53	KJ/kg					
	14,082.70	Btu/lb					
Latent Heat Q							
[0, (14, 04)] (2402, 10207, 41977)]		T <- 202 00					
$Q_L = (M + 9H)(2495 + 1.929I_g - 4.18/I_a)$		1 _g <-302 C					
$Q_L = (M + 9H)(2442 + 2.0935T_g - 4.187T_a)$	959.68	T _{g>} 302 ^O C					
$LHV = HHV - O_{2}$	31 874 85	K.I/ka					
	01,074.00	ræng					
	13,671.10	Btu/lb					
Theoretical air-fuel ratio, (A/F).							
11.44C + 34.32(H - 0/2) + 4.29S =	10,76	ka drv air/ka fuel	if all C in fuel is burned				
$\frac{78}{11.44C_a + 34.32(H - 0_a) + 4.29S} =$		ka drv air/ka fuel	if C _a is carbon actually				
Actual air-fuel ratio		y , y	burned				
$(1+e)\left(\frac{A}{F}\right)_{t} =$	13.99	kg dry air/kg fuel	if Oreat or day see				
$e = \frac{O_2 - 0.5CO}{0.264N_2 - (O_2 - 0.5CO)} =$			analysis is known				

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		Sampl	e Calculation	for 1000 kW (Genset		
			INP	UTS			
ULTIMATE ANALYSIS C	F DIESEL FUE	L, %					
Parameter =>	С	н	S	Ν	0	ASH	Total, %
% Weight =>	90	9.63	0.05	0.3	0	0.02	100
Mol. Wt. =>	12	1	32	14	16	Excess Air (EA), % =>	30
Parameter =>	Stack Diameter, m	AMBIENT TEMP., C	AMBIENT TEMP., K	STACK TEMP., C	STACK TEMP., K		
Value =>	0.36	28	301	300	573		
			1				
Parameter =>	Pov	ver	Specific Gravity/Den sity	High Heating Value	Thermal Efficiency	Power Factor	Hrs. of Operation
Parameter => Unit =>	Pov kW	ver MW	Specific Gravity/Den sity kg/Liter	High Heating Value Btu/Ib	Thermal Efficiency %	Power Factor %	Hrs. of Operation Hours
Parameter => Unit => Value =>	Pov kW 1000	ver MW 1.000	Specific Gravity/Den sity kg/Liter 0.825	High Heating Value Btu/Ib 19,300.0	Thermal Efficiency % 32	Power Factor % 80	Hrs. of Operation Hours 24
Parameter => Unit => Value =>	Pov kW 1000	wer MW 1.000	Specific Gravity/Den sity kg/Liter 0.825	High Heating Value Btu/Ib 19,300.0	Thermal Efficiency % 32	Power Factor % 80	Hrs. of Operation Hours 24
Parameter => Unit => Value => Emiss	Pov kW 1000 ion Factor fo	MW 1.000 Dr Diesel Er	Specific Gravity/Den sity kg/Liter 0.825 ngine (AP42),	High Heating Value Btu/Ib 19,300.0	Thermal Efficiency % 32	Power Factor % 80	Hrs. of Operation Hours 24
Parameter => Unit => Value => Emiss Para	Pow kW 1000 ion Factor fo ameter ==>	Wer MW 1.000 Dr Diesel Er TSP	Specific Gravity/Den sity kg/Liter 0.825 ngine (AP42), SO ₂	High Heating Value Btu/Ib 19,300.0 Ib/MMBTU CO	Thermal Efficiency % 32 NO ₂	Power Factor % 80	Hrs. of Operation Hours 24
Parameter => Unit => Value => Emiss Para	Pow kW 1000 ion Factor fo ameter ==> <588.24 kW	MW 1.000 or Diesel Er TSP 0.31	Specific Gravity/Den sity kg/Liter 0.825 ngine (AP42), SO ₂ 0.29	High Heating Value Błu/Ib 19,300.0 Ib/MMBTU CO 0.95	Thermal Efficiency % 32 NO ₂ 4.41	Power Factor % 80	Hrs. of Operation Hours 24
Parameter => Unit => Value => Emiss Para Capacity of Genset	Pow kW 1000 ion Factor for ameter ==> <588.24 kW > 588.24 kW	wer MW 1.000 or Diesel Er TSP 0.31 0.10	Specific Gravity/Den sity kg/Liter 0.825 ogine (AP42), SO ₂ 0.29 1.01 (S)	High Heating Value Błu/Ib 19,300.0 Ib/MMBTU CO 0.95 0.85	Thermal Efficiency % 32 NO ₂ 4.41 3.20	Power Factor % 80	Hrs. of Operation Hours 24

Sample Calculation for 1000 kW Gense	Sample	Calculation f	or 1000	kW (Genset
--------------------------------------	--------	---------------	---------	------	--------

OUTPUTS										
Conversion from lb/MMBtu to lb/1000 gal : [133.835 MMBtu/(1000gal burned)] For 1000 kW										
Parameter	Formula	lb/1000 gal								
TSP	0.1 × 133.835 =	13.38								
\$O ₂	0.0505 × 133.835 =	6.76								
СО	0.85 × 133.835 =									
NO ₂	NO ₂ 3.2 × 133.835 = 428.27									
	FUEL RAT	E CALCULATIO	N, FR							
kg/hr	1x3412.2	x1000x(80/10	0)/((32/100)×19300×2.21)=	199.99						
liters/hr										
g/sec		242.41×0.825/3.6= 55.55								
liters/yr			242.41×24×365=	2123549.23						
liters/sec			242.41×/3600=	0.0673						

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		COMBUSTION CALC	ULATION, gmol	/sec				
с	C _s ,	$\sum_{n=1/2}^{n=1/2} = \frac{FRx^{2/3}C_{100}}{MW_c}$	55.55×	(90/100)/12=	4.1665			
н	H_{gm}	$\frac{FRx^{h}}{MW_{H}} = \frac{FRx^{h}}{MW_{H}}$	55.55×	(9.63/100)/1=	5.3498			
S	Sgme	$\frac{FRx^{*} \sqrt{5}}{MW_s} = \frac{FRx^{*} \sqrt{5}}{MW_s}$	55.55×(0).05/100)/32=	0.0009			
N _{fuel}	N2	$\frac{FRx^{2}/\sqrt{N_{2}}}{MW_{N}} = \frac{\frac{FRx^{2}}{\sqrt{100}}}{MW_{N}}$	55.55×	(0.3/100)/28=	0.0060			
		$C + O_2 = CO_2$		=4.1665	4.1665			
	O ₂	$H + \frac{1}{4}O_2 = \frac{1}{2}H_2O$		=5.3498/2	2.6749			
		$S + O_2 = SO_2$		=0.0009	0.0009			
	O ₂ (CO ₂)	=2	4.1665		4.1665			
	O ₂ (H ₂ O)	2.6	749/2=		1.3374			
'@ 0% EA	O ₂ (SO ₂)	0	.0009		0.0009			
	ΣΟ2	4.1665+1	.3374+0.0009=		5.5048			
Excess O ₂	$T_{O_{2_{EA}}}$:	$= T_{O_{2_{get}}} x \frac{EA}{100}$	5.5	i048x30/100=	1.6514			
Excess N _{air}	$T_{O_{1_{2^{a}}}} x(1 -$	$+ \frac{EA}{100} (\frac{79}{21})$	5.50x(1+30	/100)x79/21=	26.9211			
N _(air + fuel)	<i>T_{o₁,}</i> , <i>x</i>	$(1 + \frac{EA}{100})(\frac{79}{21}) + N_{2_{2mi}}$	26.9	211+0.0060=	26.9271			
Total Exhaust Gas			5.5048+1.65	514+26.9271=	34.0833			
Flow, m ³ /s	34.083	3x22.4x573/(1000x301)=	1.453					
Normal Flow, m ³ /s		1.453x301/573=	0.763					
V1, mps	1.	453/(3.1416x(0.36/2)^2)=	14.278					
V2, mps	0.	763/(3.1416x(0.36/2)^2)=	7.501					

Parameter	Formula	Tons/Year	
TSP	(13.38/1000)x2,123,549.23/(2.2x3.785x1000)=	3.41	
SO 2	(6.76/1000)x2,123,549.23/(2.2x3.785x1000)=	1.72	
CO	(113.76/1000)x2,123,549.23/(2.2x3.785x1000)=	29.01	
NO 2	(428.27/1000)x2,123,549.23/(2.2x3.785x1000)=	109.22	
CO ₂	(24400/1000)x2,123,549.23/(2.2x3.785x1000)=	6222.48	
Parameter	Formula	mg/Ncm	
TSP	(13.38/1000)x2,123,549.23/(8760x3600x2.2x3.785x0.763=	141.76	
SO 2	(6.76/1000)x2,123,549.23/(8760x3600x2.2x3.785x0.763=	3.58	
СО	(113.76/1000)x2,123,549.23/(8760x3600x2.2x3.785x0.763=	1,205	
NO 2	(428.27/1000)x2,123,549.23/(8760x3600x2.2x3.785x0.763=	4,536	
CO ₂	(0.00/1000)x2,123,549.23/(8760x3600x2.2x3.785x0.763=	258,444	
Parameter	Formula	gm/sec	
TSP	3.41x10^6/(31536000)=	0.1082	
SO 2	1.72x10^6/(31536000)=	0.0547	
CO	29.01x10^6/(31536000)=	0.9199	
NO ₂	109.22x10^6/(31536000)=	3.4633	
CO ₂	6,222.48x10^6/(31536000)=	197.3136	



2.3.5 Air Modeling

Dispersion Model for the expansion of Mabuhay FilCement was conducted for purposes of air quality prediction for the existing and proposed expansion for the identification of impact areas related to said expansion in compliance with the Implementing Rules and Regulations of the Philippine Clean Air Act (RA874).

The model was done for two scenarios (1.) Uncontrolled Scenario (Cement Plant Expansion and 2 Quarry Sites); (2.) Controlled Scenario (Cement Plant Expansion and 2 Quarry Sites) with emission Sources from the Cement Plant include processing components as Buoyant Line sources, Pre heater/Pre-calciner, Clinker Cooler and Kiln Stack as Point Sources while Two (2) Quarry Sites with approximately 841,232 square meters each for as major area sources.

Based on the study, the worst case scenario (Scenario 1) and (Scenario 2) simulating all four (4) lines of the cement plant is summarized in the following tables:

PARAMETER	RUN	RANK	PEAK Concentration	LOCATION
	1 HD	1 st Rank	360.5 ug/Ncm	approximately 5,192 m WSW from
TOTAL	TTIK	98 percentile (176 th rank)	116 ug/Ncm	map domain center
SUSPENDED	24 HR	1 st Rank	115 ug/Ncm	3622 m west direction
PARTICULATES (TSP)	24111	98 percentile (8 th rank)	64 ug/Ncm	
	Resul	t for both 1 hour and 24 hour a standard and the	averaging time is above e 230 ug/Ncm air quality	the 300 ug/Ncm ambient air quality guideline value.
	1 HR	1 st Rank	109.3 ug/Ncm	5,192 m at West southwest (WSW) direction from the map domain center
PARTICULATE MATTER (PM 10)	24 HR	1 st Rank	29.6 ug/Ncm	located 4,317 m at the West southwest (WSW) direction
	Results hr guide	for both 1 hour and 24 hour a line value of 150 ug/Ncm. PM star	veraging time is below t 10 concentrations for Id Idards and guideline valu	he 200 ug/Ncm Standard and the 24 entified receptor areas are within the ues.
	1 HR	1 st Dank	1781.7 ug/Ncm	1720.5 m NorthWest (NW) direction from the map domain center
Carbon Monoxide (CO)	8 HR	I Kalik	686.1 ug/Ncm	1843.9 m west southwest (WSW) direction
	Result f mg/l	or 1 hour averaging time is be Ncm. Carbon Monoxide (CO) c star	low the Standard of 35 u oncentrations for Identi idards and guideline valu	Ig/Ncm and 8 hr guideline value of 10 fied receptor areas are within the ues.
NITROGEN DIOXIDE (NO ₂)	1 HR	1 st Dank	1720 m northwest (NW) direction from the map domain center	
	24 HR		105 ug/Ncm	1843.9 m northwest (NW) direction from the map domain center
	Resu	Its are both below the 1hr sta	ndards of 260 ug/Ncm a	nd guideline value of 150 ug/Ncm.

Table 2.23: Peak Concentrations at Uncontrolled Scenario (Scenario 1)

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PARAMETER	RUN	RANK	PEAK Concentration	LOCATION
	Nitroge	en Dioxide (NO ₂) concentratior	ns for Identified receptor guideline values.	r areas are within the standards and
	1 HR	1st Decid	195 ug/Ncm	1720.5 m northwest (NW) direction from the map domain center
SULFUR DIOXIDES (SO2)	24 HR	I. Kauk	29.6 ug/Ncm	1843 m northwest (NW) direction from the map domain center
	Results	s are both below the 1hr stand	dards of 340 ug/Ncm and	d the guideline value of 180 ug/Ncm.

Table 2.24: Peak Concentrations at Controlled Scenario

PARAMETER	RUN	RANK	PEAK Concentration	LOCATION				
		1 st Rank	18.1 ug/Ncm	5,192 m towards at west southwest				
TOTAL	1 HR	98 percentile (176 th rank)	5.98 ug/Ncm	(WSW) direction from the map domain center				
SUSPENDED	24 HR	1 st Rank	5.8 ug/Ncm	3,622 m west direction from the map				
(TSP)	24111	98 percentile (8 th rank)	3.31 ug/Ncm	domain center				
	Result	for both 1 hour and 24 hour a standard and the	veraging time is above t e 230 ug/Ncm air quality	he 300 ug/Ncm ambient aiur quality guideline value.				
	1 HR	1 st Rank	5.5 ug/Ncm	5,192 m west southwest (WSW) direction from the map domain center				
PARTICULATE MATTER (PM 10)	24 HR	1 st Rank	1.5 ug/Ncm	5192 m west southwest (WSW) direction from the map domain center				
	Results hr guide	for both 1 hour and 24 hour averaging times is below the 200 ug/Ncm Standard and the 24 line value of 150 ug/Ncm. PM10 concentrations for Identified receptor areas are within the standards and guideline values.						
	1 HR		178 ug/Ncm	1.720.5 m northwest (NW) direction from the map domain center				
Carbon Monoxide (CO)	8 HR	1 st Rank	68.6 ug/Ncm	1843 m west northwest (WNW) direction from the map domain center				
	Result f mg/l	or 1 hour averaging time is be Ncm. Carbon Monoxide (CO) c star	low the Standard of 35 u concentrations for Identi ndards and guideline val	ug/Ncm and 8 hr guideline value of 10 ified receptor areas are within the ues				
	1 HR	1 st Rank	69.9 ug/Ncm	1720 m towards the northwest (NW) direction from the map domain center				
NITROGEN DIOXIDE (NO ₂) 24 HR			10.6 ug/Ncm	1843.9 m northwest (NW) direction from the map domain center				
	Resu Nitroge	sults are both below the 1hr standards of 260 ug/Ncm and guideline value of 150 ug/Ncm.						

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PARAMETER	RUN	RANK	PEAK CONCENTRATION	LOCATION
			guideline values.	
	1 HR	1 st Dook	19.6 ug/Ncm	1720 m northwest (NW) direction from map domain center
SULFUR DIOXIDES (SO2) 24 HR		I KdHK	3 ug/Ncm	1843 m northwest (NW) direction from map domain center
	Result	s are both below the 1hr stand	dards of 340 ug/Ncm an	d the guideline value of 180 ug/Ncm.

Percentage increase that may be caused by expansion project

Existing Production 500,000 metric tons per year (MTPY) of cement clinker, and about 657,000 metric tons of finished cement products per year. With the expansion, clinker and cement production will be 1,200,000 (MTPY) and 2,600,000 (MTPY);

Figure 2.23: Scenario 1 – Cement Plant Expansion+ 2 Quarries Uncontrolled GLCs Table of Notable Peak Values and 98 Percentile (Rank 8th (1 hr) and 176th 24 hr)

COMP	COMPARISON OF THE PREDICTED MAXIMUM CO, NO ₂ , PM ₁₀ , SO ₂ and TSP Ground Level Concentration (GLC) WITH THE DENR STANDARDS (Uncontrolled Condition)										
			FOR 1	HR AVERAGING	TIME						
UTM COOR	ITM COORDINATE, m.		ERIA POLLUTANT	PREDICTED AMBIENT MAXIMUM Ground Level Concentration (GLC) CONC.	DENR AMBIENT STD.	Distance From Map Domain Center,	Direction				
X (m)	Y (m)	Av	CRITI	ug/Ncm	ug/Ncm	m.					
576119.62	1124836.64		со	1,781.7	35000	1720.5	NW				
576119.62	1124836.64		NO2	699.0	260	1720.5	NW				
572119.62	1122036.64	1-HR	PM10	109.3	200	5192.3	WSW				
576119.62	1124836.64		SO2	195.6	340	1720.5	NW				
572119.62	1122036.64		TSP	360.5	300	5192.3	WSW				
575319.62	1123836.64		со	686.1	10000	1843.9	WNW				
575919.62	1124836.64		NO2	105.8	150	1843.9	NW				
572919.62	1122436.64	24-HR	PM10	29.6	150	4317.4	WSW				
575919.62	1124836.64		SO2	29.6	180	1843.9	NW				
573519.62	1123036.64		TSP	115.5	230	3622.2	w				

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Figure 2.24: Scenario 2 – Cement Plant Expansion + 2 Quarries Controlled GLCs Table of	Notable
Peak Values and 98 percentile (Rank 8th (1 hr) and 176th 24 hr)	

COMP	COMPARISON OF THE PREDICTED MAXIMUM CO, NO ₂ , PM ₁₀ , SO ₂ and TSP Ground Level Concentration (GLC) WITH THE DENR STANDARDS (Controlled Condition)										
			FOR 1	HR AVERAGING	TIME	,					
UTM COOR	DINATE, m.	eraging Time	ERIA POLLUTANT	PREDICTED AMBIENT MAXIMUM Ground Level Concentration (GLC) CONC.	DENR AMBIENT STD.	Distance From Map Domain Center,	Direction				
X (m)	Y (m)	Av	CRITI	ug/Ncm	ug/Ncm	m.					
576119.62	1124836.64		со	178.2	35000	1720.5	NW				
576119.62	1124836.64		NO2	69.9	260	1720.5	NW				
572119.62	1122036.64	1-HR	PM10	5.5	200	5192.3	WSW				
576119.62	1124836.64		SO2	19.6	340	1720.5	NW				
572119.62	1122036.64		TSP	18.1	300	5192.3	WSW				
575319.62	1123836.64		со	68.6	10000	1843.9	WNW				
575919.62	1124836.64		NO2	10.6	150	1843.9	NW				
572919.62	1122436.64	24-HR	PM10	1.5	150	4317.4	WSW				
575919.62	1124836.64		SO2	3.0	180	1843.9	NW				
573519.62	1123036.64		TSP	5.8	230	3622.2	W				

The above tables were the model result/output based on both using the existing and expansion project data. The criteria used are the following:

- SCENARIO 1 UNCONTROLLED (CEMENT PLANT EXPANSION + 2 QUARRY SITES)
- SCENARIO 2 CONTROLLED (CEMENT PLANT EXPANSION + 2 QUARRY SITES)

The existing condition criteria is not considered in the modeling activity based on the given scope. However, by simple ratio and proportion, the percentage can be presented by the following: Mabuhay Cement Processing Plant Expansion • Mabuhay FilCement Inc.

		UNCON	TROLLED		CONTROLLED		90		
		PM	PM10		PM	PM10			
		Emission	Emission		Emission	Emission			
		Stregnth	Stregnth		Stregnth	Stregnth			
		(g/s)	(g/s)		(g/s)	(g/s)			
I. AREA SOURCE		0.01380000	0.00000174		0.00223290	0.00011966			
		UnCon	trolled		Contr	rolled			
		TSP	PM-10		TSP	PM-10			
II. AREA SOURCE		g/sec-m2	g/sec-m2		g/sec-m2	g/sec-m2			
Expansion	1,200,000	0.00000139	0.00000051		0.0000007	0.0000003			
Expansion	1,200,000	0.00000191	0.0000032		0.00000010	0.0000002			
III. POINT SOURCE			UNCON	TROLLED			CONTRO	LLED	
Kiln Stack	1,200,000	PM	CO	NOx	Sox	PM	CO	NOx	Sox
			g/s	sec			g/sec		
		1.7	166.7	65.4	18.3	1.69	166.67	65.42	18.25

SUMMARY OF AERMOD INPUT FILE (MODELED)

EXISTING (NOT YET MODELED)

		UNCON	TROLLED		CONTROLLED		90		
		PM	PM10			PM10			
	MT/HD	Emission	Emission		PM Emission	Emission			
	миляк	Stregnth	Stregnth		Stregnth (g/s)	Stregnth			
		(g/s)	(g/s)			(g/s)			
I. AREA SOU	IRCE	0.01197471	0.00898103		0.01197471	0.00898103			
		UnCon	trolled		Contr	olled			
		TSP	PM-10		TSP	PM-10			
II. AREA SO	URCE	g/sec-m2	g/sec-m2		g/sec-m2	g/sec-m2			
Existing	5,000,000	0.00000594	0.00000220		0.0000030	0.00000011			
Existing	5,000,000	0.00000580	0.00000214		0.0000029	0.00000011			
III. POINT S	OURCE		UNCONT	ROLLED			CONTR	OLLED	
Kiln Stack	500,000	PM	CO	NOx	Sox	PM	CO	NOx	Sox
			g/s	ec			g/s	ec	
		No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

		UNCON	TROLLED	CONTROLLED	
I. AREA SOURCE	Total	0.0258	0.0090	0.0142	0.0091
	% Increase	53.541	0.019	15.716	1.315
III. POINT SOURCE	Total	1700000			
	% Increase	70.588			

The study revealed that the general results of the controlled TSP, PM-10,Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2) emission in the dispersion model run for 1 hour and 24 hour averaging time are below the ambient air quality standards and guideline values under the Implementing Rules and Regulations (DAO 2000-81) of the Philippine Clean Air Act (RA8749). Using properly maintained control facilities such as electrostatic precipitator (ESP) and Bag house filter are amongst other technologies are those recommended for particulate control. Area source dust abatement such as water sprinkling and planting vegetation as green buffer zone in the cement manufacturing operation is also recommended to control dust re-suspension.

The study also revealed that the highest predicted ground level concentrations (GLC) in Area Sensitive Receptors (ASRs) for TSP are in compliance to the National Ambient Air Quality Guideline Values and National Ambient Air Quality Standards for Source Specific Air Pollutants. For Scenario 1 and 2 uncontrolled and controlled scenarios for Total Suspended Particulates (TSP) and PM10 in all

ASRs for 1 hour and 24 hour, are all below the standards. All gaseous air pollutants in all ASRs are below the ambient air quality standards and guideline values.

Control measures outside the facility especially the quarry area is recommended such as periodic watering of roads, minimizing generation and re-suspension of dust particles. Area source dust abatement such as water sprinkling and planting vegetation as green buffer zone in the cement manufacturing operation is also recommended to control dust re-suspension. Other cleaner production measures are also recommended. Installation of portable met station at the plant is recommended to monitor actual site meteorological data. (See attached Report for details).

2.3.6 Noise

Noise pollution will be of great concern during construction and operational phases of the Cement Plant expansion since the plant is too near to the community. Hence, the impact of noise should be considered in relation to present and future plan of the proposed plant.

"Noise" is generally defined as unwanted sound or sound in wrong place at the wrong time. It is also defined as "any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or otherwise annoying."(U.S. EPA, 1972). The definition of "noise" as unwanted sound implies that it has an adverse effect on human being and their environment, including land, structures, domestic animals, natural wildlife and ecological systems.

The noise assessment method uses random sound measurement at specific locations within the area namely a) beside Sabang River; b) Entrance Gate of plant; c) Road beside Raw Mill Area; d) Back Side of MFI Plant (see **Map 2.24**). The sound level measurement was performed by the consultant and Mabuhay during daytime using digital sound level meter. The scale used was "A-weighted sound-level" since this is an appropriate scale.

The Philippines do not have specific legislation (such as Noise Control Act and Quiet Communities Act of USA) related to noise environment in which we can base our study. Hence, in the absence of a specific noise standard, we will be referring much of our study to the U.S. Environmental Protection Agency and Federal Interagency Committee on Urban Noise in setting our noise-level criterion to protect health and welfare of the community with an adequate margin of safety.

Referring to **Table 2.26**, the sound level measurement done by the PCO on May 8-9, 2015 and September 25-26, 2018. The maximum level indicates the presence of different anthropogenic noises pick-up by the devices during the period as indicated by the remarks.

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Map 2.24: Noise Sampling Locations

Ambient Noise Levels at Mabuhay Cement Processing Plant



Figure 2.25: Ambient Noise Levels

Table 2.25: Ambient Noise Sampling Location geocoordinates

N	Sample Identification	Coordinates
1	Beside Sabang River	N 10° 9.817' E 123°42.267'
2	Entrance gate of MFI	N 10° 09.617' E 123°42.300'
3	Road beside Raw Mill Area	N 10° 09.750' E123°42.217'
4	Back Portion of MFI	N 10° 09.785' E123°42.238'

The figures above show that the noise levels at sampling locations Beside Sabang River and Back Portion of MFI passes the allowable ambient noise standards. However, for areas such as at the Entrance gate of MFI and Road beside Raw Mill Area is above the standard by more or less 2 decibels. According to the remarks made during the conduct, the main contributor to the noise are coming from the passing of light to heavy vehicles along the National Highway and the Barangay Road. This mainly occurs during the afternoon to early evening.



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N	Date Sampled	Noise Levels (decibels)	NAAQs Standard (dB)	Sampling Location	Contributor	Remarks
1		67.1	75	Beside Sabang River	Neighbourhood chickens, flowing water and passing motorcycles	Pass
2	Mov 0, 2015	75.5	75	Entrance gate of MFI	Near National Highway	Fail
3	2:30-3:30 PM	76.5	75	Road beside Raw Mill Area	Barangay Road with light and heavy vehicles passing by	Fail
4		70.6	75	Back Portion of MFI	Barangay Road with light and heavy vehicles passing by	Pass
5		67.9	75	Beside Sabang River	Flowing water, Passing motorcycles	Pass
6		73	75	Entrance gate of MFI	Near National Highway	Pass
7	May 8, 2015 6:05 – 6:45 PM	75.5	75	Road beside Raw Mill Area	Barangay Road with light and heavy vehicles passing by	Fail
8		69.8	75	Back Portion of MFI	Barangay Road with light and heavy vehicles passing by	Pass
9		50.9	75	Beside Sabang River	Flowing water	Pass
10	Mov 9, 0, 2015	70.1	75	Entrance gate of MFI	Near National Highway	Pass
11	11:30 PM – 12:05 AM	64.9	75	Road beside Raw Mill Area	Barangay Road with light and heavy vehicles passing by	Pass
12		59.5	75	Back Portion of MFI	Barangay Road with light and heavy vehicles passing by	Pass
13	May 9, 2015 6:05 – 6:45 PM	67.6	75	Beside Sabang River	Neighborhood chickens, Flowing water, Passing motorcycles	Pass
14		77.2	75	Entrance gate of MFI	Near National Highway	Fail
15		76.3	75	Road beside	Barangay Road with light	Fail

Table 2.26: Sound Level Analysis in San Fernando, Cebu

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N	Date Sampled	Noise Levels (decibels)	NAAQs Standard (dB)	Sampling Location	Contributor	Remarks
				Raw Mill Area	and heavy vehicles passing by	
16		70.9	75	Back Portion of MFI	Barangay Road with light and heavy vehicles passing by	Pass
17		62.9	75	Beside Sabang River	Motorcycle passing at the barangay road near the river, Faint equipment noises from the Plant.	Pass
18	September 25,	68.5	75	Entrance gate of MFI	Multiple vehicles passing Traffic: Light to Heavy Blowing of horns	Pass
19	2018 7:30 AM - 9:00 AM	58.8	75	Road beside Raw Mill Area	Normal conversation from people passing, Passing Motorcycle, Hauler truck passing, faint noises coming from the activity inside the plant	Pass
20		56.2	75	Back Portion of MFI	Faint noises coming from the plant and from the road, Sound of birds	Pass
21		61.2	75	Beside Sabang River	(3) Motorcycle passing at the barangay road near the river, Faint equipment noises from the Plant.	Pass
22	September 25, 2018	68.6	75	Entrance gate of MFI	Multiple vehicles passing. Traffic (Moderate), Blowing of horns	Pass
23	3:40 PM - 6:00PM	58.6	75	Road beside Raw Mill Area	(5) Motorcycle vehicle, (3) hauler truck passing, blowing of horns.	Pass
24		54.0	75	Back Portion of MFI	Faint noises coming from the plant and from the road.	Pass
25	September 25, 2018 7:15 PM – 10:00	63.3	75	Beside Sabang River	Motorcycle passing the barangay road near the river, Noise from MFI plant, sound of animals	Pass

Table 2.26: Sound Level Analysis in San Fernando, Cebu

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N	Date Sampled	Noise Levels (decibels)	NAAQs Standard (dB)	Sampling Location	Contributor	Remarks
					(bats), conversation 2m from sampling point	
26		70.1	75	Entrance gate of MFI	Trailer truck passing the highway, multiple vehicles passing Traffic: Moderate	Pass
27	РМ	60.1	75	Road beside Raw Mill Area	Passing two Multicabs, one motorcycle passing the provincial road	Pass
28		55.4	75	Back Portion of MFI	Equipment noises coming from the plant	Pass
29		58.6	75	Beside Sabang River	Conversation 2meters from sampling point	Pass
30	September 25- 26, 2018	61.9	75	Entrance gate of MFI	Several vehicles passing in the hi-way,	Pass
31	10:30 PM - 1:23 AM	59.7	75	Road beside Raw Mill Area	Two motorcycle passing by	Pass
32		55.0	75	Back Portion of MFI		Pass

2.4 People

2.4.1 Population Trend (2007-2015)

Prior to the establishment of Mabuhay Cement Plant, the Municipality of San Fernando has a total population of 54,932 based on the 2007 PSA Census. Population grew at a rate of 3.87% between 2007-2010 and decreased to 1.6% between 2010-2015. Meanwhile, Barangay South Poblacion had a population of 6,709 in 2007 and grew 3.16% annually from 2007 to 2010. Between 2010 to 2015, the population in South Poblacion increased by 942 inhabitants or 12.8% with an estimated annual average of 2.56%. It must be noted that the growth in South Population is higher than the entire Municipality of San Fernando, where many mountain barangays are still under developed and sparsely populated.

Table 2.27. Population of Municipality San Fernando and Baranday South Poplacion (2007-20	Table 2.27:	Population	of Municipality	y San Fernando	and Barangay	South Poblacion	(2007-2015
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	San Fernando	South Poblacion
2007	54,932	6,709
2010	60,970	7,352
2015	66,280	8,294



Population for San Fernando Municipality and Brgy. South Poblacion, San Fernando (2007-2015)



2.4.2 Population Baseline (Based on 2015 PSA Census)

Based on the PSA 2015 Census, the Municipality of San Fernando has a total of population of 66,280 and a population density of 995/sq.km., while Brgy. South Poblacion, where the site is located, has a total population of 8,294. Comparing to many sparsely inhabited barangays in San Fernando, South Poblacion is most dense with a population density of 6,380/sg.km. or 63/ha. South Poblacion is considered to be the center of the municipality where many industries and economic activities are concentrated.

Table 2.28: Demographic and Housing Characteristics, 2015

Data	San Fernando	South Poblacion	Year Obtained
Household Population	66,257	8,282	2015
Institutional Population	23	12	2015
Total Population	66,280	8,294	2015
Population by Sex	Male: 34,079 Female: 32,201	Male: 4,262 Female: 4,032	2015
Household	Occupied Housing Units: 14,223 No. of Households: 14,258 Average Household Size: 4.65	Occupied Housing Units: 1,756 No. of Households: 1,761 Average Household Size: 4.70	2015

Source: Philippine Statistics Authority, 2015 Census of Population

2.4.2.1 San Fernando and South Poblacion Population by Age Group and Sex (2015)

The table below shows the total population in San Fernando Municipality and Barangay South Poblacion by age group and sex. Data revealed that in San Fernando and South Poblacion there are more males than females in most age groups. This trend changes though among the senior age groups (60 and above) when the female population is greater than their male counterpart. The highest number of people are children between the ages 5 to 9 years old in both cases. More than half (53%) of the population in San Fernando and 54% in South Poblacion are 24 years old below. Among the labor force age group (15-64), 57% and 56% of the poulation in San Fernando and South Poblacion are in that age group respectively.

		San Fernand	0	South Poblacion			
Age Group	Both Sex	Male	Female	Both Sex	Male	Female	
Total	66,280	34,079	32,201	8,294	4,262	4,032	
Under 1	1,444	756	688	217	115	102	
1-4	6,000	3,120	2,880	736	386	350	
5-9	7,510	3,985	3,525	984	518	466	
10-14	7,032	3,724	3,308	925	492	433	
15-19	6,862	3,472	3,390	881	457	424	
20-24	6,480	3,388	3,092	813	425	388	
25-29	5,484	2,830	2,654	684	332	352	
30-34	4,663	2,413	2,250	550	274	276	
35-39	4,212	2,164	2,048	547	272	275	
40-44	3,545	1,847	1,698	433	228	205	
45-49	3,331	1,706	1,625	438	229	209	
50-54	2,727	1,393	1,334	343	173	170	
55-59	2,173	1,131	1,042	252	135	117	
60-64	1,744	847	897	172	83	89	
65-69	1,249	593	656	140	62	78	
70-74	764	341	423	80	42	38	
75-79	570	207	363	48	19	29	
80 yrs old and above	490	162	328	51	20	31	

Table 2.29: Total Population by Age Group, Sex, and Barangay: 2015

2.4.2.2 Highest Educational Attainment in South Poblacion

Majority of the population in Barangay South Poblacion's highest educational attainment is Elementary Level closely followed by High school Level for both sexes with 2,616 and 2,613

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students, respectively. And about ninety six percent (96.5%) of the school age and above (above 5 years) attended school.

Highest Grade/Year Completed	Total Population (5 years old and over)	Percentage (%)
South Poblacion		
Both Sexes	7341	100%
No Grade Completed	255	3.47%
Preschool	187	2.55%
Special Education	10	0.14%
Elementary	2616	35.64%
Grade 1 - 4	1367	18.62%
Grade 5 - 6	458	6.24%
Graduate	791	10.78%
Highschool	2613	35.59%
Undergraduate	1240	16.89%
Graduate	1373	18.7%
Post Secondary	68	0.93%
Undergraduate	3	0.04%
Graduate	65	0.89%
College Undergraduate	795	10.83%
Academic Degree Holder	787	10.72%
Postbaccalaureate	10	0.14%
No Reported		

South Poblacion has a high literacy rate particularly among 10 years old and over. It was reported that 99.1% are literate.

Table 2.31: Literacy of the Household Population 10 Years Old and Over by Age Group and Sex: 2015

Age Group	Household Population (10 years old and over)		Percentage (%)
South Poblacion			
TOTAL	6345	6286	99.1%
10-14	925	918	99.2%
16-19	881	876	99.4%
20-24	812	809	99.6%

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Age Group	Household Population (10 years old and over)	Literate	Percentage (%)
25-29	683	680	99.6%
30-34	549	543	98.9%
35-39	545	540	99.1%
40-44	429	426	99.3%
45-49	438	435	99.3%
50-54	342	337	98.5%
55-59	252	252	100%
60-64	171	168	98.2%
65 years old and over	318	302	95%

2.4.2.3 Health Condition and Services

Health Services. There are about eight (8) Barangay Health Stations and two (2) Municipal Health Centers in the whole of San Fernando that provide the basic health services in the area. For medical cases that require hospitalization, referral to the nearest government hospitals (Carcar, Minglanilla, Talisay or Cebu City) and Cebu Doctors Hospital (South Gen) located in Naga is done since San Fernando does not have a hospital.

The Municipal Health Center and Rural Health Stations engages in broad range of activities from preventive, promotive and curative aspects of health care. They provide basic health care, such as maternal and childcare, immunizations, treatment of simple medical conditions, nutrition, family planning, sanitary health care, emergency treatment and health education.

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Map 2.25: Location of Health Services in San Fernando, Cebu

From years 2014- 2018, the Municipal Health Office reported that the leading cases of morbidity is Upper Respiratory Tract Infection (URTI) followed by Punctured Wounds and Hypertension. Stroke, Pneumonia, Cancer and Myocardial Infarction are still the top leading causes of mortality especially in adults for the past four-five years. Causes of these diseases may be attributed to infection, genetics, unhealthy lifestyle and poor nutrition among others. There are no conclusive findings to the leading causes of these diseases.

The following table presents the historical health data (top leading causes of morbidity and mortality) from 2014-2018.

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Table 2.32: Top 10 Leading Causes of Morbidity in San Fernando, Cebu (2014 - 2nd Quarter 2018)

N 2014			2015		2016		2017		2018 (1Q and 2Q)	
1	Upper Respiratory Tract Infection	2170	Upper Respiratory Tract Infection	2774	Upper Respiratory Tract Infection	3048	Upper Respiratory Tract Infection	3478	Upper Respiratory Tract Infection	1456
2	Rhinitis	1175	Punctured Wound	519	Hypertension	789	Community Acquired Pneumonia	573	Wound (Punctured, Lacerated, Incised, Avulsed)	163
3	Systemic Viral Infection	418	Rhinitis	293	Wound (Punctured, Lacerated, Incised, Avulsed)	636	Wound (Punctured, Lacerated, Incised, Avulsed)	484	Hypertension	162
4	Punctured Wound	386	Hypertension	289	Community Acquired Pneumonia	472	Hypertension	286	Pneumonia	127
5	Hypertension	337	Dog Bite	190	Urinary Tract Infection	251	Urinary Tract Infection	216	Hypersensitivity Reaction	105
6	Pneumonia	293	Fever	155	Acute Gastroenteritis	174	Hypertension Stage 2 Dog Bite Fever	142	Abscess	84
7	Dog Bite	193	Abscess	150	Dog Bite	170	Hypersensitivity Reaction	141	Urinary Tract Infection	83
8	Infected Wound	191	Allergy	128	Fever	163	Infected Wound	136	Dog Bite	66
9	Impetigo	152	Myalgia	111	Impetigo	140	Systemic Viral Infection	133	Infected Wound	43
10	Urinary Tract Infection	127	Urinary Tract Infection	107	Abscess	116	Abscess	125	Fever	38

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Table 2.33: Top 10 Leading Causes of Mortality

N 2014			2015		2016	2016		2017		2018 (1Q and 2Q)	
1	Stroke	71	Pneumonia	52	Stroke	65	Stroke	35	Pneumonia	18	
2	Pneumonia	34	Stroke	46	Pneumonia	32	Pneumonia	29	Cancer all types	11	
3	Sepsis	30	Cancer all types	37	Acute Myocardial Infarction	21	Cancer all types	29	Stroke	10	
4	Cancer all types	21	Sepsis	28	Cardiopulmonary Arrest	11	Cardiovascular Accident	14	Myocardial Infarction	6	
5	Myocardial Infarction	20	Cardiovascular Disease Infarct	14	Sepsis	7	Acute Myocardial Infarction	12	Cardiovascular Arrest	5	
6	Gunshot Wound	7	Myocardial Infarct	11	Bronchopneumonia	6	Asphyxia	8	Chronic Hypertensive Disease	4	
7	Intrauterine Fetal Death, Congestive Heart Failure	4	Asphyxia	9	Bronchial Asthma in Acute Excerbation	5	Congestive Heart Failure	7	Pulmonary Tuberculosis	2	
8	Asphyxia, COPD, NIDDM	3	Congestive Heart Failure	8	NIDDM	5	Pulmonary Tuberculosis	6	Asphyxia	2	
9	PTB, Status Asthmaticus, Hypovolemic Shock	2	Pulmonary Tuberculosis	7	Asphyxia	4	Non Insulin Dependent Diabetes Mellitus	6	Sepsis	2	
10	Others	1	NIDDM	5	Peptic Ulcer Disease	4	Diabetes Mellitus Type 2	5	Non Insulin Dependent Diabetes Mellitus	2	

2.4.3 Project Socio-Economic Impacts

2.4.3.1 Employment Opportunities

At present (2019), Mabuhay Cement Plant has two hundred sixty three (263) total manpower of which are about 72% males. The present manpower is only 58% of the plant's manpower compared to 2015 plant's manpower when it was producing their own clinker. In 2016, the plant started to buy clinker instead, hence the manpower requirement was reduced to almost half. As the plant production capacity will increase and will start to produce their own kiln again, it is expected that the manpower requirement will also increase, thereby giving more employment opportunities. With this, additional employees may be hired from the locality through barangay announcements. Shown below is the historical record of employment by the plant indicating those recruited directly and through the manpower agencies.

Year	MFI Direct	Agency A	Agency B	Agency C	Total Manpower
2009	28	45			73
2010	31	118	116		265
2011	40	97	96	38	271
2012	53	105	48	10	216
2013	84	171	32	25	312
2014	98	209	27	28	362
2015	108	182	39	119	448
2016	103	179			282
2017	97	170			267
2018	89	173			262
2019	87	176			263

Table 2.34: Manpower Employment History (2009-2019)



Figure 2.27: Current Plant Employment (Elderly and GAD Program) (2018)

2.4.3.2 Livelihood Opportunities

One of the direct benefits of the plant is the creation of livelihood opportunities around the communities as a multiplier effect. Some of these livelihood opportunities created as those providing services to the employees and delivery truck drivers such as carinderia, transport service and boarding houses. In addition, with the on-going partnership with the barangay, Mabuhay Filcement has supported livelihood programs as proposed by the community. Among the previous livelihood programs supported by Mabuhay are the ecobag-making program, swine-fattening program, and the donation of sewing machines. These livelihood projects will be continued as part of the Corporate Social Responsibility (CSR) program of the plant and may be expanded depending on the response of the community.

2.4.3.3 Displacement of Settlers

There will be no displacement of people in the implementation of the expansion program. The development is confined within the property of the existing cement plant. There will also be no economic dislocation since there is no economic activity in the project site other than the cement plant within the property.

2.4.3.4 Impact on In-Migration Patterns

In-migration is not remote considering that the economy of the municipality is becoming more industrialize. This is indicated in the population growth rate of 1.6% between 2010-2015 in the entire municipality. Since, there is a possibility to hire additional employees, in-migration may happen when the required skills are not found in San Fernando or nearby municipalities. When this

happens, minimal increase of population is expected.

2.4.3.5 Impact on Physical and Cultural Resources

There are no significant physical cultural resources and landscapes that have archaeologic, paleontologic, historical, religious, aesthetic or cultural significance in the area. Therefore, the project shall have no impact to the cultural resources of the municipality

Effects on Existing and Neighboring Properties. As previously mentioned, the proposed plant expansion is located within the same property of the existing plant. This shall have minimal impact towards its neighboring properties since the area was already zoned as an industrial area, thus, it is expected.

Effects on Agriculture. Since the plant expansion is located within the existing plant and that the expansion components are to be located in already concreted areas of the plant, there is little to no significant value for agricultural activities. Greeneries and landscaped gardens will grow and be maintained. Buffer trees will increase and will serve as additional air pollution control.

2.4.3.6 Effect on the Delivery of Basic Services and Resource Competition in the Areas

Power Source. Mabuhay cement will not pose power shortage in San Fernando. Power usage in the previous years is around six (6) megawatts per month due to the non operation of the clinker. With the expansion, it is expected that the processing plant will start the production of its own clinker. With this operation, it will require an additional six (6) megawatts per month, totaling to twelve (12) megawatts. The power requirement will be supplied by the power vendor (Visayan Electric Co.) without disrupting the normal utilization of the local residents. All the twelve (12) barangays in San Fernando are with electric power.

Water Sources of South Poblacion. Utilization of water supply of the proposed project would not deprive the community for its normal utilization. The project has its own source of water supply, an existing deep well.

Water will be sourced from the existing well. For emergency cases, from water vendors contracted to supply water on a need basis. Moreover, the proponent shall ensure that water is used efficiently at the site by sensitizing employeses and staff to avoid irresponsible water use.

Moreover, with the operation of the plant expansion, it is expected that there will be insignificant increase in water requirement. The previous operations utilized 33 cu.m. /day and for the expansion, a total of 45 cu.m./day will be required. The water requirement remains low due to the recycling scheme of the system. The 45 cu.m. consumption will cover domestic use and losses from evaporation during the cooling process for clinkering. No adverse effect could be expected from its operation for the untoward incidence of water depletion in the community as also discussed previously in the water balance sections. The volume and water supply requirement is detailed in the previous sections as well.

Telecommunication. The post office, the telecom companies (PLDT/SMART/SUN and Globe) serve the communication needs of the community. Internet services in the area is also provided though it needs upgrading to cater to the growing demand of the community. There is no seen

competition between the plant and the community in terms of accessibility to the free market telecommunication services.

Transportation. Being located in along the national hi-way generation of traffic is also anticipated as part of the daily operation of the plant, particularly when about fifty (50) delivery and hauler trucks go in and out of the plant during the 15-hr operation or average of 3-5 trucks per hour. If not properly managed, this may cause disturbance to other commuters in the area. However, some measures will be employed to minimize any adverse result of the traffic in coordination with the LGU (traffic enforcers) and Department of Public Works and Highways. In addition, the plant has already provided a proper ingress and egress to minimize the obstruction of the trucks along the national hi-way. All vehicles that will conduct business with the plant will not be allowed to park along the national hi-way.

In terms of competition with the local transportation, the employees of the plant will utilize the existing public transport system or the company service vehicle. Since the plant is along the hiway, accessibility to public transport is not a problem at the moment. In case of additional employees of 100-200 persons, its is estimated that the public jeepneys, buses, jabal-jabal (motorcycle) that are regularly plying the area can still accommodate the number. Specially so, that most commuting San Fernando residents are going out of the municipality to work in the city, while the Mabuhay employees are coming in if not are residing within.

Peace and Order / Crime Rate. Barangay Tanods or Barangay Auxiliary Police are organized to maintain peace and order in the locality. These groups of security personnel are directly under the Barangay Captain and supervised by the PNP Station Commander.

The cement plant operation is not foreseen to impact the crime rate or peace and order in the community. Activities of the employees will be confined inside the plant which is secured and if there are conflicts can be managed internally. Erring personnel will be reprimanded and may cause their job. Robbery and burglary may happen but remotely, given the tight security measures imposed by the Plant. In addition, the LGU various security measures programs such as barangay visitations, dialogues, continuous IEC, and conduct of National Crime Prevention Week programs and among others.

Education Facilities / Recreational and Sports Facilities. In the field of education, San Fernando has twenty-one (21) elementary schools serving all the twenty-one (21) barangays of the municipality, four (4) High Schools and a private kindergarten in the urban center. There are no tertiary level schools as San Fernando is only 29.3 kilometers from the City of Cebu where college students get quality education. With the project expansion, the inbound increase of population will be coming from the working age group and will not be requiring schools. To support the educational facilities in San Fernando, Mabuhay FilCement Inc. supported various school improvement projects by provided additional classroom facilities and fencing for the nearby elementary schools such as South Poblacion and Bulangag Elementary Schools.

2.4.4 Threat to Public Health and Safety

"If" the cement plant will not manage their operation properly in order to minimize its negative environmental impact and comply with the set pollution standards, it may threaten the public health and safety. However, since Mabuhay FilCement imposed precautionary measures to comply

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with the environmental quality standards, threat to people's health was minimized. From the Ambient Air sampling test done on the 2nd Quarter of 2018 at Sitio Kapangi-an (100 meters from the plant), it was measured to have a Particulate Level of 0.086 mg/NCM. This result is within the standard of 150 mg/NCM according to the National Ambient Air Quality Standard (NAAQS). In essence, Mabuhay FilCement should monitor the pollution level it will produce, particularly if it will revive its clinkering activity, making sure that it is within the standard or better.

At present, since there is no clinkering activity in Mabuhay Cement Plant, the dust generation within the direct impact area is mainly due to the cement bagging and transporting activities in the case of Mabuhay and other factors i.e., the road repair activities and the operation of another cement plant within the vicinity. Since there are residential areas near the plant, dust generation are becoming a nuisance from time to time. It is in this context that, measures such as enclosure of delivery trucks, cleaning of tires, installation of air pollution control devices e.g., filters, and planting and maintenance of buffer trees around the property are carried out. With these measures, Mabuhay FilCement is hoping to contribute in minimizing the impact of the dust generation in the community.

In terms of water pollution, since the plant is using a recycling or close loop water system for its production, the plant produces only about 5 cu.m. of domestic wastewater per day mostly coming from the toilets. Wastewater are basically treated through the septic tanks installed for each toilet prior to its disposal to the public drainage and Sabang Rlver.

The following table presents the list of the top leading causes of morbidity and mortality in San Fernando and its relation to the cement plant activity.

Cases	General Causes	Relation to Cement Processing Activities?						
Mortality								
Asphyxia	Asphyxia can occur when the airway is physically blocked or as a side effect of an injury or other medical condition.	None						
Acute Myocardial Infarction (Heart Attack)	Bad Cholesterol, Saturated Fats, Trans Fat, High blood pressure	None						
Bronchial Asthma in Acute Excerbation (Asthma Attack)	Genetic or environmental conditions: Traffic Pollutions, VOCs, Formaldehyde exposure, pesticides, smoking during pregnancy, common indoor allergens, etc.	Possible. Although there are other local factors that may be the cause.						
Bronchopneumonia	Acquisition of viruses, bacteria, or fungi that cause inflammation and infection in the alveoli (tiny air sacs) in the lung.	None						
All Cancer Types	Other cancer type organs Lung Cancer: Carcinogens in Outdoor Air Pollution (WHO)	Inconclusive						
Cardiopulmonary Arrest	Coronary Artery disease, Structural heart	None						

Table 2.35: List of Top Mortality and Morbidity Cases in San Fernando and Its General Causes and Relevance to Cement Processing Activities



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Cases	General Causes	Relation to Cement Processing Activities?
(Cardiac Arrest)	disease, Inherited arrhythmia syndromes, Trauma, Bleeding, Overdose, Drowning, Pulmonary Embolism	
Cardiovascular Accident	Blood clot	None
Cardiovascular Disease Infarct (Heart Disease)	Blood Clot due to plaque build up	None
Congestive Heart Failure	Unhealthy heart	None
Chronic Obstructive Pulmonary Disease (COPD)	Smoking Lack a protein called alpha-1 antitrypsin	None
Gunshot Wound	(self explanatory)	None
Hypovolemic Shock (Blood Loss)	Bleeding from cuts/wounds, blunt traumatic injuries, internal bleeding, ectopic pregnancy, digestic tract bleeding, Endometriosis, etc. Loss of fluids by prolonged diarrhea, severe burns, excessive vomiting, excessive sweating	None
Intrauterine Fetal Death (Stillbirth)	Fetal growth restriction, Placental abruption, vasa previa, Genetic Abnormalities, Umbilical cord complications, Uterine rupture	None
Myocordial Infarction (Heart Attack)	Heart muscle damage by blood clotting	None
Non Insulin Dependent Diabetes Mellitus (NIDDM) Type II	Failure to metabolise glucose	None
Peptic Ulcer Disease	H. Pylori, NSAIDs drug use, Aspirin use, Stress, Spice consumption, Alcohol consumption, etc.	None
Pneumonia	Acquisition of viruses, bacteria, or fungi that cause inflammation and infection in the alveoli (tiny air sacs) in the lung.	None
Pulmonary Tubercolosis (PTB)	Exposure to bacterium <i>Mycobacterium tuberculosis</i> (M tuberculosis)	None
Sepsis	Pneumonia, Abdominal Infection, Kidney Infection, Bloodstream Infection	None
Status Asthmaticus	Uncontrolled Asthma Genetic or environmental conditions: Traffic Pollutions, VOCs, Formaldehyde exposure, pesticides, smoking during pregnancy, common indoor allergens, etc.	Possible. Although the traffic pollution can also contribute to this effect.
Stroke	Blood clots and blood vessel breaks	None
Morbidity		
Abscess	Bacterial infection	None
Acute Gastroenteritis (Stomach Flu)	Compromised Immune System Contact with an infected person or by	None

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Cases	General Causes	Relation to Cement Processing Activities?
	ingesting contaminated food or water	
Allergy	Other types of allergy (food, medicine, etc) Dust Allergy: top triggers are dust mites, cockroaches, mold, pollen, pet hair, fur and feathers	Possible but not limited to. Sensitive allergens are commonly found in the household.
Community Acquired Pneumonia	Acquisition of viruses, bacteria, or fungi and commonly from <i>Streptococcus pneumoniae</i>	None
Dog Bite	Dog bite	None
Fever	Symptom to Colds/Flu, Earaches, Bronchitis, Step Throat, Urinary Tract Infections, Mononucleosis	None
Hypersensitivity Reaction (Disambiguation)	Same as allergies or other autoimmune disorders	Possible but not limited to. Sensitive allergens are commonly found in the household.
Hypertension (High Blood Pressure)	Obesity, Alcoholism, Smoking, Family History	None
Myalgia (Muscle Pain)	Over-use or over-stretching of muscles Viral Infections (if without traumatic history)	Possible, but no recorded case in Plant Clinic from Employees.
Infected Wound	Infected wound	Possible, but no recorded case in Plant Clinic from Employees.
Impetigo	Bacterial contact	None
Pneumonia	Acquisition of viruses, bacteria, or fungi that cause inflammation and infection in the alveoli (tiny air sacs) in the lung.	None
Rhinitis	Caused by viruses, bacteria, irritants or allergens	Possible but not limited to. Sensitive allergens are commonly found in the household.
Systemic Viral Infection	Virus	None
Upper Respiratory Tract Infection	Caused by both viruses and bacteria	None
Urinary Tract Infection	Bacterial infection in urethra	None
Wound	Punctured, Lacerated, Incised, Avulsed	Possible

Most of the top 10 cases for mortality and morbidity in the municipality of San Fernando in the past five (5) years are unrelated to the plant activities. However, dust emissions may have been a contributory cause for asthma attacks, lung cancer and allergies. Although these cases may be caused by other environmental factors such as allergens, and carcinogens. Wounds and muscle pain may also be caused by plant activities, however, none of these recorded cases were connected with the plant operation.

2.4.5 Threat to Employees Health and Safety

If the plant produces pollution that will threaten the health of people, the employees in the plant will be affected first. Given that they are exposed to the plant daily and are vulnerable to possible safety hazards. Hence, Mabuhay FilCement seeks to adhere to guidelines set forth by the Department of Labor and Employment (DOLE) Occupational Safety and Health Hazard Standards. Employees are provided personal protective equipment (PPE). Use of PPEs such as eye and face protection, respiratory protection, hand and arm protection, safety nets, safety shoes, the minimum space requirements for gas, electric welding and cutting operations, fire protection and control rule and notification and record keeping requirements will be continuously adopted.

In the past, all job applicants were required to submit barangay or city health certificate to ascertain their health condition and avoid spread of contagious diseases such as TB, influenza, flu, sore eyes in the plant. To monitor the health condition of all workers, annual medical examination is done. The cement processing plant has its own in-house clinic that caters to the needs of the plant's employees and workers. Referral is done on case to case basis. This activity will be continued and possibly improved as long as plant operates.

The following graphs present the result of the x-ray examination of the directly hired employees from 2014-2019. The result shows that most of the reported abnormal cases are not directly work-related acquired sickness.

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2.4.6 Environmental Health Impact Assessment (EHIA)

Project Phase	Health Critical Activities	ldentified Health Hazard	Receptors or Impact Population	Adverse Health Consequences	Health Consequence Rating	Incident Exposure Rating	Priority Rating	Mitigating Measure
Pre- Construction Phase	Site Development; Delivery of Raw Materials	Dust generation within the dev't area	Employees and Neighbors	Allergy due to dust; Trigger of respiratory sicknesses	slight	Low	1	- Use of PPE - Enclosure of the delivery trucks
	Construction of	Occupational related hazards like	Construction workers	Accidents	Major injuries/ illness	High	1	- Strict implementation of Safety Measures
Construction Phase	ion installation of equipment and mechanical support system	non-observance of construction safety measures; Dust generation, fumes, noise	Nearby community	Allergy due to dust and fumes; Respiratory sicknesses	Slight	Low	1	 Regular watering of unpaved roads & exposed soils. Cover hauling trucks with appropriate materials Use of PPE
Operation Phase	Plant Operations	Dust emission from the plant operations	Nearby community	Allergy due to dust; Respiratory sicknesses	Minor injury	Low	1	 Strict compliance to occupational safety & health code Installation of cyclone, dust collector & filter bag house Use of PPE Enclosure of delivery trucks
Abandonment	Dismantling of equipment & structures	Safety, dust and noise generation	Construction workers	Accidents	Major injuries/ illness	High	1	 Provision of on site emergency response team Implement dust suppressors (sprinkling, truck wheel cleaning, tree buffers, etc.) Use of silencers and mufflers Use of PPE

Table 2.36: Environmental Health Impact Assessment

2.4.7 Other Expected Local Benefits

Improvement of Local Economy. Through the use of locally available materials during the construction phase of the proposed expansion project, some local suppliers will benefit from the project which will in turn contribute to the local economy. The consumption of these materials, additional limestone and kiln requirement and other materials will give revenue to both the private business and the government through taxes. The additional cement production that could be generated from the proposed expansion will be able to increase the lacking supply of cement demand. As such, the services of the other businesses in Cebu will be improved, as well.

Local Revenue. The project is expected to generate direct income for the LGU in form of taxes and donations. Indirectly, the project is expected also to create multiplier effect with the increase in demand for all basic services for the plant's employees, sub-contractors and clientele. The demand may trigger on the services for food, transportation, housing and other domestic and personal needs. Micro enterprises are expected to follow thereby increasing the income of the community.

Increased Cement Supply. The project's rationale is to contribute in supplying the increasing national demand for cement in time for the "BUILD, BUILD, BUILD" program of the current administration. With the ongoing infrastructure projects alone in Metro Cebu like the Cebu-Cordova Link Expressway, along with other commercial and residential developments, the need for cement is on the rise.

Appreciation of Land Values. With the ongoing economic activities in San Fernando, the land value has been increasing and expected to continue to increase. In relation to the establishment of the expansion project, Mabuhay FilCement Inc. intends to support the improvement of some roads in the area, in coordination with the LGU. In the past Mabuhay has been donating cement to improve some barangay roads. To this effect, the delivery of services and accessibility of the area will be improved and will furthermore increase the land value of neighboring properties.

2.4.8 Effect on Traffic Situation

San Fernando has a total road length of 156.78 kilometers. Most roads are top-coated with earthfill (65.04%); gravel (28.42%); asphalt (6.54%). There are fourteen (14) bridges in the municipality, with six (6) concrete ones in the town center and eight (8) in the interior areas. Natalio Bacalso (national highway) is currently being improved to be totally concreted by DPWH.

The Municipality has three (3) major barangay roads and one (1) provincial road that serves all the barangays. The Provincial road starts from South Poblacion, intersecting the South Cebu National Highway, to Tinubdan, Tabionan, Magsico and Bugho and leads towards the neighboring municipality of Pinamungahan. The first barangay road starts from barangay of San Isidro to Ilaya and Cabatbatan. The second barangay road starts from barangay North Poblacion to Tananas, Magsico and Cabatbatan. The third barangay road starts at Panadtaran to Tonggo and Tabionan and connects to the Provincial road. Only the provincial road is serviced by PUJs. The San Isidro to Ilaya road is accessible using a private vehicle that patronizes the Hidden Valley Mountain Resort. All the Barangay roads are served by habal-habal or motorcycle for hire, while the provincial road is served by a PUJ to Sangi Pinamungahan.

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With the growing industrialization, economic and tourism activities in San Fernando and other municipalities towards the south of Cebu, increase in traffic volume plying through the National Hi-way is currently experienced and expected to get worst if not managed accordingly. Since Mabuhay Cement Plant is located along the national highway, it may also contribute to the traffic situation in the area particularly with an average of fifty (50) trucks that come to the plant each day. Hence, some measures will be employed to minimize any adverse result that the plant may contribute. Specifically, the management of the Mabuhay Cement Plant will ensure that all the vehicles entering and going out of the plant will not deter the traffic flow along the hi-way by providing proper ingress and egress. No trucks and any vehicles doing business in Mabuhay will be permitted to park along the hi-way. Traffic management will be done in coordination with the LGU, particularly the traffic enforcer team and the Department of Public Works and Highways.

During the construction phase, heavy vehicles moving in and out of the project site are likely to slightly increase the traffic and the effect will be minor. Specifically, the expansion will involve mainly on the installation of major components and lesser on the delivery of construction materials since cement will be sourced from the same location.

During operation, the cement plant has a potential of increasing pressure on existing infrastructure such as roads, among others. This would be due to added vehicle traffic in the project area and delivery of goods. To this effect, the delivery of goods and leaving of trucks shall follow a designated schedule as specified by the traffic management system that will be imposed by the involved parties such as the Department of Public Works and Highways (DPWH), the local government and the host barangay.

At the present operation, about less than fifty (50) truck trips are dispatched in a day for deliveries. For the expansion, there is an estimated 80 to 100 delivery trucks per day leaving and going to the site. Delivery hours will be spread out from 6 AM to 11 PM. With the increase of the number of deliveries, Mabuhay will continuously follow truck ban hours and will observe changes in the ordinances from the municipality and from other governing bodies. With the current delivery routes, only Talisay City, Cebu has implemented truck ban hours which is from 6 to 9 AM.

Below is a summary of traffic generators (vehicles) going in and out of the plant:

Load Material, Mode, Ave. Road Travel	Ave. Weight per day (MT)	Schedule	No. of Trucks and Trips	Operation
Clinker Panamax Vessel, Libor Pier ~ 5 km7,5002 times / 3207,500mos.12 trip		20 trucks 12 trips / truck	1 week (7 days weather permitting condition)	
Gypsum Barge, Libor Pier ~ 5 km	2,500	Once a month	10 trucks 12 trips/truck	2 days
Greywacke Pangdan, Naga ~ 13.1 km	550	Daily	8 trucks 3 trips/truck	Daily
Limestone Apid, Toledo	350	Daily	4 trucks 4 trips/truck	Daily

Table 2.37: Estimated Plant Traffic Generation



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Load Material, Mode, Ave. Road Travel	Ave. Weight per day (MT)	Schedule	No. of Trucks and Trips	Operation
~ 24 km				
Fly Ash Toledo ~ 40 km	200	Daily	3 trucks 3 trips/day	Daily
Cement Dispatch Durir oper		During 16-hr and 24-hr operations	70 trucks per day 16hrs operation (0600H-2300H) 120 trucks per day 24hrs operation	



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3.0 ENVIRONMENTAL MANAGEMENT PLAN

3.1 Overview

This chapter proposes various environmental management plans (EMPs) that will highlight probable impacts and proposed measures to address the latter. The EMP will be used to ensure that Mabuhay Cement Processing Plant Expansion is operated with minimum environmental negative impact. In order to accomplish this objective, the environmental management systems described in the subsequent section will consist of the following key information:

- Environmental Impact Management Plan;
- Environmental Monitoring Plan;
- Information, Education and Communication (IEC) and Social Development Plans;
- Abandonment/ Rehabilitation Plan; and,
- Institutional Plan.

This EMP will serve as a guideline for the minimum requirements of the detailed procedure to be developed and will be updated and revised as needed throughout the construction and operation phases of the Project. The contractor will be responsible for preparing and implementing a detailed worker health and safety plan, a copy of which should be provided to Mabuhay FilCement Inc. prior to construction and installation of the expansion.

3.2 Environmental Impact Management Plan

The EMP involves the monitoring of parameters which are required both during the construction phase and operation phase of the project. The EMP task will likely be administered by the Safety and Pollution Control Officer (SPCO), who will have the authority when necessary to "stop the job" if an environmentally detrimental/hazardous activity being conducted is eminent. The operational level of the EMP team may be third party consultants and engineers who will be resident throughout all phases of the proposed project. Implementation of the EMP will be the responsibility of the proponent who will be coordinating, arranging the collection and reporting of the results of environmental quality monitoring.

3.2.1 Solid Waste Management

Mabuhay Cement Processing Plant Expansion Project will adopt an integrated solid waste management system which addresses concerns starting from waste generation, in-house collection, storage to final disposal. The system shall incorporate the following programs:

- Waste minimization;
- 3Rs (Reduce, Reuse, and Recycling); and
- Information, Education, and Communication (IEC) materials to the plant workers.

<u>Waste Minimization</u>. One of the basic or the most important aspect in solid waste management is the minimization of waste generation. The lesser waste produced, the better. It will lighten the burden of treating, collecting, and disposing the wastes. Waste minimization includes the practice of reducing, reusing and recycling.

During construction, most of the construction wastes will be recovered and sold as scrap metals. As much as possible, recoverable and recyclable materials will be reused to minimize construction wastes.

During the operation, it is estimated that on average a worker will generate about 0.2 to 0.3 kg of solid wastes daily. The plant site will have designated trash bins for specific wastes-hazardous, recyclable, non recyclable. The administration building will also have designated trash bins labeled non-biodegradable and biodegradable at strategic places. These office or domestic wastes, mainly composed of food waste, plastics and papers may be easily managed by imposing segregation at source and at the main plant site's Material Recovery Facility (MRF) as the final staging area.

<u>Waste Segregation</u>. All generated solid wastes in Mabuhay Cement Processing Plant Expansion will be segregated prior to its collection in the plant site's main MRF. "No segregation, No collection policy" will be implemented in compliance to the Ecological Solid Waste Management Act (RA 9003). This means that during the construction and operational phases, wastes will be and must be segregated at source. All offices/sections/process sites will be required to have their wastes segregated and properly labeled (plastic, paper and metal wastes). Kitchen wastes may be given away to interested party or may also be composed in the designated compost pit found in the plant site.

During construction, bulk or construction wastes will likewise be treated separately. Furthermore, indiscriminate dumping will be prohibited. When wastes are segregated, management will be easier. Biodegradable wastes can be used as materials for composting or for animal feeds, while the recyclables can be given or sold to recyclers in coordination with the LGU or Peoples Organization in Barangay South Poblacion (host barangay).

Storage, Collection, and Disposal. From the site office, wastes will be stored temporarily in garbage bins both for bio and non- biodegradable wastes. Prior to collection and delivery to the plant site MRF, each container will be sealed. A system of collection (schedule and route) will be in placed in coordination with the LGU and the recyclers (third party) to ensure proper waste

collection. As much as possible, fixed schedule will be followed. With the proper management of the different kinds of wastes, the remaining residual wastes will be disposed at the nearest sanitary landfill in coordination with the LGU. In case of some interruption, proper coordination with the LGU will be done. In the worst possible scenario, Mabuhay FilCement Inc. may opt to dispose their wastes at the sanitary landfill directly.

Below is a standard waste segregation and handling scheme practiced in the plant

Was	te Material	Handling			
Piedea	radabla Waata	Disposed of in general waste, skips or bulk bins and			
biouey		deposited into compost pits			
Dooy	alabla Waata	Disposed of in general waste, skips or bulk bins and			
Recy		sent for recycling, sale or auction as appropriate			
In	ort Mooto	Disposed of into skips or bulk bins and sent for			
111		recycling or to landfill as appropriate			
Electrical	Recyclable	Sold or auctioned to scrap dealers			
and	Worthloss	Disposed of into skips or bulk bins and sent for			
Electronic	WUI UIIIESS	reprocessing or to landfill as appropriate			
Waste	Reusable / Valuable	Label as Obsolete Equipment			
Composite Waste		Disposed of into skips or bulk bins and sent for			
		recycling or to landfill as appropriate			
	azardaya Waata	Contact Waste disposal facilities for proper handling or			
IUXIC / H	azaruuus waste	label as Toxic Waste and send to separate storage.			

Table 3.1: Waste Handling Scheme

Table 3.2: Waste Disposal Scheme

Waste Material	Disposal Site		
Biodegradable Waste	Mabuhay Cement Processing Plant Site Compost Pit		
Recyclable Waste	Junk yard, NGO (ecobag, etc.), Reuse in plant		
Residual, Composite Waste	LGU Collection to Landfill Sites: Naga Landfill – operated by FDRCon Inc., now FDR-IRRM Consolacion Sanitary Landfill – Asian Energy Systems Corp.		
Toxic / Hazardous Waste	RRDS Petro-Chemical Industries, Inc. Mandaue City, Cebu		

Shown below is the Waste Description Plan utilized as a general guide for local daily actions for the waste segregation, storage, collection and treatment of waste materials.

Figure 3.1: Waste Description Plan



Environmental Performance Report and Monitoring Plan

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Figure 3.2: Plant Site Materials Recovery Facility (MRF)

3.2.2 Contaminated Land Management

To avoid costly site remediation, MFI will ensure proper handling and disposal of waste material. When accidental spillage of waste occur, chemical analysis on both soil and groundwater samples will be done. Regular housekeeping will also be done to ensure orderliness inside the cement processing plant. Housekeeping will include: a) provision of storage with proper labeling, storage area shall be provided with protection layers, and c) Spillage collector in case of accidental spillage of waste.

3.2.3 Waste Water Management

Provision of sanitary and sewage treatment facility will be provided during construction and operation of the facility. Table below shows the various mitigating measures during the stages of development.

N	Type of Waste	Construction Stage	Operation Stage
1	Domestic Wastes	Toilet Septic tank	Toilet 3 Chambered Septic Tank
2	Oil and grease	Oil and grease separator	Oil and grease separator
3	Erosion / Runoff	Wash basin/Silt pond or basin	Detention Basin

<u> 3 Chambered Septic Tank</u>

The three chambered tank with retention time of at least 48 hours will be able to bring down the BOD level by 60% thus complying the Class D water. The first chamber will be the digestive chamber followed by leaching chamber.

Oil and Grease Separator

The facility shall provide oil and grease separator basin to ensure capture and retention of oil that may have accidentally spilled onsite and in the operation. The Oil and grease separator shall be provide with baffle to screen out oil floating on water. The facility shall be designed correspondingly according to the hydraulics requirement.

<u>Silt Basin or Silt Pond</u>

During the construction, the surface runoff may carry soil and mud resulting in high turbidity and subsequently siltation downstream, it is recommended that the contractor shall provide silt basin downstream of the construction site to capture silts and sediments. A separate silt basin shall also be constructed downstream to collect any particulates and silts generated during the operation of the facility. At present, five small settling basins were constructed near and around coal stockyard, gypsum storage hall, clinker silo, and raw material additives storage halls which allows silts and mud coming from the different storage halls to settle before being discharge to the main drainage line. Further treatment or settling would occur at the main settling pond designed to trap further sediments and other pollutants.

<u>Sludge Waste Disposal</u>

The plant ensures that the sludge from the toilets will be collected and treated on a regular basis at least every 2-3 years through treaters. In addition, all other hazardous wastes like lead acid batteries, busted bulbs, is also properly disposed thru hired transporters and treaters.

3.2.4 Groundwater Resource Management

<u>Resource Conservation</u>. The water supply of the cement plant is mainly sourced from the existing deep well. Water is used mainly in plant operations for absorbing gas, spray water to capture dispersed solid particles, and for cooling motors. To minimize groundwater extraction, MFI developed water recycling system that results in the recovery of 90% of the total water requirement. Hence only around 45 m³/day of water will be extracted from the groundwater.

<u>Protection from Contamination</u> The existing cement plant provided systems to protect the groundwater source from contamination. This is done by the following:

- a) Minimizing usage of chemicals. Instead of using chemicals, MFI uses recycled water for cleaning the system.
- b) Providing protection layers. The facility is also enclosed and with cement floors such that accidental spill will not be in contact with soil.

- c) Capture mechanism (holding tank). The facility is also provided with holding tank to capture wastewater and store in a holding tank. No discharge will be done without proper treatment.
- d) Storage and treatment system. Used chemicals and spent water will be treated accordingly. For special waste, it shall be collected by accredited transporter and treater.
- e) Continues monitoring of the facility., Lastly monitoring of the housekeeping of the facility is an important part to be done by MFI. This will preclude futures hazard to our groundwater resources.

With the above processes, ground water is assured of non-contamination. Hence, no adverse impacts are expected in the cement plant's operation on groundwater quality.

3.2.5 Ambient Air Quality Management

Installation of Dust Emissions Collector Devises. In order to minimize dust emissions, MFI's cement processing plant installed dust collectors, cyclones and electrostatic precipitators (EP's) in their existing facility. Dust collectors were installed from the crushing area until packing of the cement into cement bags. The same technology will be used in their expansion facility. The table below shows the air pollution control devices to be used for the operation.

Monitoring of Dust Collector System. The system requires proper monitoring and maintenance of the dust collection system. At a certain period of time, it may be necessary to replace and maintain the system to ensure high efficiency.

Feedback from Neighbors. The management may also request for feedback from the neighboring community on the perceived dust emission particularly during certain season of the year, i.e. summer time.

Furthermore, as an added mitigating measure, there will be a continuous tree planting and maintenance of buffer trees on site to serve as natural barriers at the plant perimeter. This will also enhance capture of fugitive dust escaping the plant's dust collector technologies.

Dust emission reduction to be continuously done is also the implementation of road sprinkling, truck wheel washing, and covering of delivery trucks of finished cement bags. These actions are regulations to be imposed and looked close into by the plant manager, PCOs and safety officers and other monitors.

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Table 3.3:	Pollution	Control	Equipment
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AIR POLLUTION CONTROL DEVICES				
Air Pollution Source Equipment	Air Pollution Control Device	Specification / Capacity		
Limestone Crusher	Air Box Pulse Bag Filter	24 t/h; Efficiency up to 99.9%		
Raw Mill	Electrostatic Precipitator-EP150	Dust Collection Efficiency: 99% with one (1) unit 250 kw ID fan (Air flow: 30,000 m^3/hr)		
Raw Meal Silo	Dust Collector Fan	Capacity: 9,600-19,200 m^3/hr with one (1) unit 55 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Coal Mill	Dust Collector Fan	(Air Volume: 20,736 m^3/hr with (2) units filter fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Pre-heater	Spray Tower	(Air Volume: 320,000 m^3/hr); Efficiency 90% (≻5 µg) and 60%-80% (3~5 µg)		
Grate Cooler	Electrostatic Precipitator-EP80	(Air Volume: 240,000 m^3/hr); Collection Efficiency 92%~99%		
Finish Mill 1	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 185 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Finish Mill 2	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 185 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Finish Mill 1 & 2 additives	Dust Collector Fan	55 Kw Blower fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Clinker Storage	Dust Collector Fan	37 kw blower fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Cement Silo 1	Dust Collector Fan	Air Volume: 9,600 -19,200 m^3/h); Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Cement Silo 2	Dust Collector Fan	(Air Volume: 9,600 -19,200 m^3/h); Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Packhouse 1 & 2	Dust Collector Fan	(Processing Air: 23,000-46,000 m^3/h) with two (2) units 37 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		

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ADDITIONAL POLLUTION CONTROL DEVICES				
Air Pollution Source Equipment	Air Pollution Control Device	Specification / Capacity		
Finish Mill 3	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 315 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Finish Mill 4	Dust Collector Fan	(Capacity: 90 tons/hr, Processing Air 110,000 m^3/hr) with one (1) unit 315 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Finish Mill 4 Additive	Dust Collector Fan	18.5 kw; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Packhouse 3	Dust Collector Fan	(Processing Air: 23,000-46,000 m^3/h) with one (1) unit 55 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Packhouse 4	Dust Collector Fan	(Processing Air: 23,000-46,000 m^3/hr) with one (1) unit 37 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Cement Silo 3	Dust Collector Fan	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		
Cement Silo 4	Dust Collector Fan	(Processing Air: 9,600-19,200 m^3/h) with one (1) unit 22 kw dust collector fan; Efficiency Prefilter (0.61m x 0.61m x 0.10) 60% (>1.0 microns), Primary Filter (0.61m x 0.61m x 0.53m) 92% (>1.0 microns)		

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Figure 3.3: Road Sprinkling at Plant Annex

Figure 3.4: Road Sprinkling at Entrance/Exit Gate



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Figure 3.5: Road Sprinkling near Machine Area

3.2.6 Hazardous Waste Management

Pursuant to Republic Act 6969, "Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990" and its implementing rules and regulations as per DAO 2013-22, Hazardous wastes are to be collected, treated and disposed by waste transporters and treaters. The generator shall secure a Certificate of Treatment or COT from treater within thirty (30) days from date of receipt of wastes.

able 3.4: Accredited Toxic and Haza	dous Waste Transport,	, Storage and Disposal	Facility
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Company Name	RRDS Petro-Chemical Industries, Inc. Gallego's Merchandising
Facility Address	Purok Tambis, Brgy. Umapad, Mandaue City
TSD Registration Certificate	TR – R7 – 22 – 00173 TP – R7 – 22 - 00228
TSD Category	D, F
Type of Wastes	D – Waste Organic Solvents (G 703, G 704) D - Wastes with Inorganic Chemicals (D 407, D 406) D - Oil (I101) F – Ink/Dye/Pigments/Paint/Resin/Latex/Adhesives/Sludge (F601) F – Oil (I 104)
Date of Certificate	February 15, 2018 March 16, 2019
Generator ID	Mabuhay FilCement Inc. GR-R7-002-00685

3.2.7 Traffic Management

At the present operation, about than fifty (50) truck trips are dispatched in a day for deliveries. For the expansion, there is an estimated 80 to 100 delivery trucks per day leaving the site. Delivery hours will be spread out from 6 AM to 11 PM. With the increase of the number of deliveries, Mabuhay will continuously follow truck ban hours and will observe changes in the ordinances from the municipality and from other governing bodies. With the current delivery routes, only Talisay City has implemented truck ban hours which is from 6 to 9 AM.

Below are the following truck/vehicle traffic volume expected from the plant operation.

Load Material, Mode, Ave. Road Travel	Ave. Weight per day (MT)	Schedule	No. of Trucks and Trips	Operation
Clinker Panamax Vessel, Libor Pier ~ 5 km	7,500	2 times / 3 mos.	20 trucks 12 trips / truck	1 week (7 days weather permitting condition)
Gypsum Barge, Libor Pier ~ 5 km	2,500	Once a month	10 trucks 12 trips/truck	2 days
Greywacke Pangdan, Naga ~ 13.1 km	550	Daily	8 trucks 3 trips/truck	Daily
Limestone Apid, Toledo ~ 24 km	350	Daily	4 trucks 4 trips/truck	Daily
Fly Ash Toledo ~ 40 km	200	Daily	3 trucks 3 trips/day	Daily
Cement Dispatch		During 16-hr and 24-hr operations	70 trucks per day 16hrs operation (0600H-2300H) 120 trucks per day 24hrs operation	

Table 3.5: Estimated Plant Traffic Generation

In the current practice, truck haulers both from <u>contractors</u> and the <u>In-house truck fleet</u> follow the hauler's policy as stipulated below to effectively and efficiently protect property, people and environment.

Hauler Policy

- 1. When entering the plant STOP for Inspection
- 2. All drivers must have a Non-Expired LTO Professional Driver's License. Surrender your license to the guard upon inspection.
- 3. All truck boys must pass the MAIN GATE for frisking and inspection.
- 4. Driving with influence of Liquor and prohibited Drugs is strictly prohibited.
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- 5. Always wear the prescribed Personal Protective Equipment or PPE.
- 6. When drivers and truck boys step out of their respective trucks PPEs must always be worn.
- 7. When driving inside the MFI Plant premises, 15 kph Speed Limit must be observed at all times.
- 8. Always provide Choke Wheels when parking. When moving out remove choked wheels immediately.
- 9. All operators must never leave the equipment or trucks if the engine is running.
- 10. Cleaning of any vehicle inside the plant is strictly prohibited, unless cleaning truck wheels from mud before leaving the MFI plant.
- 11. Maintenance of trucks and equipment such as changing of oil is prohibited inside the plant.
- 12. Hauler delivering raw materials must always have a dump box cover such as tarpaulin to avoid material spillages at roads during transport.
- 13. Customer trucks delivering cement bags must cover the truck before leaving the plant.
- 14. Inspect your vehicles before entering the plant for any possible spillages.
- 15. Always provide Spotter when moving back and forth.
- 16. Haulers driver are advised to use their truck boy or pilers as spotter in loading bays.
- 17. Washing, eating, and cooking inside MFI plant is strictly prohibited.
- 18. Smoking inside the plant is strictly prohibited.
- 19. Riding at the back of trailer truck without canopy is strictly not allowed.
- 20. All plastic is not allowed inside MFI plant. Like empty PET bottles/cellophane/etc..
- 21. Observed proper segregation (Plastics/Can/Bottle/Paper). To observe good housekeeping.
- 22. Standby and parking area must be at the Designated Hauler's Parking only.
- 23. Never leave the vehicles unattended.
- 24. Do not follow closely behind another vehicle.
- 25. In case of Emergency look for Evacuation Area.
- 26. Haulers will be given a penalty for damaging any MFI property.
- 27. Observe and follow the Safety Signage posting in all areas.

3.2.8 Abandonment Phase Management

With the nature of the project, abandonment is unlikely to happen. The cement processing plant intends to continuously cater to the continually rapidly rising demand for cement worldwide. However in extreme cases, where major and destructive natural calamities take place, the project may need to be abandoned particularly when irreparable damages on the plant takes place or should the government declare to abandon all cement plant projects which is unlikely to happen as well.

In the event of such unwanted or unlikely scenario, the management of Mabuhay FilCement. Inc. in coordination with third parties and Local Government units, have prepared to execute the following activities as follows:

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- Cutting off of power and water line
- Removal of debris or loose materials
- Removal of cement manufacturing machinery/components
- Disposal/Collection of Hazardous and Toxic material
- Dismantling of temporary or light weight structures
- Disassembling of equipment and machinery and this will include equipment and/or machinery will be disposed and sold to interested buyers
- Demolition of building structure (optional; if structural integrity is not compromised)
- Hauling of construction debris (steel, concrete, roofing materials, etc.)
- Housekeeping/Clearing of area
- Replanting (within area)
- Setting up of perimeter fence to prevent illegal settlers to enter

Likewise, Mabuhay FilCement Inc. may have to do the following management plan to minimize the negative impacts of the abandonment to the environment. These impacts will be mainly on land and solid waste management. Specific actions for each plant component are found in Chapter 7 of this report.

Table 3.6: Abandonment Management Plan

Management/ Measure	Responsible Group	Projected Cost (at present cost)
Dust Generation		
Immediate hauling of debris and destroyed materials within the property	Mabuhay FilCement Inc. and hired material haulers	P 75,000-250,000
Use of personnel protective equipment (PPE) during dismantling or demolition activity	Mabuhay FilCement Inc. safety officers	P 75,000
Solid Wastes		
Waste recovery and selling/ disposal of recyclable materials	Third party recyclers. (They can sell or give the recyclables)	No cost on the part of the project
Waste segregation and provision of temporary Material Recovery Facilty (MRF) and collection area	Mabuhay FilCement Inc. and third party recyclers	No cost on the part of the project; existing
Disposal of residual wastes to the functional future sanitary landfill	Mabuhay FilCement Inc. and LGU	P700-P1500 per ton
Proper treatment and disposal of bulk and hazardous	Contracted hazardous waste treaters and bulk wastes managers	P5,000- 10,000/ton

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3.3 Environmental Monitoring Plan

3.3.1 Overview

Environmental Monitoring (EM) shall be undertaken to determine the impacts/effects of the project in all phases of its implementation and to provide an early warning tool for detecting any contamination and pollution that may arise. EM shall serve as basis for the efficiency and/or effectivity of the mitigating measures. It shall be continuous, periodic and shall involve field observation, sampling, and analysis. It is essential to detect and correct violations, provide evidence to support mitigating actions, and evaluate enforcement by the succeeding monitoring activities.

Monitoring shall be undertaken to determine the effects against the baseline data gathered. This shall be done to ensure that all mitigating measures are religiously implemented and that the negative impacts beyond tolerable levels and carrying capacity are detected and mitigating measures shall be implemented before it aggravates. It makes economic sense to correct environmental degradation during the early stages than introducing corrective measures, when the problem becomes almost irreversible and the financial costs are very high.

The object of the monitoring activities is to a) Ascertain that ECC conditions are complied, b) Determine level of compliance to RA 8749 (Philippine Clean Air Act), RA 9275 (Philippine Clean Water Act), RA 9003 (Ecological Solid Waste Management Act of 2000), and other applicable environmental laws and its implementing rules and regulations, and c) Determine compliance to the IMP and EMoP which breakdowns the requirement of PD 1586, implementing rules and regulations (IRR), and procedural manuals (PM).

Parameters for monitoring are to be based from the DENR Administrative Order 2016-08.

3.3.2 Monitoring Parameters

Monitoring of certain parameters during both the construction and operational phases of the cement processing plant is essential to ensure that impacts are fully evaluated and that necessary mitigation measures are applied. This is necessary to demonstrate compliance with any current and future standards. Monitoring will apply to the following:

- Ambient Air Quality and Stack Monitoring (Kiln)
- Noise Quality
- Wastewater Quality (Discharge)
- Public Complaints Procedures

3.3.2.1 Ambient Air Quality

<u>Ambient Air Quality Monitoring.</u> Mabuhay FilCement Inc. will initiate the conduct ambient monitoring at four (4) specified stations to determine if the level of pollution in air including noise is within the allowable limit on regular basis as required by DENR. Parameters that will be analyzed will include measurement of ambient TSP, PM_{10} , SO_2 and NO_2 , concentrations. In case of complaints or as need arises, Mabuhay FilCement Inc. will conduct additional tests.

Sampling Station	Stn	TSP µg/Ncm	PM₁₀ µg/Ncm	SO₂ µg/Ncm	NO2 µg/Ncm	Remarks
South Poblacion Barangay Hall	A1	301.2		0.1	3.2	>< NAAQ Value
Barangay Luknay Basketball Court	A2	315		0.1	Not Detected	>< NAAQ Value
Vacant Lot in Sitio Kapangi-an	A3	91		0.1	Not Detected	>< NAAQ Value
Front of San Isidro Labrador Parish	A4	60.7		0.1	Not Detected	>< NAAQ Value

Table 3.7: Ambient Air Quality Sampling Format

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Map 3.1: Ambient Air Sampling Stations



Table 3.8: Ambient Air Sampling Location geocoordinates

Sampling Location		Latitude	Longitude
South Poblacion Barangay Hall	A1	10° 9′35.05″N	123°42'17.38"E
Barangay Luknay Basketball Court	A2	10° 9′39.93″N	123°42′13.55″E
Vacant Lot in Sitio Kapangi-an	A3	10° 9′51.60″N	123°42'14.10"E
Front of San Isidro Labrador Parish	A4	10° 9′45.92″N	123°42'24.76"E

MFI will utilize the previously identified monitoring locations as shown in the Map below, as these areas are considred critical to the sensitive receptor which are the surroudning communites. From the identified sampling locations, it can cover for the immediate community and directly exposed to by plant activities. It is important that Mabuhay FilCement Inc. will stick to the

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recommended sampling stations.

Below is the identified area receptors found in the air dispersion modelling report.



Figure 3.6: Recommended Monitoring Sites (Air Dispersion Modeling Report)

3.3.2.2 Noise

A bi-annual noise level survey will be conducted at the site during construction and operation of the facility which will be taken within and at the periphery. In the initial stages of cement processing plant expansion, monitoring will be done at the site boundaries and at selected receptor locations up to a distance of approximately 300 meters from the site. Monitoring results will be compared with the baseline noise levels monitored at the same positions prior to the commencement of plant expansion construction activities.

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Map 3.2: Noise Sampling Locations



Table 3.9: Ambient Noise Sampling Locations

Sampling Location		Latitude	Longitude
Beside Sabang River	A1	N 10° 9.817′	E 123°42.267′
Entrance Gate of MFI	A2	N 10° 09.621'	E 123°42.305'
Road Beside Raw Mill Area	A3	N 10° 09.743'	E 123°42.224′
Back Portion of MFI	A4	N 10° 09.763′	E 123°42.218

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Compling Station	Timo	Noise Level (dB)		Domarka / Source
Sampling Station	Time	Min	Max	Remarks / Source
Besides Sabang River	(AM / PM)	50	65	e.g. Blasting Sounds, Pass/Fail
Entrance Gate of MFI	(AM / PM)	67	77	e.g. Conversations from construction workers
Road Beside Raw Mill Area	(AM / PM)	59	71	e.g. Noise from motor bikes, buses
Back Portion of MFI	(AM / PM)	55	70	e.g. Mobile conversations, etc.

Table 3.10: Ambient Noise Sampling Quality Format

3.3.2.3 Water Quality and Discharge

Effluent discharge from the facility will be monitored every six months. The effluent should comply with Class D effluent as shown below. Correction of the system should be done when this standard at not met. Moreover, collection of sludge shall be done by accredited treater and disposed to septage plant located nearby. (Naga City has septage management facility)

Parameters	Unit	Parameter Levels	DAO 2016-08 (Class D)	Remarks
Ammonia as NH3-N	mg/L	3	7.5	Pass / Fail
BOD5	mg/L	35	120	Pass / Fail
COD	mg/L	20	200	Pass / Fail
Dissolved Oxygen (min.)	mg/L	5	2	Pass / Fail
Oil and Grease	mg/L	2	5	Pass / Fail
рH	(range)	7	5.5-9.5	Pass / Fail
Temperature	Э°	28		
Total Suspended Solids	mg/L	90	150	Pass / Fail

Table 3.11: Water Quality Sampling Format

Note: *Samples must be taken from 9:00AM to 4:00PM

*TNTC = >200 colonies/100 ml ; "Too numeroud to count"

*BDL = Below Detectable Level; *TCU = True Color Unit

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Discharge Sampling Locations					
Discharge Point 1	Outfall to Public Drainage				
Discharge Point 2	Outfall to Sabang River				

Figure 3.7: Location of Outfall to Public Drainage and Sabang River Outfall (Wastewater Discharge Quality Sampling Locations)



Also, for analysis purposes, sampling should also be done along Sabang River and Luknay Creek and at the raw water reservoir for testing of the freshwater and groundwater parameters.

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Figure 3.8: Sampling Locations for Freshwater Quality



Table 3.12: Freshwater Quality Sampling Locations

Sampling Location		Latitude	Longitude
SFR 1	A1	10° 9′48.06″N	123°42′13.74″E
SFR 2	A2	10° 9′55.68″N	123°42′0.05″E
SFR 3	A3	10°10′12.90″N	123°41′36.18″E
Luknay River	A4	10° 9′39.72″N	123°42′10.38″E

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Figure 3.9: Sampling Locations for Groundwater Quality



Table 3.13: Freshwater Quality Sampling Locations

Sampling Location		Latitude	Longitude
SF Deepwell 1	A1	10° 9′59.58″N	123°41′59.52″E
SF Deepwell 2	A2	10° 9′38.29″N	123°42'14.40″E
Plant Site Deepwell	A3	10° 9′42.00″N	123°42'14.40"E
Manugas Residence	A4	10° 9′50.58″N	123°42'15.90"E

3.3.2.4 Public Complaints Procedure

The pollution control and safety officer (PCSO) will be responsible for obtaining, reporting and maintaining all environmental data records and for correct implementation of the public complaints and emergency procedures.

All public complaints will be logged on a complaints register to include the name and address of the complainant, the time and date that the complaint is registered and the details of the complaint. Each complainant will then be contacted by the Multi Partite Monitoring Team (MMT) or its nominated representative, either by means of a personal visit or telephone, in order to discuss the details of the complaint, and establish how the complaint can be rectified in the interests of all concerned.

Reporting Procedures

Implementation of the Environmental Monitoring Plan will be the responsibility of the Pollution Control and Safety Officer (PCSO) who will be responsible for arranging and reporting the results of all ambient air quality and noise monitoring. The PCSO will also be responsible for obtaining, reporting and maintaining all environmental data records and for implementing corrective actions with regards to both the environment and implementation of responding to public concerns or complaints.

The PCSO will also be responsible for conducting all in-house analysis and for reporting the latter results directly to the Plant Manager, who will in turn be responsible for compilation of all monitored results and for informing the authorities of any possible non-conformity.

There will also be a plant superintendent nominated with responsibility for environmental matters who can ensure that decisions are made to rectify any problems, for example, modifying plant operations when there are any exceedances of emission standards or simply when equipment needs repair or replacement.

As previously indicated, there may be occasions where third party consultants are required for specialist monitoring or training. This may arise, for example, if there was a complex noise issue requiring detailed frequency analysis or if training was required in specific areas. The PCSO will be responsible for coordinating any monitoring conducted by a third party. In either case, all monitoring results obtained by outside monitoring bodies will be reported to the Plant manager.

3.3.3 Impact Mitigation Plan (IMP)

Below is the Impact Mitigation Plan matrix showing the different potential impacts and mitigating measures for implementation by specific parties from Mabuhay FilCement Inc. and corresponding costs.

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Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
A. PRE-CONSTRUC	TION PHASE			•		
Environmental Aspect # 1	A. The Land	- Land Clearing and Housekeeping	- Limit land clearing to project site	Contractor	P 50,000	MFI will set aside the amount
Environmental Aspect # 4	D. The People	- Secure Brgy. Clearances / LGU Permits	- Proper coordination and comply requirements	Contractor	P 20,000	MFI will set aside the amount
B. CONSTRUCTION	PHASE			·		
Environmental Aspect <i>#</i> 1	A. The Land	 Change in aesthetics Solid waste production Increase domestic waste 	 Planting and maintenance of the trees Proper disposal and other solid wastes Limit activities within the area for development only 	Contractor	P 50,000	MFI will set aside the amount
Environmental Aspect # 2	B. The Water	– Water usage and waste water.	 Practice water conservation Septic Tanks Silt Traps 	Contractor	P 50,000	MFI will set aside the amount
Environmental Aspect # 3	C. The Air	- Dust generation	 Cover stockpiles to minimize dust blown by wind Spray water on access roads, haulage roads and dust generating areas, cleaning of tires before leaving the plant 	Contractor	P 50,000	MFI will set aside the amount
Environmental Aspect # 4	D. The People	 Increase employment and economic activity Increase in noise generation caused by pile drivers, hammer, heavy equipment and other noise generating equipment 	 Prioritize hiring of qualified workers within San Fernando. Schedule delivery during non peak hours Provide silencers and mufflers to minimize noise 	MFI	P 50, 000	MFI will set aside the amount

Table 3.14: Impact Mitigation Plan (IMP)

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
C. OPERATIONAL P	HASE					
Environmental Aspect <i>#</i> 1	A. The Land	- Increase solid waste production - Aesthetic Concern	 Planting and maintenance of the trees Proper segregation and disposal of solid wastes. Provide solid waste receptacles on strategic places. Regular good housekeeping 	MFI	P 50,000 Salary for the cleaning/ maintena nce personnel	Part of the operational cost
Environmental Aspect # 2	B. The Water	 Increase in water usage and waste water. Generation of wastewater Increase need for water supply 	 Implement water conservation methods (recycling, harnessing the utilization of rainwater) Provision of adequate wastewater treatment facility (septic tank) Provide water supply to the community 	MFI	P 50, 000	Part of the operational cost
Environmental Aspect # 3	C. The Air	 Emission of TSP, SOx and NOx Emission from Stack and cement components Noise due to operation activities Dust emissions due to increase traffic 	 Maintenance of trees along the perimeter of the project site Daily housekeeping; vacuuming as needed Watering of stockpile Planting of tree along the perimeter of the project site Continued use of Air Pollution Control Devices for each corresponding Air Pollution Source Equipment (Bag Filters, Electrostatic Precipitator, Dust Collectors and Spray Tower) Use of CEMS for monitoring stack emissions 	MFI	P 50, 000	Part of the operational cost

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Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost	Guarantee / Financial Arrangements
Environmental Aspect # 4	D. The People	 Increase employment and economic activity Increase housing needs Support for livelihood programs health and education support activities 	 Prioritize hiring of qualified workers within the municipality Facilitate in the delivery of basic social services Regular use of PPE Implementation of the Social Development Programs 	MFI	1.5% of the operation al cost	C/o of operational cost
D. ABANDONMENT	PHASE (only after	construction period)				
Environmental Aspect # 1	A. The Land	- Increase solid waste generation	- Dispose the excess materials collected from the construction debris and dispose properly	MFI	P 50,000	
Environmental Aspect # 4	D. The People	- Loss of jobs	- Provide lawful pay and other benefits - Provide referrals for transfer of company	MFI	P 20,000	

3.3.4 Environmental Monitoring Plan (EMoP) with Environmental Quality Performance Levels (EQPLs)

Table 3.15: Environmental Monitoring Plan (EMoP) and Environmental Quality Performance Levels (EQPLs)

Key Environment al	Potential		Sampling	and Measurem	nent Plan					EQPL MANAGE	MENT SCHEME	:	
Environment	Impacts per	Parameters					Annual Cost		EQPL RANGE		MAN	AGEMENT MEA	SURE
Aspects per Project Phase	Environment al Sector	to be Monitored	Method	Frequency	Location	Lead Person	Estimate (PhP)	Alert	Action	Limit	Alert	Action	Limit
I. PRE-CONST	RUCTION PHAS	SE		1									
Land	Solid Waste Management	Soild Waste Volume and Housekee ping	Visual	Daily	Project Site	Mabuhay FilCement Inc.	Part of Salaries	No collection of Solid Wastes for 2 weeks Stockpile of debris at MRF	No collection of Solid Wastes for 3 weeks; No vacuum / sweeping of dust at open spaces Debris gathered not in designated areas	No collection of Solid Wastes for 1 month; Muddy Road; Scattered debris No maintenance personnel workers	Prepare Solid Wastes for Collection Contact Waste Collector	Contact Waste Collector Employ maintenanc e personnel to do housekeeping	Contact Waste Collector Stop Delivery of trucks Do a massive clean up drive for plant
People	Complaints	Presence of complaints	Barangay Hall courtesy call	Only when there are complaints	South Poblacion Barangay Hall	Mabuhay FilCement Inc. CRO and PCO	Part of Salaries	Letter of Notice	Barangay Call for Courtesy	Protest against plant operation	Immediately contact barangay Resolve Issue	Set a meeting with barangay council to discuss complaints and issues; Resolve Issue	Set a press conference / meeting with barangay constituents to discuss complaints and issues; Resolve Issue

Key Environmental Aspects per Project Project Environmental Environmental			Sampling	Sampling and Measurement Plan			Annual Cost			EQPL MANAGE	MENT SCHEME		
Environmental Aspects per	Impacts per	Parameters				Lead Person	Annual Cost		EQPL RANGE		MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
II. CONSTRUC	TION PHASE												
Air	Dust Emissions (Expected to be minimal as construction activity will not involve heavy earth moving)	Dust particulate	Air Quality Test	At least twice a year and as needed	On Site	Mabuhay FilCement Inc. Construction Management Group	15,000	Near Failing DENR Standard (TSP=360 µg/Ncm, S02 = 410 µg/Ncm, S02 = 410 µg/Ncm, C0 = 65 ppm) PM10= 12/0.03ppm C0= 50ppm	Near failing the DENR Standard (TSP=350 µg/Ncm, S02 = 390 µg/Ncm, N02 = 310 µg/Ncm, C0 = 50 ppm) PM10= 10/0.03ppm C0= 40ppm	Failing DENR Standard (TSP=300 µg/Ncm, S02 = 340 µg/Ncm, N02 = 260 µg/Ncm, C0 = 30 ppm) PM10= 07/0.03ppm C0= 30ppm (35mg/Ncm)	Dust control measure at source Enclosure of the construction site	Correct construction method producing dust	Curtail dust generation activities by implementi ng the alert and action measures
Air	Noise	dB for class C areas Noise level neighbors complaint	Observation and giving feedback Noise test as needed	Daily	Within the site	Mabuhay FilCement Inc. Construction Management Group	3000	Complaint s on noise 50 dB	Above 65 dBA noise level (10 PM – 5 AM)	Above 70 dBA noise level (10 PM – 5 AM)	Enclosure of the construction site PPE for noise	Repair and maintenance of noise source	Repair and maintenance of noise source; Limit/ decrease noise generating activities

Key Environmental	Dotontial		Sampling	and Measurem	nent Plan					EQPL MANAGE	MENT SCHEME		
Environmental Aspects per	Impacts per	Parameters				Lead Person	Annual Cost		EQPL RANGE		MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
Water	Ground, surface (inland water contamina tion)	E. Coli coliform pH TSS COD BOD	Spread plate, multiple tube fermentat ion	Once-to establish baseline	Nearest water well	Mabuhay FilCement Inc. Managem ent Group	10000	Near Failing standard COD=260mg/I BOD=180mg/I or 75% removal of WW before treatment pH =5.0-9.0 TSS <30mg/I increase Temp 3°C rise	Near Failing standard COD=280mg/I BOD=190mg/I or 85% removal of WW before treatment pH =5.0-9.0 TSS <30mg/I increase Temp 3°C rise	Failing standard COD=300mg/I BOD=200mg/I or 95% removal of WW before treatment pH =5.0-9.0 TSS <30mg/I increase Temp 3°C rise	Recheck the last schedule for sludge removal, affecting the treatment efficiency	Perform sludge removal and treatment with accredited third party treater	Stop operation and perform remedial measures; Improve Wastewater treatment process
Water	Increased Water Consumption	Extraction Rate / Water Consumption	Water Meter	Monthly	Water Reservoir	Mabuhay FilCement Inc. Managem ent Group	None	Water Consumption is 40 cu.m. / day	Water Consumption is 42 cu.m. / day	Water Consumption is 45 cu.m. / day	Check Water Practices	Check Water Practices, Correct unnecessary water usage	Look for leaks and fix at source
Water	Siltation	Siltation level	Site inspection	Weekly	Within the site	Mabuhay FilCement Inc. Construction Management Group	Part of construction contract	Silted water Water Ponding	Silt traps are half or 50% full	Silt traps are full (100%)	Check source of siltation	Stop activity causing siltation; Immediate remediation / clean up and housekeeping of areas	Cleaning up of silt basin and improve design or retrofit drainage system as needed

Key Environmental Aspects per			Sampling	and Measurem	nent Plan					EQPL MANAGE	MENT SCHEME		
Aspects per Project	Impacts per	Parameters				Lead Person	Annual Cost		EQPL RANGE	_	MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
Water	Flooding	Presence of Water impounding on road / plant site	Visual	During rainfall events and water insurgence	Road outside plant and inside plant	Plant Manager and staff	None	Plant Drainage Lines are full off the brim of storm water	Water impounding at site	Water Level at knee level	Check if there are blockages at drainage outlet or at the line	Clear Outfall of debris and manual pump out of storm water	Turn off all electrical lines and machinery; Stop operation; Evacuate
Land	Domestic and Constructi on wastes	Volume and quality	Visual	Daily	Within the site	Mabuhay FilCement Inc. Construction Management Group	Part of construction contract	Unsegregated wastes; Garbage bins are half or 50% full of its holding capacity or uncollected wastes on collection schedule	Unsegregated wastes Overflow of garbage or uncollected wastes 2 days after schedule	Overflowing and undisposed wastes for a week	Impose waste segregation; Inquire and remind waste collector of the collection schedule Coordinate with wastes recyclers	Coordinate with the city on the uncollected wastes Coordinate with a recycling company	Lodge complaint to the concerned office for the irregular waste collection Dispose uncollected waste

Key Environmental Potential Parameter			Sampling and Measurement Plan					EQPL MANAGEMENT SCHEME					
Aspects per Project	Impacts per	Parameters				Lead Person	Annual Cost		EQPL RANGE		MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
People	Complaints	Presence of complaints	Barangay Hall courtesy call	Only when there are complaints	South Poblacion Barangay Hall	Mabuhay FilCement Inc. CRO and PCO	Part of Salaries	Letter of Notice	Barangay Call for Courtesy	Protest against plant operation	Immediately contact barangay Resolve Issue	Set a meeting with barangay council to discuss complaints and issues; Resolve Issue	Set a press conference / meeting with barangay constituents to discuss complaints and issues; Resolve Issue

Кеу	Dotontial		Sampling	and Measuren	nent Plan					EQPL MANAGE	MENT SCHEME		
Environmental Aspects per Project Phase	Impacts per	Parameters				Lead Person	Annual Cost		EQPL RANGE		MAN	AGEMENT MEAS	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
III. OPERATION	I PHASE												
Air	Noise generation disturbing the neighbors	dB, Noise level Complaints	Observation Noise monitoring	bi- annual and as needed	At designated sampling stations as indicated in the EMP	Mabuhay FilCement Inc.	5,000.00	Presence of complaints; Noise is beyond 50% of PD 984 National Pollution Control Commission, Class C Standard (70 dBA)	Consistent complaints filed; Noise is beyond 75% of PD 984 National Pollution Control Commission, Class C Standard (70 dBA)	Test result beyond limit; Noise is beyond PD 984 National Pollution Control Commission, Class C Standard (70 dBA)	Enclosure of the generators Use of PPE	Repair and maintenance of generator causing the noise	Replacement of the generator if beyond repair
Air	Gas Emissions	Ambient Air Quality TSP PM10 N02 S02	Ambient Air Quality Test: TSP- High Volume Gravimetric PM10 - High volume with 10 micron particle-size inlet; Gravemetric S02 - Gas Bubbler and Pararosaniline Method (West and Gaeke Method) or	bi- annual and as needed	At designated sampling stations as indicated in the EMP	Mabuhay FilCement Inc. and/or Pollution Control Officer	15,000.00	Near Failing DENR Standard (TSP=360 μ g/Ncm, S02 = 410 μ g/Ncm, N02 = 340 μ g/Ncm, C0 = 65 ppm) PM10= 12/0.03ppm C0= 50ppm	Near failing the DENR Standard (TSP=350 µg/Ncm, SO2 = 390 µg/Ncm, NO2 = 310 µg/Ncm, CO = 50 ppm) PM10= 10/0.03ppm CO= 40ppm	Failing DENR Standard (TSP=300 µg/Ncm, S02 = 340 µg/Ncm, N02 = 260 µg/Ncm, C0 = 30 ppm) PM10= 07/0.03ppm C0= 30ppm (35mg/Ncm)	Regular maintenance of Cement Components and Air Pollution Control Devices such as Bag Filters, Electrostatic Precipitators, Dust Collectors and Spray Tower	Repair of Cement Components and Air Pollution Control Devices such as Bag Filters, Electrostatic Precipitators, Dust Collectors and Spray Tower, as	Replace cement component equipment and/or air pollution control devices causing the pollution if beyond repair

Key Environmental		Sampling	and Measurem	nent Plan					EQPL MANAGE	MENT SCHEME			
Environmental Aspects per	Impacts per	Parameters to he				Lead Person	Annual Cost Estimate		EQPL RANGE		MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
			Flame Photometric Detector NO2 – Gas Bubbler and Griess- Saltzaman or Chemiluminesc ence Method, All methods inconforman ce to USEPA 40 CFR, Part 50 CEMS as per DAO 2007-22 Stacks Methods for Metals									needed	
Water	Wastewater / Water Contamin ation	BOD TSS Oil & Grease coliform	Lab. Test Spread plate, multiple tube fermentation Site inspection	Twice a year	Within the site	Mabuhay FilCement Inc.	2,000/ sample	Lab result indicating 50% below the class C standard per DAO 35 (Color (PCU) = 150, pH = 6.5- 9.0, BOD = 50 mg/L, COD = 100 mg/L, Oil and Grease = 5 mg/L, TSS = 70 mg/L, Coliform = 100 MPN/mL]	Lab result indicating 75% below the class C standard per DAO 35 (Color (PCU) = 150, pH = 6.5- 9.0, BOD = 50 mg/L, COD = 100 mg/L, Oil and Grease = 5 mg/L, TSS = 70 mg/L, Coliform = 100 MPN/mL]	Lab result consistently below the class C standard in spite of the remediation (Color (PCU) = 150, pH = 6.5- 9.0, BOD = 50 mg/L, COD = 100 mg/L, Oil and Grease = 5 mg/L, TSS = 70 mg/L, Coliform = 100 MPN/mL)	Analyze source of high pollutants if not from domestic discharge Check efficiency of water and oil separators	Retrofit source of failure	Installation of Wastewater Treatment Facility (WTF)

Key Environmental Accords per		Sampling	and Measurem	nent Plan					EQPL MANAGE	MENT SCHEME			
Environmental Aspects per	Impacts per	Parameters				Lead Person	Annual Cost		EQPL RANGE		MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location	Location	(PhP)	Alert	Action	Limit	Alert	Action	Limit
Land	Solid waste	Volume and quality	Visual	Everyday	Within the site	Mabuhay FilCement Inc.	Garbage fee imposed by the LGU	Unsegregated wastes; Improper handling of wastes; Uncollected wastes during collection schedule	Unsegregated wastes; Indiscriminate dumping; Overflow of garbage or uncollected wastes 2 days after schedule	Overflowing, and undisposed wastes for a week	impose waste segregation; Housekeeping and solid waste management; Inquire and remind waste collectors of the collection schedule	Coordinate with the LGU on the uncollected wastes	Engage third party for waste disposal as needed Coordination with the LGU
Land	Hazardous wastes generation	Accumulat ion of hazardous wastes	Visual	Monthly	On-site	Mabuhay FilCement Inc. Safety Officer	Treatment fee (P6000- 10,000) per month	75% filled capacity of the hazardous wastes storage	90% filled capacity of the hazardous wastes storage	100% filled capacity of the hazardous wastes storage	Housekeeping Contact treaters to schedule collection and used oil buyers	Housekeeping Follow-up treaters and buyers; Explore other suppliers	Housekeeping Source other suppliers
People	Complaints	Presence of complaints	Barangay Hall courtesy call	Only when there are complaints	South Poblacion Barangay Hall	Mabuhay FilCement Inc. CRO and PCO	Part of Salaries	Letter of Notice	Barangay Call for Courtesy	Protest against plant operation	Immediately contact barangay Resolve	Set a meeting with barangay council to	Set a press conference / meeting with barangay

Key Potential			Sampling and Measurement Plan				Annual Cost	EQPL MANAGEMENT SCHEME					
Environmental Aspects per	Environmental Potential Paramete Aspects per Impacts per to be					lead Person	Annual Cost		EQPL RANGE		MAN	AGEMENT MEA	SURE
Project Phase	Environmental Sector	Monitored	Method	Frequency	Location		(PhP)	Alert	Action	Limit	Alert	Action	Limit
											Issue	discuss complaints and issues; Resolve Issue	constituents to discuss complaints and issues; Resolve Issue

CHAPTER 4 ENVIRONMENTAL RISK ASSESSMENT (ERA) AND DISASTER RISK AND MITIGATION MEASURES AND EMERGENCY RESPONSE POLICY AND GUIDELINES

4.0 ENVIRONMENTAL RISK ASSESSMENT (ERA) AND DISASTER RISK AND MITIGATION MEASURES AND EMERGENCY RESPONSE POLICY AND GUIDELINES

4.1 Risk Assessment (QRA)

Risk is inevitable in the operation of Mabuhay Cement ProcessingPlant. There is a chance that something may occur in the plant that will have a negative impact on the health or safety of a person or group of persons. These risks are identified and measured in terms of likelihood and consequence.

Because the potential risks are not static, rather they are dynamic and their likelihood and consequences can increase or decrease suddenly depending on various factors. Hence, the risk assessment tool of MFI will be reviewed and changed as needed to be more responsive.

MFI shall undertake Risk Assessment that will involve the following:

- Risk Identification;
- Risk Analysis;
- Risk Evaluation;
- Risk treatment and discuss how they can be controlled through proper planning and decision-making; and,
- Monitor and Review.

4.1.1 Risk Identification

The aim of the risk identification step is to identify a comprehensive list of risks based on events that might create, enhance, prevent, degrade accelerate or delay the achievement of MFI objectives.

4.1.2 Risk Analysis

Risk analysis involves consideration of the causes and sources of risk, their positive and negative consequences, and the likelihood that those consequences can occur. Controls represent any process, policy, device practice or other actions taken by management which reduces the likelihood of a risk occurring or the potential damage arising from the risk rating for each risk documented through the following three steps:

(1) Analyze the inherent risk

- assess the likelihood and consequence of a risk event if it were to occur in the absence of controls

(2) Identify and assess controls

- identify the existing controls in place to address the risk and assess how effective they are in operation

(3) Analyze the residual risk

- reassess the likelihood and consequence of a risk event if it were to occur, taking into consideration the effectiveness of the control environment as assessed in Step 2.

4.1.3 Risk Evaluation

The purpose of risk evaluation is to assist in making decisions based on the outcomes of risk analysis, about the risks that need treatment, and the implementation priority for these treatments.

4.1.4 Risk treatment and discuss how they can be controlled through proper planning and decision-making

Risk treatment will involve selecting one or more options for modifying risks and implementing those options; once implemented, treatments provide or modify the controls. Generally, there are a number of options when treating a risk i.e., (1) avoid the risk; (2) reduce the risk; (3) share the risk; or (4) retain or accept the risk. In all of these, risks will be managed proactively to avoid them as much as possible.

4.1.5 Monitor and Review

MFI through the safety officer shall monitor and report the progress of treatment implementation of each identified risk. Based on the outcome, the identified risk will be rated accordingly based on its likelihood and consequences.

In order to implement these risk management schemes, MFI has adopted standardized criteria and rating scales to be applied across all risk assessment activities. The following tables present the defined criteria and rating scales and their application is assessing risks.

LEVEL	DESCRIPTOR	ENVIRONMENT	HEALTH AND SAFETY	SOCIAL
1	Insignificant	Negligible reversible environmental impact requiring very minor remediation	No injury or illness reported	Low-level social impacts
2	Minor	Minor reversible environmental impact requiring minor remediation	First aid attention needed	Minor social impacts on small number of people.
3	Moderate	Moderate reversible environmental impact with short term effect requiring moderate remediation	Medical attention required-examination at a hospital or medical clinic	Frequent social issues.
4	Major	Serious environmental impact with medium term effect requiring significant remediation	Long-term illness or severe injury (means hospitalization for more than 24 hours)	A breakdown of social order.
5	Catastrophic	Permanent, severe environmental impact with long term effect requiring major remediation	Death or permanent disability	Complete breakdown of social order

Table 4.1: Qualitative Measures of Consequence

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LEVEL	DESCRIPTOR	DESCRIPTION	GUIDING FREQUENCY
A	Almost certain	The event is expected to occur in most circumstances.	Will occur in regular basis
В	Likely	There is a strong possibility the event will occur.	Will occur in the next 1-2 years
С	Possible	The event might occur at some time.	Will occur every 2 to 5 years
D	Unlikely	Not expected, but there's a slight possibility it may occur at some time.	Will occur every 5 to 10 years
E	Rare	Highly unlikely, but it may occur in exceptional circumstances. It could happen, but probably never will.	Will occur every 10 years upward

Table 4.2: Qualitative Measures of Likelihood

Table 4.3: Risk Assessment Matrix by Likelihood and Consequences

			CONSEQUENCES		
LIKELIHOOD	Insignificant	Minor	Moderate	Major	Catastrophic
	(I)	(Z)	[3]	(4)	(5)
(A) Almost Certain	Н	Н	E	E	E
(B) Likely	М	H	Н	E	E
(C) Possible	L	М	Н	E	E
(D) Unlikely	L	L	М	Н	E
(E) Rare	L	L	М	Н	Н
E = H =	Extreme Risk High Risk	M = L =	Moderate Risk Low Risk		

The following tables presents the Risk Assessment Matrix, Risk Categorization and Control Measure Plan for Mabuhay Cement Plant.

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	CONSEQUENCES								
LIKELIHOOD	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)				
(A) Almost Certain	Hearing impairment	Flooding	Increased respiratory symptoms, such as irritation of airways, coughing or difficulty of breathing.	E	Air quality degradation				
(B) Likely	Community complaints that lead to barricades and rallies	н	н	E	E				
(C) Possible	Surface water contamination	м	Spreading of communicable diseases	E	Vehicular related accidents				
(D) Unlikely	L	Caught in between injuries from mechanical motion such as rotating and reciprocating parts	Electrocution and electrical shock	Slips, trips and falls	E				
(E) Rare	L	L	Struck by falling objects	Н	Issuance of Notice of violation or Cease and desist order				

Table 4.4: Risk Assessment Identification Matrix

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RISK ASPECTS		POTENTIAL CAUSES	HAZARD	RISK ASSESSMENT		MENT		MONITORING	
				С	L	R	CUNTRUL MEASURES	FREQUENCY	RESPONSIBILITIES
Environment	Land	Poor drainage system	Flooding	2	А	Η	Design drainage with proper elevation and capacity	As needed	Civil and Structural Engineer
	Water	Oil Spill	Surface water contamination	1	С	L	Provide proper storage with secondary containment	Daily	Environmental Engineer / PCO
	Air	Hauling activities and the emission released from heavy equipment	Air quality degradation	5	A	E	Conduct road water sprinkler at quarry and access roads. Regular maintenance of heavy equipment. Cover the hauling trucks	Daily	PCO
Social	Social contact	Social issues related to air, noise, water and visual amenity that can disrupt the quality of life of the community	Community complaints that lead to barricades and rallies	1	В	М	Conduct IEC Program for the affected communities. Regular coordination with the concerned communities and promptly/proactively address their concerns.	As needed	CRO
	Socio- economics	Non-complaint to mandatory and legal requirements	Issuance of Notice of violation or Cease and desist order	5	E	Η	Conduct internal audit and comply promptly with all legal and mandatory requirements.	As needed	PCO/Legal
Health and Safety	Safety	Brake failure and reckless behavior	Vehicular related accidents	5	С	E	Proper maintenance of heavy equipment including change oil and emission test and enforce speed limit to the hauling trucks	Daily	Safety Officer
	Safety	Working below the operating overhead crane and working above others	Struck by falling objects	3	E	М	Practice isolation system such as permit to work and Provision of toe guard and ensure good housekeeping especially when working at heights	Daily	Safety Engineer

Table 4.5: Risk Categorization and Control Measure Plan

	POTENTIAL CAUSES	HAZARD	RISK ASSESSMENT		MENT	CONTROL MEASURES	MONITORING	
			C L		R		FREQUENCY	RESPONSIBILITIES
Safety	No machine guards	Caught in between injuries from mechanical motion such as rotating and reciprocating parts	2	D	L	Provide machine guards in all rotating equipment, apply isolation system (LOTOTO) during maintenance and conduct safety awareness to all operators	Daily	Safety Engineer and Maintenance Engineer
Safety	Faulty electrical wiring, electrical equipment coming contact with water, downed power lines, lightning strike and overheating of cables or other electrical equipment through overloading	Electrocution and electrical shock, burns and fires	3	D	М	Electrical installation and maintenance should be done by authorized personnel, apply isolation system (LOTOTO) during maintenance, proper insulation, guarding, grounding and use of electrical protective devices	During Maintenance schedule and as need arise	Safety Engineer and Electrical Department
Safety	Unstable and unsafe edges	Slips, trips and falls	4	D	H	Conduct safety and health training/seminar and provide safety signage.	Daily	Environmental Engineer/Safety Engineer
Health	Rapid expansion and the migration of itinerant workers	Spreading of communicable diseases	3	С	H	Regular coordination with health center units and provide yearly medical examination to employees.	Monthly	CRO and Nurse
Health	Air pollution exposure	Increased respiratory symptoms, such as irritation of airways, coughing or difficulty of breathing.	3	A	Н	Road watering and provide PPE to all workers.	Daily	PCO and Safety Officer
Health	Exposure of high level of noise	Hearing impairment	1	A	Н	Planting of trees at the plant perimeter that will serve as a buffer and provide ear plug/muffler to employees	Daily	PCO and Safety Officer

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4.2 Risk Management Measures

4.2.1 Fire Risks Management

Although cement processing plants are usually provided with modular fire protection systems to areas and enclosures with an inherently elevated fire risk, additional fire equipment must be provided. The cement plant will have firefighting equipment of recommended standards and in key strategic points all over the property such as Fire pumps, hydrants, hose houses, dry chemical systems, detection/alarm systems, portable fire extinguishers among others. A fire evacuation plan will be posted in various points including procedures to take when a fire is reported. All workers will be trained on fire management and fire drills will be undertaken at least annually.

4.2.2 Noise and Heat Management

 Noise – prolonged exposure to excessive noise levels can cause noise-induced hearing loss. When you are exposed to excessive noise levels, the first stage is temporary hearing loss. Over time, the hearing loss becomes permanent. Mitigating this risks can be with the utilization of noise-reducing installations and the use of ear mufflers as basic PPE.

To minimize disturbance of the community from noise, the cement plant is enclosed particularly the noise producing equipment. And buffer trees around the perimeter of the property also intend to desipate the noise produced in the plant.

 Heat – This can occur when workers have prolonged work under direct sunlight and lack of ventilation. For the enclosed work station, MFI shall provide proper ventilation or air conditioning as deemed necesssary. Workers who are exposed to the sun will have regular break periods.

4.2.3 Hazard Substance Inventory

All hazardous wastes are stored in a sealed hazardous waste facility within the plant. In line with this, MFI acquired a Hazardous Waste Generator Registration no. GR-R7-22-00685 with DENR approved 06/01/2017 (See Annex B). Below is the list of registered types of hazardous wastes. For complete list of quantities of hazardous wastes, please see submitted Quarterly Self-Monitoring Reports (SMRs) found in Annex D.

Class	Waste Number
Mercury and Mercury Compounds (Busted fluorescent lamps)	D407
Used oil for lubrication; grease wastes/lubricants	1101
Waste electrical and electronic equipment	M506

Table 4.6: List of Registered Types of Hazardous Wastes

4.2.4 Protection Against Collapse of Structures

The expansion of the cement plant will have minimal structural construction and more of installation of equipment, hence utmost consideration to safety will be at the forefront. Careful execution and step by step installation procedures will be followed to avoid accidents due to collapsed equipment or structure.

4.2.5 Storage of Materials

Construction materials and equipment shall not be placed or stored on a permanent or temporary structure exceeding its safe load carrying capacity. Lumber or structural steel and similar building materials shall be properly stored and secured against collapsing or tipping. Pipes and reinforcing steel shall be stacked in racks or frames supported to prevent movement. Gangways and platforms shall not be used as storage for materials and tools.

4.2.6 Protection to Public

Proper side walk is provided for the passersby along the cement plant. Traffic will be controlled to avoid accidents between the pedestrians and the vehicles going to and fro the cement plant. Security personnel will be assigned to ensure the safety of the public passing through.

4.2.7 Protection from Falling of Materials

Steps shall be taken out to protect workers from falling materials, such as the provision of safety helmets and safety shoes. Tools, objects and materials (including waste materials) shall not be thrown or tipped from a height but shall be properly lowered from crane, hoist or chutes. If such is not practicable, the area where the materials is thrown or lowered shall be fenced and no person allowed in the fence area.

4.2.8 Loose Materials

Loose materials shall not be placed or left on working platforms, gangways, floors or other workplaces but shall be removed, stacked or stored not to obstruct passage. Materials shall not be stacked in a manner causing danger to the workers or overload and render unsafe any platform, gangway, floor, roof or other part of a building or structure.

4.2.9 Vehicular Loading

No person shall remain on or in a vehicle during or unloading except those required to be there and only when all necessary protection against hazards are provided.

4.2.10 Vehicle Driving

No person shall operate any vehicle or equipment in a construction site unless he has adequate training and experience or license to operate such vehicle or equipment and is authorized by his immediate superior.

4.2.11 Electrical

Before any activity is commenced, steps shall be taken to prevent danger to the workers or operating equipment from any live electrical cables or equipment by providing barriers to prevent contact. Every worker in the workplace and approach thereto, where raising and lowering operations with the use of lifting appliance are in progress, and all openings dangerous to workers, shall be lighted with the minimum requirements.

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4.3 Occupational Safety and Health Program

MFI shall organize and maintain Health and Safety Committee conforming to the Standards that is set by the Department of Labor and Employment by its Bureau of Working Conditions.

The Health and Safety Committee shall plan and create a policy making group in all matters, pertaining to Safety and Health. The principal duties of the Health and Safety Committee will be;

- Plans and develops accident prevention programs for the establishment;
- Directs the accident prevention effort of the establishment in accordance with the safety program safety performance and government regulations in order to prevent accidents from occurring in the workplace;
- Conduct safety pep talk meeting prior to the start of job and conducts a safety meetings at least once a month;
- Reviews report of inspection, accident investigation and implementation of programs;
- Submits reports to the manager on meetings and activities;
- Provide necessary assistance to government inspecting authorities in the proper conduct of their activities such as the enforcement of the provision of standards;
- Initiates and supervises safety training for employees; and,
- Develops and maintains a disaster contingency plan and organizes such emergency service units as maybe necessary to handle disaster situation pursuant to the emergency preparedness manual for establishments of the office of civil defense.

4.3.1 Use of Personal Protective Equipment (PPE)

All personal protective equipment shall be of the approved design and construction appropriate for the exposure and the work to be performed. No person shall be subjected or exposed to a hazardous environmental condition without protection.

Eye and Face Protection

Eyes and face protective equipment shall be required where there is reasonable probability of exposure to such hazards. In such cases these is required where the processes or operations present of hazards flying object, liquids, dust, glare or a combination of these hazards.

Respiratory Protection

All employees will be wearing masks particularly in areas where dust is generated. This is addition to the engineering and control measures such the installation of dust filters, enclosure or confinement of the operation, general and local ventilation.

Head Protection

Hard hats for the protection of workers from impact penetration from falling and flying objects, blows, and from limited electric shock and burns shall be provided where there is reasonable probability of exposures to such hazards.

Hard hats shall be made of non-combustible or slow burning materials and when used in

electrical environment shall be non-conductor of electricity. Hard hats shall have a brim all around to provide protection for the head, face and back of the neck. Hard hats without brims and low crowns maybe only allowed in confined spaces.

Hair Protection

Persons with long hair when operating a machinery shall completely cover their hair with well fitting caps or other equivalent protection.

Hand, Arms and Feet Protection

When selecting gloves, consideration should be given to the hazards to which the user may be exposed to and the ease and free movement of the fingers. Glove, mittens and leathers or pads for workers handling sharp edge or abrasive objects shall be made of tough materials and where necessary provided with special reinforcement. Gloves, mittens and sleeves for workers handling hot metals shall be made of suitable heat resisting materials. Gloves and sleeves for electrical workers shall be made of rubber or other suitable materials conforms the test requirements on dielectric strength. Workers handling corrosive substances such as acids and caustics shall be made natural rubber, synthetic rubber or pliable plastic materials resistant to corrosion. Safety shoes with steel toe must wear at all times and must be approved design is required and fit to the workplace of assigned task.

Safety Belts, Life Lines and Safety Nets

Workmen in unguarded surface above and similar locations, or working from unguarded surfaces six (6) meters or more or above the ground, temporary platform, scaffold or where otherwise exposed to the possibility of falls hazardous to life shall be secured by safety belts and lifelines. In situation where safety belts and lifelines in guarded platform and scaffolds or temporary floors are not feasible, safety nets shall be provided and installed.

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Figure 4.1: Suggested Basic PPE for both Plant Workers and Visitors (hard hat, steel toe, ear mufflers, goggles)

4.4 Disaster Risk Management Program

Disasters may happen at any given time and usually comes unexpectedly. Hence, MFI shall implement the following plans and programs during disastrous events

4.4.1 Typhoon

Since typhoons usually have forecasts, early warnings and preparations minimize the effect of typhoon and floods. Specifically, the following typhoon emergency procedures, policies and guidelines will be done and observed:

- Always ensure that all means of communication are open and have constant update/information about the expected calamity.
- Inform and alert all personnel on-duty including the security guards and prepare for contingency.
- Conduct regular ocular inspection of the power stations.
- Secure equipment and tighten if necessary to prevent rain intrusion.
- Check condition of emergency lights and other safety devices.
- Check operability of the auxiliary generator. Conduct regular warm up/possible damage
- Secure all spare parts and equipment. For unit under maintenance, use ropes to lash parts that are pulled out to prevent them from falling or possible damage.
- All equipment at the top silos should be covered with tarpaulin or canvas to prevent intrusion of rain.
- Communications man to closely monitor weather bulletins issued by PAGASA and to disseminate important weather updates.


General Guidelines

- Routine inspection shall be conducted in order to determine if all equipment, supplies and other related items vulnerable to damage and contamination under such conditions are protected and secured.
- Supervisors should caution their respective personnel to minimize movement in their assigned areas.
- All equipment that may possibly be used in times of emergency shall be checked to ensure that all are in good operating condition.
- All flammable, corrosive and explosive materials shall be secured to avoid any possibility of endangering lives and property in case these materials are spilled or exposed.
- All electrical wiring connections, switch and circuit breakers shall be checked to ensure that these are not exposed to water and the possibility of short circuit and sparking are eliminated.
- All first aid supplies and equipment shall be checked for availability and safety stock levels.

Signal no. 1

• If and when Signal No.1 is hoisted in your area, the applications of the general guidelines are to be observed, at the discretion of management.

Signal no. 2

- Measures shall be taken to prevent damage to Mabuhay FilCement Incorporated properties by wind and water.
- All vehicles shall be secured.
- Supervisors shall remind their respective personnel on the evacuation priorities of records, files, and other valuable properties, which may be vulnerable to damage.
- The fire brigade shall check on their firefighting equipment to ensure that these are in good operating condition when the need arises.

Signal no. 3

- All support group personnel and other personnel that are not necessary in securing vital operations shall be set home, depending on their priorities set by the officer in charge.
- No vehicle shall operate except on a very urgent mission.
- Contact with the Disaster Coordinating Council Office and PAGASA shall be maintained and checked every thirty minutes.
- While situation (Signal No. 3) remains hoisted all managers shall be on alert so their advice can be readily available on call.

After the Typhoon

- Checking of premises, noting any structural damage, weakness and making necessary repairs.
- Check protection/safety equipment (alarms and electronic instruments).
- Check stock and contents in the plant compound for water damage. Start salvage operations or dry out that can be done. After making repairs, arrange for permanent repairs.
- Report to management in writing the extent of damage if any and incidents occurred within their respective area. (Brief Summary within 24-hours and 1-week for detailed report).
- If equipment or components have been damaged by an insured hazard, notify the insurance

company immediately.

• Provide guard to patrol the premises.

Evacuation Plan

As an emergency situation reaches destructive proportion, evacuation is effected to save lives and property. Similarly, valuable properties were lost due to looting or wrong priority selection at the height of a disaster. Hence, the following evacuation plan was developed by MFI.

Objectives

- 1. To safely evacuate personnel away from the location of where emergency occurs.
- 2. To evacuate valuables away from the disaster area and secure these against looting and damages

from mishandling.

Priority Setting

The respective Managers and Supervisors shall be responsible in determining the priority setting of the documents and properties of their offices.

FIRST PRIORITY (marked RED)	High Value Materials e.g. money, classified and confidential documents the disclosure or loss of which could cause serious damage to the company
SECOND PRIORITY (marked YELLOW)	Important documents, matters or equipment which when exposed or lost will not cause serious damage to the company but may hamper or delay its smooth operation

<u>Guidelines</u>

- Security Personnel shall give order in the evacuation of personnel and valuables.
- All personnel shall leave the location using the designated zone exits.
- The zone warden shall guide the orderly egress of personnel and enforce safety requirements.
- In case the per-designated zone exit is the scene of the emergency (fire, bomb, etc.) the personnel affected should use the nearest exit available.
- All personnel should leave the building immediately and report to the designated evacuation site.
- All personnel should report to their respective zone wardens for proper headcount.
- Members of the evacuation team shall conduct evacuation of valuables from the disaster area to the evacuation site. Evacuation shall follow the evacuation setting.
- Security team shall cordon and secure the evacuation area.

4.4.2 Earthquake Emergency Plan

Earthquakes, unlike typhoons, strike without warning and is unpredictable. It may range from slight tremor to great shocks, may last from a few seconds to several minutes. It could intermittently occur in series for a period of time. Although it is the actual movement of the ground, it is seldom the direct cause of injury. Casualties are due to falling materials, fire, explosion, landslide and tidal wave.

Objectives

To enlighten all employees on the measures to be taken to minimize, if not prevent unnecessary loss of lives and properties in the event of strong earthquakes.

Concept

In a disaster due to earthquake, the most common enemy to all is PANIC and the simultaneous occurrence of fire. During this emergency, presence of mind is a MUST and immediate stumping out of fire incident, is a "definite rule". Each department head / supervisor shall exert positive leadership in pacifying his or her employees in order to avoid panic and shall ensure that general precaution in case of earthquake is understood by everybody.

General Precaution

During Tremor

- Remain calm. Think the consequences of any action you plan to take. Try to calm and reassure others.
- If indoor, watch for falling plasters, bricks, light fixtures and other objects. Watch out for high bookcases, cabinets, shelves, and other furniture, which might slide or topple. Stay away from windows, mirrors and chimneys. If in danger, get under the table, desk or bed, in a corner away from the windows or in a strong doorway. Encourage others to follow your example. Do not run outside.
- If outside, avoid high buildings, walls, power poles, and other objects that could fall. Do not run through streets. If possible, move to an open area away from all hazards.
- Shut off all electrical power connections that might pose danger in case of breaks.
- Extinguish at once fire that may start around you.
- If in automobile, stop in the safest place available, preferably in an open area.

After Tremor

- Stay out from the damage building. The aftershocks could be more damaging.
- Cut off main switches in the area, live electric wires hanging or strewn to the ground are dangerous to life and potential causes of fire.
- Rescue and medical services should be deployed immediately.
- Check utility lines and appliances / equipment for damage. If gas leaks exist, shut of main gas valve. Shut off electrical power if there is damage to wiring. Do not use matches or lighters until it has been established that there are no gas leaks.
- Check building for cracks and damage. Unnoticed damage could lead to a fire. The initial check could be made from a distance. Approach building with great caution.
- DO NOT SPREAD RUMORS. They often do great harm following disasters.
- Request for help from Police, fire Fighting Civil Defense, and relief organizations. Cooperate fully with public safety Officials.
- Check for injuries. Do not attempt to move seriously injured persons unless they are in immediate danger of further injury.
- Check for fires.
- Do not eat or drink anything from open containers near shuttered glass. Liquids maybe strained through a clean handkerchief or cloth if danger of glass contamination exists.

4.4.3 Fire Emergency Plan

Controlled fire is useful and necessary while uncontrolled fire is destructive. It causes loss of lives; severe damages to property and affects business adversely. An early response and correct action in the event of fire occurrence do not only limit the losses in terms of property but in most cases minimize the dangers to human lives as well. Prompt action of employees and adequate preparation in the event of fires can only be attained through anticipation of efforts and careful planning. However, the best situation is where everyone in the corporation is safety conscious and prevents the occurrence of destructive fires.

Objective

To provide a clear plan and procedure in combating and controlling fire to protect personnel and property and to restore as early as possible the operational capability of the corporation.

Duties and Responsibilities

Employees

Any employee who notices or is near the location of the fire shall:

- 1. Put out the fire with any available means if the fire is just starting. For fires of electric origin, cut off the current first before putting out the fire.
- Pass the word to alert everybody in the area on the location and nature of fire. Inform the Emergency Marshal who in turn will summon / activate the in-house Fire / Disaster Control Brigade and make the necessary coordination for fire / police assistance or call the public fire department.
- 3. Activate the nearest installed fire alarm in the area.
- 4. Know the location of the exits. Follow exit instructions and walk to your assigned exit. Maintain order and calmness. Complete all emergency duties assigned to you and be ready to march out according to the plan.
- 5. Check if everyone is accounted for. If not, inform the fireman or rescue squad. Do not try to attempt going back to the location of the fire.
- 6. Move away from the location quickly and report to the designated evacuation site or emergency assembly area for the head count of all personnel and accounting of evacuated valuables.

Managers / Supervisors

Respective Managers / Supervisors of each location being threatened by fire shall immediately conduct personnel and records evacuation. The Manager / Supervisor concerned shall not allow any risky operation or action to be performed by their employees in the event of fire. All employees not involved in firefighting operations shall not be allowed in the fire scene and must be evacuated immediately.

• Fire / Disaster Control Brigade

Upon notification, members of the various Brigade Units shall assemble and proceed to the location of fire and immediately perform their respective duties under the direction of the Emergency Marshall. These units and their respective roles are as follows:

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Fire Fighting Team	Controls the spread of fire and put out the flames by use of available firefighting equipment.		
Communication Team	To give alarm to the occupants by using pre-arranged warning sig- nals and to call fire department for assistance in case fire cannot be put out by the in-house Fire Fighting Team.		
	To maintain communication links with other agencies in case of accident / emergency.		
Transportation Team	To provide with the need of transport services during and after the incident.		
Evacuation Team	To evacuate important documents and office equipment and assist the floor wardens in effecting a planned and controlled movement of personnel whether egress or ingress during emergencies.		
	Alert floor occupants of the emergency.		
	Direct flow of evacuees to main stairway or the fire escape stairway.		
	Prevent confusion and avert panic by keeping calm and giving nec- essary assistance and direction.		
Floor and Zone Wardens	Enforce safety by disallowing the carrying of bulky personal effects and instructing ladies to remove high-heeled shoes before proceed- ing to the fire exit.		
	Conduct final check of all rooms including comfort rooms members have vacated the building.		
	At the designated evacuation / assembly area, verify if all occupants in their respective locations are all accounted for.		
Rescue Team	To locate injured and trapped people and remove them to a place where they can be attended by properly trained medical personnel.		
	To attend to the wounded and the injured personnel and adminis- tered first aid.		
First Aid / Medical Team	To arrange their transport to the hospital, to call for an ambulance form the nearest hospital in order to evacuate the wounded and in- jured in extreme cases.		
Security Team	To determine, secure and distribute the supply requirements of the different action teams.		
Damage Control, Recovery and Re-entry Team	To take charge in assessing, salvaging, rehabilitating the damage caused by the emergency situation and for coordinating reentry operations.		
	Directs and coordinates actions of Disaster Control Brigade Team members and employees during emergencies.		
Chief Emergency Marshal	Recommends disciplinary measures for violation/infraction of safety rules and regulations.		
	Supervises training and drill of employees on emergency preparedness.		

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Deputy Emergency
MarshalPerforms the duties of the Chief Emergency Marshal in the absence
of the latter.

4.4.4 Emergency Preparedness

MFI developed this emergency preparedness program to provide all departments with the generalized guidelines for emergency planning. The objectives of an emergency plan are to:

- 1. Minimize the effect on personnel and community.
- 2. Keep property and equipment losses to a minimum.
- 3. Assure interdepartmental and inter-plant coordination and cooperation.
- 4. Assure the cooperation of outside agencies.
- 5. Assure the release of accurate information to the public.
- 6. Provide for an effective response to emergency situations.

An effective plan should analyze the probability and extent of all emergencies; fire, explosion, bomb threat, spills, rupture of utility mains, typhoon, storms, floods, earthquakes, etc. The plan must take into consideration the adequacy and state of preparedness of emergency services such as plant protection, fire department, medical, safety, public relations and communications.

Outline of an Emergency Plan

1. Scope of emergency

Internal Types	In-plant fires, explosions, line ruptures, spills, internal employee subversion.				
External Types	Natural causes (floods, typhoons, earthquakes, storms, lightning), riots or other civil disorders, etc.				
	Personnel – total and distribution by shifts				
Operational	Building – hazards or weaknesses of construction and layout				
Considerations	Production – products or type of activity				
	Fire and explosion hazards – pressure vessels and lines; boilers; flammable, combustible, corrosive or toxic materials; reaction hazards				

2. Emergency Systems

Local Alarm	Alarm signal device – siren, etc. Voice communication – intercom Telephones
Communication to and from Areas of Plant and Emergency Center	Telephone / Mobile Phones Radios Plant sirens or whistles
Other Equipment	Emergency lighting, evacuation route, control room Alternate sources of power

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3. Responsibility for initiation of Plan

- a) Appointment of a person in charge of Emergency Response
- b) Sounding of Alarm
- c) Notification of communication center
- d) Notification of supervisory personnel (up-to-date emergency telephone list)

4. Management Evaluation of Emergency Situation

- a) Notify supervisor responsible for area
- b) Decide whether normal shutdown, emergency shutdown, or evacuation
- c) Effect on neighboring in-plant buildings and processes
- d) Effect on adjacent community notification of local authorities

5. Evacuation Procedures

- a) Evacuation routes
- b) Designation of personnel assembly areas
- c) Accountability for all personnel

6. Return and Startup

- a) Check of building or emergency area
- b) Communication of "All Clear" signal
- c) Inspection and report of damage
- d) Determination of safe startup

7. Testing of Emergency Systems

a) Periodic tests of alarms, communications, response of local units and in-plant brigades, evacuation procedures, etc.

4.4.5 Conducted Drills and Training

Fire Drills

In coordination with DILG – Bureau of Fire Protection, employees and workers alike are trained on the emergency response procedures in the event of fire. The training was completed on March 31, 2012.

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Figure 4.2: Certification of Completion

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BUREAU OF FIRE PROTECTION SAN FERNANDO FIRE STATION San Fernando, Cebu
CERTIFICATE OF COMPLETION
For Calendar Year 2012
* To *
MABUHAY FIL-CEMENT INCORPORATED
For having successfully complied the requirements of the New Fire Code of the Phillipines, FIRE DRILL Lecture / Seminar and the
South Poblacion, San Fernando, Cebu.
Given this <u>31st</u> day of March, 2012 at San Fernando Fire Station, San Fernando, Cebu, Philippines.
*
Angelma
INSP MYLAHU SELMA, BFP
MUNICIPAL FIRE MARSHAL
v Redio die

Basic Life Support and Rescue Training

Included in the training by the Bureau of Fire and Protection is the Basic Life Support and Rescue Training. This activity will equip the employees and workers to be able to do basic rescue actions for the event of emergencies. Some of the activities included is the conduct of proper Cardiopulmonary Resuscitation (CPR), transporting of injured using a stretcher, without a stretcher and among others.

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Figure 4.3: Basic Life Support and Rescue Training

Also, additional training was conducted in the year 2015.

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Figure 4.4: 2015 First Aid Training

Figure 4.5: 2015 First Aid Drill



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For any untoward incident that would cause damage to the plant, its equipment, and machinery, insurance coverage is provided. This insurance cover includes damages caused by fire, typhoon, earthquake and man-made disasters which would be catastrophic in magnitude. Machinery breakdown insurance is also part of the coverage even as the plant personnel are required to adhere to standard operating procedures, religiously follow maintenance guidelines, and implement all applicable safety rules and regulations.

4.5 Emergency Response Team

4.5.1 Organization of Emergency Response Team (Internal)

The primary responsibility of the Emergency Response Team formed by this Plan is to provide for the safe and efficient evacuation of all personnel during an emergency situation. The secondary responsibility will be to assist in mitigating the emergency if it is within the capabilities of the Team. This Team will be comprised of the following members:

- Scene Manager
- Safety Officer
- Area Leaders (1 per area)
- Floor Monitors (1 per area)
- Personnel Coordinator (1 per floor)

The organizational flow chart for the Response Team is illustrated in Figure 4.3. The primary responsibility for each Team member is as follows:

- a) The Scene Manager will assess the situation and determine whether an emergency exists. Once an emergency has been declared, the Scene Manager will establish contact with the appropriate emergency personnel. This person will establish the Hot Zone, Warm Zone and Safe Zone, based on the best information immediately available. The Scene Manager will maintain radio contact with the Emergency Response Team and emergency dispatch and make necessary decisions until professional respondents arrive on site. Upon arrival of emergency personnel, the Scene Manager will pass along all pertinent information. After the incident has terminated, the Scene Manager, based on the advice of the emergency personnel, will sound the "all clear" and allow reoccupation of the affected areas.
- b) The Safety Officer's responsibility is to identify and evaluate potential hazards and to provide direction to the Scene Manager with regard to the safety issues at hand. The Safety Officer will recommend at what distance the Warm and Safe Zones shall be established and will constantly re-evaluate their placement.
- c) One Area Leader will be selected for each area or floor within the Plant. All Personnel Coordinators within the designated areas will report to the Area Leader when the Plan is activated. As information becomes available from each floor of the affected area, the Area Leader will relay it directly to the Scene Manager.
- d) One **Floor Monitors** will be selected from each area of the Plant Site. The Floor Monitors will be responsible for instructing all occupants to evacuate and to check floor conditions for potentially

hazardous situations. They may also take corrective actions in an emergency situation if it is within their capabilities. They report directly to the Area Leader.

e) One Personnel Coordinator will be selected for each floor or area. Primary responsibilities include maintaining a roster of all floor occupants and ascertaining whether all occupants are present and accounted for in the emergency assembly areas. Included in the information which the Personnel Coordinator should collect is the presence on the floor of any personnel who may have difficulty in rapidly evacuating because of some disability. Also, any person or persons who might have to remain behind to perform emergency shutdown procedures during an evacuation must be listed so that it is understood that they may be delayed for reporting to the Evacuation Area. The Personnel Coordinator will report directly to the Area Leader.

4.5.2 Off-Site Emergency Response Team

During emergency, the scene manager is assigned to contact off-site emergency response team depending on the case of the emergency.

• Municipal Disaster Risk Reduction and Management Office (MDRRMO)

The MDRRMO can be contacted for cases of additional assistance in facilitating and supporting on-going conduct of natural emergencies such as flooding, earthquakes and among others. They are assigned to aid in the training of staff and designing risk assessments.

• Ambulance

An ambulance can be called and commissioned should there be an on-site plant staff or employee requiring medical attention that cannot be accommodated in an RHU but in a provincial or private hospital.

• Bureau of Fire Protection (BFP)

The BFP role is to suppress and prevent the outbreak of destructive fires, enforce relevant laws, and provide or help provide emergency medical and rescue services in the event of a fire within the plant. Likewise, while BFP has not yet arrived, trained personnel should immediately conduct fire suppression using fire equipment like fire extinguishers, if fire size is manageable and if not caused by chemical explosions.

• Philippine National Police (PNP)

The PNP may be called should there be a crime scene or a terrorist attack/threat. Crimes may be in forms of offense against the person, violent offense, sexual offense and offense against property and among other categories.

• Rural Health Unit (RHU)

The RHU may be called should a staff or personnel require medical assistance and attention that cannot be attended by the in-house clinic due to lack of medical

instruments, or severity of the case.

Below are the contact numbers of the aforementioned departments to be noted by the Scene Manager and Safety Officers:

Table 4.7: San Fernando Emergency Hotline Numbers

SAN FERNANDO EMERGENCY HOTLINE NUMBERS:				
MDRRMO	(032) 260-2083			
(24 HRS)	0942-6383201			
AMBULANCE	0942-7539382			
BFP	488-9793			
PNP	255-2636			
RHU	488-9703			

Below is the organizational chart for the Emergency Response team showing the hierarchy of the chain of order during emergencies for both internal and external teams.

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EMERGENCY RESPONSE TEAM ORGANIZATIONAL FLOW CHART



4.6 Safety Audit and Monitoring Plan

4.6.1 Record of Events

Shown below is a list of significant calamities that has significantly affected the operation of the plant since 2009. Effects are mainly on the stop of operation due to strong winds, continuous earth-shaking and non-passable roads.

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N	Date	Local Name / Epicenter	International Name	Intensity
1	February 2009	Bising		Signal no. 1
2	December 2011	Sendong	Washi	Signal no. 1
3	August 2012	Samar		7.6
4	October 2013	Bohol		7.2
5	November 2013	Yolanda	Haiyan	Category 5 Super Typhoon
6	July 2014	Rammasun	Glenda	Category 5 Super Typhoon
7	December 2016	Nock-Ten	Nina	Category 5 Hurricane (SSHWS)
8	April 2017	Crising		Tropical Depression

Table 4.8: Significant Natural Calamities Affecting Plant Operation

Dates as shown in the table do not take place on a single day but may span to a couple days. For instance, earthquakes have numerous aftershocks following the main hit. For typhoons, days off work may span from one (1) day to four (4) days.

There are no recorded accidents or fatalities towards plant workers and staff from the plant operation caused by human or equipment error (physical and work-related). Implementation of proper safe work ethics, use of PPE and regular inspection and maintenance of equipment aids so much in promoting a safe work environment.

4.6.2 Safety Monitoring Plan

During operation of the cement plant, it is in practice that the plant's process equipment are checked for defects, malfunctions and efficiency. The lists below show the various equipment and process parts for punch listing for commencing operation and use of equipment. The expansion project shall also undergo the same thorough inspection before operation to be done by the inspector.

Equipment				
Raw Material Weigh Feeders		EP 150		
1119	Belt Conveyor LST	1216	Drag Chain 1	
1120	Belt Conveyor Silica	1217	Drag Chain 2	
1121	Belt Conveyor Cu Slag	1218	Rotary Airlock 1	
1122	Belt Conveyor Clay	1219	Rotary Airlock 2	
Raw Materials Transport		1220	Screw Conveyor 1	
1223	Magnetic Separator	1221	Screw Conveyor 2	
1224	Belt Conveyor 1	1301	Bucket Elevator	
1201	Belt Conveyor 2	1303	Airslide	
1205	Belt Conveyor Reject	1305	Distribution Airslide	

Table 4.9: Raw Mill Component Checklist

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Equipment				
Raw Mill		1324A	Dust Collector	
1203	Impact Hammer Mill	1324	Dust Filter	
F1227	Inlet Damper	Raw Mix	Feed In	
01203	Lub Pump	1319A	Aeration Blower 1	
1204	Tube Mill	1319B	Aeration Blower 2	
F1223	Damper 1	1310	Drag Chain	
F1225	Damper 2	1311	Bucket Elevator	
012041	Lub Pump 1	1322	Diverter Flap	
012042	Lub Pump 2	1326	Airslide	
Raw Me	al Transport	1327	Airslide fr 1301	
1207A	Screw Conveyor 1	1313	Mix Bin	
1207B	Screw Conveyor 2	1325A	Pneumatic Valve 1	
1207C	Screw Conveyor 3	1325B	Pneumatic Valve 2	
1207D	Screw Conveyor 4	1318	Aeration Blower	
1213	Airslide 1	1315	Pneumatic Slide Gate	
1212A	Airslide 2	F1316	Damper	
1212B	Airslide 3	1320	Kiln Weigh Feeder	
1212C	Airslide 4	Raw Mill System Aeration		
Raw Mill Homogeneous System		1215	EP Fan	
Valve 1		F1215	EP Damper	
Valve 2		1208	Circulating Fan	
Valve 3		F1208	Circulating Damper	
Valve 4		F1224	Circulating Outlet Damper	
		F1228	Damper 1	
		F1229	Damper 2	

Table 4.10: Coal Mill Component Checklist

Equipment				
Raw Coal Transport		Coal Dust Transport		
2402	Belt Conveyor	2410	Dust Collector 1	
2403	Belt Conveyor	2411	Dust Collector 2	
	Hopper	2410A	Screw Conveyor 1	
2402A	Woobler	2411A	Screw Conveyor 2	

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	Equip	oment	
2402B	Coal Crusher	2410B	Rotary Airlock 1
Raw Coal Feed		2411B	Rotary Airlock 2
2433	Coal Bin 1	2412	Blower Fan 1
2434	Coal Bin 2	2413	Blower Fan 2
2432	Diverter Flap	F2412	Blower Fan Damper 1
2433A	Weigh Feeder 1	F2413	Blower Fan Damper 2
2433B	3 Rotary Feed 1		t Feed In
2434A	Weigh Feeder 2	2418	Coal Dust Bin 1
2334B	Rotary Feeder 2	2419	Coal Dust Bin 2
Coal Mill		2420	Roto Feeder (MB)
2408	Vertical Mill 1	2421	Roto Feeder (PC)
2409	Vertical Mill 2	F2421	Roto Feeder Damper
F2427	Hot Gas Damper 1	2423	Roto Blower 1
F2428	Hot Gas Damper 2	2424	Roto Blower 2
F2429	Fresh Air Damper 2	2425	Roto Blower 3
F230	Fresh Air Damper 1		

Table 4.11: Kiln Component Checklist

Equipment				
Kiln Feed In		EP 80		
1401	Bucket Elevator	1618	EP ID Fan Drive	
1401A	Auxiliary Drive	F1618	Fan Damper	
14403	Airslide Fan	1617	Electronic Precipitator	
1404	Rotary Airlock	1617K	Air Slide	
1405	Slide Gate	1619	Screw Conveyor 1	
Pre-Heater Blaster		1620	Screw Conveyor 2	
P1431	31 C2 Blaster		Grate Cooler	
P1432	C3 Blaster	1605	Cooler Blower Fan 1	
P1433	C4 Blaster	F1605	Damper 1	
P1434	C5 Blaster	1606-1	Cooler Blower Fan 2	
P1435	PC Blaster	F1606-1	Damper 2	
P1436	C5 Ducting Blaster	1606-2	Cooler Blower Fan 3	
	C4 Diverter	F1606-2	Damper 3	

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Equipment				
P1437	Kiln Inlet Blaster	1607	Cooler Blower Fan 4	
F1621	PC Damper	F1607	Damper 4	
	Bricks & Castable (C1-C5)	1608	Cooler Blower Fan 5	
F1620	Tertiary Air Damper	F1608	Damper 5	
Spray To	wer	1609	Cooler Blower Fan 6	
1410A	Screw Conveyor	F1609	Damper 6	
1410C	Rotary Airlock	1504A	Grate Motor Drive 1	
1411	High Temperature Fan	1504B	Grate Motor Drive 2	
F1411	HTF Damper	1504C	Grate Motor Drive 3	
01411	Lub Pump	1504D	Grate Motor Drive 4	
1421	Water Pump 1	1604	Clinker Crusher	
1422	Water Pump 2	Clinker Transport		
Kiln		1614	Pan Conveyor 1	
1501	Rotary Kiln	1616	Pan Conveyor 2	
	Bricks & Castable	1636	Diverter Flap	
1501-1	Kiln Main Drive	1621	Dust Collector	
1501-2	Main Drive Fan	1634	Drag Chain	
1501-3	Kiln Auxillary Drive	1635	Bucket Elevator	
1503	Thrust Roller	F1229	Damper 2	
1502-1	Kiln Shell Blower	Pozzolan	Chaging	
1502-2	Kiln Shell Blower	1630	Belt Conveyor 1	
1502-3	Kiln Shell Blower	1631	Belt Conveyor 2	
1502-4	Kiln Shell Blower			
1502-5	Kiln Shell Blower			
1502-6	Kiln Shell Blower			
1502-7	Kiln Shell Blower			
1602	Kiln Nose Ring Blower Fan			
1611	Primary Air Fan 1			
1612	Primary Air Fan 2]		
1637	Oil Firing Pump]		

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Equipment				
Clinker/Additives Transport Cement Silo Storage			Silo Storage	
1801B	Drag Chain 1	1902	Air Slide	
1801C	Drag Chain 2	1903	Silo 1 Diverter	
1801A	Bucket Elevator	1904B	Aeration Blower 1	
1801D	Dust Collector	1904A	Aeration Blower 2	
1801	Bucket Elevator	1914	Dust Collector	
1803A	Diverter Flap	1915	Filter Fan	
1803C	Dust Collector	1916	Dust Collector	
1803D	Filter Fan	1917	Filter Fan	
1802A	Belt Conveyor	1905-1	Cement Silo 1	
1803B	Diverter Flap	1905-2	Cement Silo 2	
1807A	Belt Conveyor 1	1908	Discharge Valve	
1807B	Belt Conveyor 2	1909	Drag Chain 1	
Cement [·]	Fransport	1910	Drag Chain 2	
1813	Screw Conveyor 1	1911	Drag Chain 3	
1814	Screw Conveyor 2	Clinker/Additives Feed In		
1815	Bucket Elevator 1	1804A	Slide Gate	
1816	Bucket Elevator 2	1806A	Weigh Feeder	
1817	Air Slide 1	1804B	Slide Gate	
1818	Air Slide 2	1806B	Weigh Feeder	
1819	Aeration Blower 1	1804C	Slide Gate	
1820	Aeration Blower 2	1805A	Weigh Feeder	
1821	Separator 1	1804D	Slide Gate	
1822	Separator 2	1805A	Weigh Feeder	
1823	Flap 1	1804D	Slide Gate	
1824	Flap 2	1805B	Weigh Feeder	
1825	Belt Conveyor 1	1807	Belt Conveyor	
1826	Belt Conveyor 2	1808	Bucket Elevator	
1827	Dust Collector	1809	Feed In Separator	
1827C	Screw Conveyor	1810	Belt Conveyor	
		1811	Tube Mill 1	
		1812	Tube Mill 2	

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	Equipment				
Cement	Fransport	Packhouse De-Dusting			
2002	Bucket Elevator	2023	Dust Collector 1		
2000	Airslide	2024	Dust Collector 2		
2000A	Aeration Blower 1	2025A	Damper 1		
2000B	Aeration Blower 2	2026A	Damper 2		
2003	Screen 1	2025	ID Fan 1		
2004	Screen 2	2026	ID Fan 2		
2005A	Bin 1	2023A	Screw Conveyor 1		
2005B	Bin 2	2024A	Screw Conveyor 2		
2006A	Slide Gate 1	2023B	Rotary Airlock 1		
2006B	Slide Gate 2	2024B	Rotary Airlock 2		
2007	Rotary Airlock 1	2021	Airslide 1		
2008	Rotary Airlock 2	2022	Airslide 2		
2009A	Discharge Chute 1	Cement Dispatching			
2009B	Discharge Chute 2	2012	Belt Conveyor 1		
2010	Roto Packer 1	2013	Belt Conveyor 2		
2011	Roto Packer 2	2014B	Belt Conveyor 3		
Bulk Cem	nent Dispatching	2015B	Belt Conveyor 4		
2034	Dust Collector	2014	Blower 1		
2035	Filter Fan	2015	Blower 2		
2034A	Chute	2016	Belt Conveyor 5		
2031	Slide Gate	2017	Belt Conveyor 6		
2032	Rotary Airlock		·		
2033	Discharge Chute				

Part of the monitoring plan will also be the checking of components' maintenance. Below are the following maintenance checklist with their corresponding scheduling.

Mechanical Maintenance:



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Table 4.14: Mill Fans Maintenance					
Daily	Weekly	Monthly	Yearly		
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.		
2. Check oil level.	2. Check oil level.	2. Check oil level.	2. Check oil level.		
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.		
	4. Check fan casing and structure.	4. Check fan casing and structure.	4. Check fan casing and structure.		
	5. Check manhole cover.	5. Check manhole cover.	5. Check manhole cover.		
		6. Check oil quality.	6. Check oil quality.		
			7. Check impeller condition.		
			8. Check fan base for cracks.		
			9. Check anchor bolts.		
			10. Check coupling alignment.		
			11. Check bearings, replace if needed.		
			12. Check suction damper.		

Mill Fans

Bucket Elevators Table 4.15: Bucket Elevators Maintenance

Daily	Weekly	Monthly	Yearly
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.
2. Check reducer oil level.	2. Check reducer oil level.	2. Check reducer oil level.	2. Check reducer oil level.
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.
	4. Check fan casing and structure.	4. Check fan casing and structure.	4. Check fan casing and structure.
		5. Check reducer oil quality.	5. Check reducer oil quality.
		6. Check bucket cans.	6. Check bucket cans.
		7. Check pulley bearings.	7. Check pulley bearings.
		8. Check pulleys.	8. Check pulleys.

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Daily	Weekly	Monthly	Yearly
		9. Check coupling alignment.	9. Check coupling alignment.
		10. Check reducer and pulley base bolts.	10. Check reducer and pulley base bolts.
		14. Check roller chain and sprocket drive.	11. Check roller chain and sprocket drive.
			12. Check bucket cans alignment.
			13. Check reducer gears and bearings.

Separators

Table 4.16: Separa	tors Maintenance

Daily	Weekly	Monthly	Yearly
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.
2. Check reducer & circulating oil level.	2. Check reducer & circulating oil level.	2. Check reducer & circulating oil level.	2. Check reducer & circulating oil level.
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.
	4. Check fan casing and structure.	4. Check fan casing and structure.	4. Check fan casing and structure.
		5. Check manhole cover.	5. Check manhole cover.
		6. Check circulating oil quality.	6. Check circulating oil quality.
		7. Check reducer oil quality.	7. Check reducer oil quality.
		8. Check fresh air damber.	8. Check fresh air damber.
			9. Check coupling alignment.
			10. Check base bolts.
			11. Check reducer gears and bearings.
			12. Check rotor condition.
			13. Check rotor bearings.

Belt Conveyors

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Daily	Weekly	Monthly	Yearly
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.
2. Check reducer oil level.			
3. Check noise and vibration.			
	4. Check belt alignment.	4. Check belt alignment.	4. Check belt alignment.
	5. Check belt rollers.	5. Check belt rollers.	5. Check belt rollers.
	6. Check belt cleaners.	6. Check belt cleaners.	6. Check belt cleaners.
	7. Check reducer oil quality.	7. Check reducer oil quality.	7. Check reducer oil quality.
		8. Check reducer oil quality.	8. Check reducer oil quality.
		9. Check pulleys.	9. Check pulleys.
		10. Check belt adjuster.	10. Check belt adjuster.
			11. Check pulley bearings.
			12. Check reducer gears and bearings.
			13. Check belt condition.

Table 4.17: Belt Conveyors Maintenance

Ball Mill

Table 4.18: Ball Mill Maintenance

Daily	Weekly	Monthly	Yearly
1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.	1. Check bearing temperatures.
2. Check reducer circulating oil level.	2. Check reducer circulating oil level.	2. Check reducer circulating oil level.	2. Check reducer circulating oil level.
3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.	3. Check noise and vibration.
4. Check water cooling systems.	4. Check water cooling systems.	4. Check water cooling systems.	4. Check water cooling systems.
	5. Check reduce base frame.	5. Check reduce base frame.	5. Check reduce base frame.
	6. Check trunnion bearing base frame.	6. Check trunnion bearing base frame.	6. Check trunnion bearing base frame.
		7. Check reducer circulating oil quality.	7. Check reducer circulating oil quality.
		8. Check trunnion	8. Check trunnion

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Daily	Weekly	Monthly	Yearly
		bearing oil quality.	bearing oil quality.
		9. Check reducer bolts and base bolts.	9. Check reducer bolts and base bolts.
		10. Check trunnion bearing bolts and base bolts.	10. Check trunnion bearing bolts and base bolts.
		11. Check girth gear bolts.	11. Check girth gear bolts.
			12. Check coupling alignment.
			13. Check reducer gears and bearings.
			14. Check girth gears and bearings.
			15. Check ball mill liner bolts and trunnion bolts.

Dust Collectors

Table 4.19: Dust Collector Maintenance

Daily	Weekly	Monthly	Yearly
1. Check air pressure.	1. Check air pressure.	1. Check air pressure.	1. Check air pressure.
2. Check purging.	2. Check purging.	2. Check purging.	2. Check purging.
3. Check exhaust stack.	3. Check exhaust stack.	3. Check exhaust stack.	3. Check exhaust stack.
4. Drain condensate.	4. Drain condensate.	4. Drain condensate.	4. Drain condensate.
	5. Check pulse valves.	5. Check pulse valves.	5. Check pulse valves.
	6. Check air pressure regulator.	6. Check air pressure regulator.	6. Check air pressure regulator.
	7. Check solenoids.	7. Check solenoids.	7. Check solenoids.
	8. Check dampers valves.	8. Check dampers valves.	8. Check dampers valves.
		9. Pneumatic cylinders.	9. Pneumatic cylinders.
		10. Check air lines.	10. Check air lines.
		11. Check air slides and dampers.	11. Check air slides and dampers.
			12. Check weldments.
			13. Check steel structure.

Electrical Maintenance:

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MV Switchgear (up to 36 kV)

Table 4.20: MV Switchgear Maintenance

Туре	Description	Interval	Extent
1. INSPECTION	General external condition.	1 y	
	Cable boxes internal.		
	Circuit breakers internal.	4 y	All
	Fused contactors internal.		
	Busbar compartments (1) internal.	8 y	
	<u>Metering:</u> – Correctness of main voltmeters. – Correctness of main ammeters. – Correctness of other measuring systems.	4 y	All
2. TEST AND MEASUREMENT (3)	Circuit breakers in/outgoing and fused contactors (3):- Operating mechanism Draw-out system/interlocks Control equipment Insulation resistance		411
	Dielectric strength across open contacts.	8 y	All
	Ductor test across closed contacts.		
	Electrical protection/tripping (2).	4 y	
	Certified Ex'e' thermal protection (4).	3 у	
	Contact distance.	4 y	Vacuum, SF6
	Dielectric test oil.	4 y	Oil- immersed
	Insulation resistance of cable (incl. motor if applicable).	4 y	All
	Restart system.	4 y	Motors
	Busbar systems:- Torque bolts (1) Insulation resistance Dielectric strength Continuity (ductor).		All
	Correctness of kW, kVAr, max.		
	lemand of measuring systems (5).		
3. RESTORATION	Greasing of operating mechanisms.	4 y	
	Oil filtering/replacement.	As	All
	Component replacement. n		

<u>LV Switchgear</u>

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Туре	Description	Interval	Extent	
1. INSPECTION	General external condition.	1 y		
	Motor starters and outgoing feeders, internal.	6.54		
	Incomers, internal.	4 y		
	Busbar compartments (1).	8 y	All	
	<u>Metering:</u> – Correctness main voltmeters. – Correctness main ammeters.	4y		
	General internal condition of outdoor equipment (5).	2 у		
2. TEST AND MEASUREMENT (3)	<u>Incoming feeders, bus section, switches:</u> – Operating mechanism. – Interlocks. – Control equipment. – Electrical protection/tripping (2).	4 у		
	<u>Busbar systems:</u> - Torque bolts (1). - Insulation resistance. - Continuity (ductor).	8 y	All	
	<u>Motor feeders:</u> – Draw-out system/interlocks. – Cable connection tightness.	4 y	-	
	Thermal and earth fault protection.	4 y	10%	
	Certified Ex 'e' thermal protection (4).	3 у	All	
	Restart system.	4 y	10%	
	Insulation resistance of motor + cable.	4 y	Selected	
	<u>Plain feeders:</u> - Draw-out system/interlocks. - Cable connection tightness.	4 y	All	
	Protection/tripping. (2)	4 y	10%	
	R.C.D. for fixed load (e.g. trace heating).	4 y	All	

Table 4.21: LV Switchgear Maintenance

Induction Motor Inspection

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Туре	Description	Interval	Extent	
	General external condition.	3 у	All	
1. INSPECTION	Winding and rotor condition (2).	4 - 6 y	Frequently started motors, essential motors.	
	Vibration (1) (8).	1 Month		
2. TEST AND	Insulation resistance (with cable). (9) (8) Polarisation index.	2 - 4 y	Selected	
MEASUREMENT	Bearing insulation.	2 - 4 y		
	White metal bearing clearance and condition.	4 - б у	All	
	Bearing lubrication (5).	As specified	All	
3. RESTORATION	Rolling bearing replacement (4, 6 and 7).	4 - 6 у	Selected and essential drives	
	Cleaning/re-insulating/rewinding (3).	As determined by inspection and tes		

Table 4.22: Induction Motor Inspection

CHAPTER 5 SOCIAL DEVELOPMENT PLAN / FRAMEWORK (SDP) AND IEC FRAMEWORK

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5.0 SOCIAL DEVELOPMENT AND IEC FRAMEWORK

5.1 Social Development Plan

Aside from producing cement in support to the growing infrastructure development in the region Mabuhay FilCement Inc. envisions itself to become one of the agents that will facilitate progress in Cebu's country side particularly in the Municipality of San Fernanado. It is hoped that the presence of Mabuhay Cement Processing Plant in San Fernando will be able to contribute in generating business opportunities and employment that will spur more vibrant economic activities in the area without compromising people's quality of life.

In this context, Mabuhay Filcement Inc. has developed an integrated Social Development Plan (SDP) to ensure that the economic benefits of the project is shared with the people and community accordingly. The plan links to socio-cultural, economic and environmental issues with an overall goal of promoting the well-being of the people and to encourage the development of a sustainable community.

In the past years, MFI conducted several Corporate Social Responsibility (CSR) projects and will continue to do so in coordination with the Local Government Units (Municipal and Barangay, together with other government line agencies, non-government organizations and people's organization (See succeeding sections for the conducted CSR projects). The CSR Projects and activities will carry out the following objectives:

- To promote balance between development and environment through environmental projects such as tree planting and river and coastal clean-up activities;
- To support community initiated livelihood activities for income generation;
- To support community health program; and,
- To support community-led activities that will improve the quality of life, social, economic, environmental and cultural condition of the host and neighboring communities.

5.1.1 Corporate Social Responsibility (CSR) Strategy

In carrying out the CSR Projects, MFI would take a supporting role in the community-initiated projects and activities. No CSR projects will be implemented unless the need is expressed by the community and in line with MFI's thrust and set CSR objectives. In addition, all CSR activities will encourage collaboration, partnership and counterparting and will avoid dole out mentality. This is to ensure that the sense of project ownership by the community is stronger which will have a bigger chance to be sustained without external pressure or influence.

5.1.2 Corporate Social Responsibility (CSR) Programs

The following section presents a list of some projects that can be proposed by the community and may be supported by MFI through its Corporate Social Responsibility Program as the budget allows. All CSR project proposals from the community will be subject to evaluation and

prioritization to be implemented with the project partners.

Health and Education

- Medical and dental mission
- De-worming and feeding program for malnourished children
- Maternal and Childcare Seminar
- Skills training for out-of-school youth
- First-aid and disaster preparedness training programs
- Career counseling for high school students

<u>Community Development</u>

- Leadership Training
- Livelihood Assistance
- Values Inculcation program

Social Services

- Emergency Relief Assistance
- Disaster Preparedness
- Peace and Order Council Organization
- Safety Training

Infrastructure

• Maintenance of barangay roads directly affected by MFI operation

<u>Environmental</u>

- Operation and Maintenance of Tree Seedling Nursery
- River and Coastal Clean-up
- Community-based Reforestation Program
- Community-based Solid Waste Management Project

5.1.3 Corporate Social Responsibility (CSR) Budget

MFI will establish a fund for the implementation CSR Projects amounting to an indicative budget of PhP500,000 to PhP1,000,000 annually. This is based on the previous year's CSR project performance. The fund may decrease or increase depending on the availability of funds, CSR's project evaluation and the impact it has created in the community. The fund will be managed by the CSR Committee appointed by the MFI President.

5.1.4 Corporate Social Responsibility Project Implementation

 Setting up policies and procedures that will guide the community, MFI and partners in the implementation of the CSR Projects. In addition, a focal person within MFI will be appointed to ensure the implementation of the CSR Project/s and will report progress to the management. This focal person will also be responsible for establishing collaboration, linkages and partnership among the stakeholders. 2. A monitoring system will be established to ensure that the CSR Projects are implemented on time as proposed, planned and agreed by the involved parties.

5.1.5 Evaluation of Program/Project/Activity

An evaluation system will also be established to determine whether the objective of any CSR project is being achieved and creating positive impact in the community. Results of the evaluation of the CSR Project will serve as a basis for project replication or suspension where lessons learned will be considered.

5.1.6 Social Development Plan Matrix

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Т	able 5.1: Social Developme	nt Framework			
OBJECTIVE	Responsible Community Member/ Beneficiary	Government Agency/ Non-Government Agency and Services	Proponent	Indicate Timeline	Source of Fund
To support community initiated livelihood activities for income generation	NGO Hunat Farmer's Association	DA, LGU DENR, TESDA DepEd, DTI NGO	Community Relations Officer	First Quarter	Proponent + community counterpart
Support for the education responsiveness in the community by providing additional instructional materials and supporting local students thru educational support programs	NGO Hunat Farmer's Association LGU Local community	DepEd TESDA LGU	Community Relations Officer	Second Quarter	Proponent
Support for Infrastructure development and support services by providing road maintenance projects	LGU Barangay Council	LGU DPWH	Community Relations Officer Plant Manager	All year round	Proponent
To support community health programs	LGU Barangay Council Local community	LGU DOH Barangay Council	Community Relations Officer SPCO	Bi-Annual	Proponent
Enhancement of local cultural, religious and other value-enhancement activities and festivities for social community development	LGU Barangay Council Local community	LGU DTI	Community Relations Officer	Fourth Quarter	Proponent
To promote balance between development and environment through environmental projects	LGU Barangay Council Local community	LGU DENR MENRO	Community Relations Officer	Bi-Annual	Proponent

*This framework will serve as a guide. Detailed activities to be implemented including the budget requirement will have to be developed on project basis.

5.2 Information, Education and Communication (IEC) Program

IEC Program is the channel to establish linkages and unity between MFI, government and community. The sustainability of the program can only be achieved with proper constant communication and coordination with its partners and stakeholders. In order to maintain the relationship between stakeholders, MFI-CRO should integrate efforts in the following aspects:

- Create awareness to the public about MFI's vision and mission for the community;
- Establishing cooperation and encourage community participation;
- Engage dialogues and open line communication with stakeholders in order to establish rapport and harmonious working relationship; and,
- Collaboration with the community to strengthen partnership.

In relation to this Environmental Performance Report and Monitoring Plan, the LGUs will be made aware about the project implications through the conduct of the IEC Meetings, Public Consultation and Public Hearing. Copy of the Environmental Compliance Certificate will be provided to the LGU for monitoring purposes.

Target Sector Identified as Needing Project IEC	Major Topic/s of concern in Relation to Project	IEC Scheme/ Strategy/ Methods	Information Medium	Indicative Timelines and Frequency	Indicative Cost
1. Local	- Project Description	Consultation	Letters,	Pre-	₱ 30,000
Government	- Project Impact	Meeting	Hand-outs	construction	
Unit	- Impact Mitigation Plan	Droiget	and visual	and	
		Project	Presentation	Dhace	
	- Project Components	Community	Hand_outs		Đ 30 000
2 Local	- Project limitations	Meeting	and Visual	construction	1 00,000
Communities	- Project Impacts and	liteeting	Presentation	and	
and	Mitigating Measures to			Construction	
Barangay	address social and			Phase	
Council	environmental concerns				
	- Disaster Risk				
	Management				
	- Community Benefits				
3. Affected	- Mitigating Measures for	Consultation	Hand-outs	Construction	₱ 50,000
Communities	Noise and Air Pollution	Meeting	and Group	and	
	- Health and Safety Issues		DISCUSSION	Deco	
/. MEI	FCC Condition	Committoo	lland outo	Construction	
H. MICI	- ECC CUTILITUT	Meeting and	and Visual	and	F 20,000
Linpioyees	and Enhancement	Toolhox	Presentation	Oneration	
	Program	Meeting		Phase	

5.2.1 IEC Plan / Framework

Table 5.2: IEC Plan / Framework

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Target Sector Identified as Needing Project IEC	Major Topic/s of concern in Relation to Project	IEC Scheme/ Strategy/ Methods	Information Medium	Indicative Timelines and Frequency	Indicative Cost
	 Social Development and Management Program MMT Monitoring Environmental Management Plan Environmental, Health and Safety Policy Safety and First Aid Training Waste Management Plan 			(Quarterly)	
5. Contractors	 Environmental, Health and Safety Policy Project Safety and Buffer Zone Maintenance Waste Management Plan 	Toolbox Meeting	Hand-outs	Construction and Operation Phase (Weekly)	₽ 20,000

5.2.2 Communication Approaches

The IEC campaign can be implemented in a variety of ways; local broadcast information, through barangay meeting, billboards, educational tour in the plant, etc. Posters and billboards, and other similar materials shall be displayed in conspicuous areas/buildings. Mabuhay Cement Processing Plant itself, is the best demonstration tool for educating people about cement production.

5.2.3 Other Approaches (Performance Rating)

Basic environmental auditing shall be undertaken at the site by Mabuhay FilCement Inc. will be rated based on their performance to EMP implementation and based on the provisions of the Procedural Manual for DAO 2003-26, known as "Revised Industrial EcoWatch System". Its compliance to pertinent EMB rules and regulations should be property rated with performance indicators:

Performance Indicators	Broad Category	Color		
Efforte boyond logal requirement	Excellent	Gold		
	bly	Silver		
Effort lovel sufficient to comply	Very Good	Green		
	Good	Blue		
Effort not sufficient for compliance	Bad	Red		
To effort to comply	Very Bad	Black		

Table 5.3: Performance Indicators

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5.3 Documentation of Past CSR and IEC Programs

5.3.1 Social Development Programs

Table 5.4: 2017 CSR Accomplishments

TABLE 7. 2017 Annual Social Development and Management Program Accomplishments					
SOCIAL DEVELOPMENT PROGRAM	PROJECT / PROGRAM / ACTIVITIES	BENEFICIARIES / STAKEHOLDERS	ACTUAL EXPENDITURES	DATE	
Sustainable Livelihood	two (2) Sewing Machine for Rag Making of HUNAT Farmers Association	Tinubdan, San Fernando	16.000.00	9-7-2017	
Responsive Education	Classroom Building	Zapatera Elementary School	193,357.71	2-10-2017	
	Two truck load of filling material for basket ball court construction	South Poblacion, San Fernando	5,000.00	10-27-2017	
	Construction of School Fence	Balungag Elementary School, Balungag San Fernando, Cebu	72,360.00	1-11-2017	
	100 Bags of Cement for school building construction	Sangat Elementary School, San Fernando Cebu	18,000.00	9-6-2017	
Infrastructure Development & Support Services	30 Bags of Cement for drainage repair	Cebu Police Provincial Office	5,400.00	6-8-2017	
	Window type airconditioner	BFP Municipality of San Fernando	10,400.00	1-30-2017	
	Public Storm Drainage Repair	South Poblacion, San Fernando	58,042.40	5-4-2017	
	200 Bags cement for school fence	Liburon Elementary School	36,000.00	3-8-2017	
	50 Bags of Cement for Chapel Renovation	Brgy. Tinubdan, San Fernando	9,000.00	1-19-2017	
	100 Bags of Cement for school building extension	Pitalo Elementary School	18,000.00	9-21-2017	
	100 Bags of Cement for school building repair	San Fernando National High School	18,000.00	6-7-2017	
	Clean-up-drive	Sabang River	19,346.00	5-26-2017	
	Distribution of Trash Bins (6) pcs.	South Poblacion, San Fernando	3,600.00	11-4-2017	
Health & Sanitation	Distribution of Trash Bins (5) pcs.	Panadtaran, San Fernando	3,000.00	11-18-2017	
	Distribution of trash bins (9) pcs.	Brgy. Balud, San Fernando	6,300.00	5-2-2017	
	Mega Cebu Month	Municipality of San Fernando	5,000.00	10-4-2017	
	Tree Planting	Municipality of San Fernando	10,000.00	9-19-2017	
Cultural, Religious & Value-	3rd Parish Youth day	South Poblacion, San Fernando	5,000.00	9-15-2017	
Enchancement Activities Assistance	Annual Fiesta Activity Sponsorship	Panadtaran, San Fernando	5,000.00	9-15-2017	
	CTU Intramurals Value Enhancement Activity Assistance	Cebu Technological University, South Poblacion, San Fernando	5.000.00	9-15-2017	
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	LGU National Educational Conference Seminar Assistance	Brgy. Tabionan, San Fernando	5,000.00	8-23-2017
	LGU Tours Seminar Assistance	Brgy. Basak, San Fernando	10,000.00	8-18-2017
	Annual Fiesta Activity Sponsorship	Brgy. Panadtaran, San Fernando	10,000.00	5-3-2017
Cultural, Religious & Value- Enchancement Activities Assistance	Annual Fiesta Activity Sponsorship	Brgy. Pitalo, San Fernando	3,000.00	4-22-2017
	Annual Fiesta Activity Sponsorship	Municipality of San Fernando	5,000.00	5-3-2017
	Annual Fiesta Activity Sponsorship	Municipality of San Fernando	200,000.00	5-14-2017
	Mayor's Cup sportsfest	South Poblacion, San Fernando	5,000.00	2-2-2017
IEC	Project Overview Environmental Mangement Programs and SDMP	Panadtaran, San Fernando	10,211.00	2-27-2017
	Community Issues and Concerns	Sitio Arce, Bgry. Balud, San Fernando	3.000.00	2-10-2017
APPRO	890,223.01			
ACTUAL ACTIVITIES / PROGRAMS / PROJECT COST FOR YEAR 2017 IN PESO:			700,657.11	
UNSPENT BUDGET			189,565.90	

Above is a summary of the accomplished CSRs conducted for 2017. And the succeeding pages are a number of documented community programs Mabuhay FilCement Inc. has participated in in promoting community development:

- Adopt-A-River Program (Sabang River)
- Run-to-Plant Campaign
- Reforestation / Tree Planting Activities
- Elementary School Classrooms (2) and Fencing Project
- NGO Ecobag-Making Project
- Donation of Backfill Material for Basketball Court

Table 5.5: 2016 CSR Accomplishments



Mabuhay Cement Processing Plant Expansion • Mabuhay FilCement Inc.

SOCIAL DEVELOPMENT PROGRAM	PROJECT / PROGRAM / Activities	Beneficiaries / Stakeholders	AMOUNT	DATE			
Cultural, Religious & Value- Enchancement Activities	CVIRAA	South Poblacion Elementary School, San Fernando	3,000.00	7-2-2016			
Assistance	Adopt a Child Program	EMB	5,000.00	12/21/2016			
Responsive Education	Computer Set	Tabionan Elementary School, San Fernando	30,000.00	12-9-2016			
Infractructure Development 9	Two (2) Classrooms	South Poblacion Elementary School, San Fernando	630,000.00	8/19/2016			
Support Services	Two (2) Truck loads of back fill material for classroom flooring	South Poblacion Elementary School, San Fernando	6,000.00	8/19/2016			
Health, Environment & Sanitation	Run to Plant 2016	Municipality of San Fernando	10,000.00	3-9-2016			
TOTAL 684000							

Table 5.6: 2015 CSR Accomplishments

SOCIAL DEVELOPMENT Program	PROJECT / PROGRAM / Activities	Beneficiaries / Stakeholders	AMOUNT	DATE
	Annual Fiesta Celebration (Sto. Nino)	South Poblacion, San Fernando	3,000.00	1/16/2015
	Annual Fiesta Celebration (Sto. Nino)	Arce Upper Balud, San Fernando, Cebu	3,000.00	1/16/2015
	Annual Fiesta Celebration (Sto. Nino)	Brgy. Balud, San Fernando, Cebu	3,000.00	1/28/2015
Cultural, Religious & Value-Enchancement	Annual town fiesta	Municipality of San Fernando, Cebu	130,000.00	5/14/2015
Activities Assistance	Annual Fiesta Celebration (San Isidro/ Sta. Cruz)	Brgy. Basak, San Fernando	3,000.00	1-5-2015
	Annual Fiesta Celebration (Sr. San Isidro Labrador)	Sitio Nag Arco Brgy. Tabionan, San Fernando, Cebu	2,000.00	2-5-2015
	Shooting competition support	Cebu Police Provincial Office	3,000.00	6/23/2015
	42nd Foundation Day Assistance (Lechon)	Brgy. South Poblacion, San Fernando, Cebu	4,000.00	6/27/2015
Infrastructure	Cement Donation (10 bags)	Municipality of San Fernando, Cebu	2,500.00	4/16/2015
Services	Cement Donation (50 bags)	Brgy. North Poblacion, San Fernando, Cebu	11,000.00	5/30/2015
		TOTAL	164500	

Table 5.7: 2014 CSR Accomplishments

SOCIAL DEVELOPMENT PROGRAM	PROJECT / PROGRAM / ACTIVITIES	Beneficiaries / Stakeholders	AMOUNT	DATE
	Annual Fiesta Activity Sponsorship	Arce Upper Balud, San Fernando, Cebu	9,000.00	1/18/2014
	Annual Fiesta Activity Sponsorship	Sitio Lower of Barangay Tabionan, San Fernando, Cebu	2,000.00	1/18/2014
	Annual Fiesta Activity Sponsorship	Brgy. Balud, San Fernando, Cebu	2,000.00	1/18/2014
	Summer Sportsfest	Brgy. South Poblacion, San Fernando, Cebu	5,000.00	3/23/2014
	Seminar sponsorship	Brgy. Tabionan, San Fernando, Cebu	10,000.00	3-4-2014
	Annual Fiesta Activity Sponsorship	Upper Panadtaran, San Fernando, Cebu	1,500.00	4/17/2014
	Annual Fiesta Activity Sponsorship	Brgy. Basak, San Fernando, Cebu	2,000.00	2-5-2014
	Summer Sportsfest Tournament	Brgy. Balungag, San Fernando, Cebu	2,000.00	5/13/2014
Cultural, Religious & Value- Enchancement Activities	Annual Fiesta Activity Sponsorship	Sitio Nag-Arco, Tabionan, San Fernando, Cebu	2,000.00	3-5-2014
	Team Building Sponsorship	Brgy. Magsico, San Fernando, Cebu	5,000.00	5/17/2014
Assistance	Annual Fiesta Activity Sponsorship	Magtalisay, Balud San Fernando	3,000.00	6/28/2014
	SANAG Anniversary Celebration Sponsorship	Municipality of San Fernando	3,000.00	8/16/2014
	Seminar sponsorship	Brgy. Tabionan, San Fernando, Cebu	3,000.00	7/15/2014
	Annual Fiesta Activity Sponsorship	Brgy. Magsico, San Fernando, Cebu	3,000.00	8/27/2014
	Annual Fiesta Activity Sponsorship (Sr. Santa Cruz & Snr. San Roque)	Lower Lucnay, South Poblacion, San Fernando, Cebu	1,500.00	9/13/2014
	Annual Fiesta Activity Sponsorship (Sr. Santa Cruz)	Brgy. Tabionan, San Fernando, Cebu	3,000.00	9/13/2014
	Regional Congress Assembly Sponsorship	Brgy. Balud, San Fernando, Cebu	4,000.00	11/28/2014
	Christmas Party Sponsorship	Brgy. North Poblacion, San Fernando	1,000.00	11-12-2014

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Responsive Education	Books for Day care pupils	Brgy. Tabionan, San Fernando, Cebu	3,000.00	8/16/2014
Dissertations on Mining Technology/ Geosciences	National Programming Workshop	Mines and Geosciences Bureau	30,000.00	10-10-2014
Health Environment	Marine/Coastal Clean-up	Municipality of San Fernando	2,000.00	6/14/2014
& Sanitation	Run to Nurture for Greening Philippines (Tree Planting)	Municipality of San Fernando	5,000.00	6/18/2014
		TOTAL	102000	

Table 5.8: 2013 CSR Accomplishments

CORPO	CORPORATE SOCIAL RESPONSIBILITIES PROGRAM AND ACTIVITIES						
SOCIAL DEVELOPMENT PROGRAM / CSR PROGRAMS	PROJECT / PROGRAM / ACTIVITIES	Beneficiaries / Stakeholders	AMOUNT	DATE			
Cultural, Religious & Value- Enchancement	Annual Fiesta Activity Sponsorship Educational Tour	Villamero's Family Catholic Organization Lower Luknay, South Poblacion, San Fernando, Cebu Barangay Tabionan	3,400.00 10,000.00	9/18/2013 8/28/2013			
Activities Assistance	Christmas Party Sponsorship Christmas Party Sponsorship	San Fernando Basketball Association (SAFBA) Barangay Tabionan	1,000.00	12/17/2013			
	19400	, _, _,					

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The Adopt-A-River program is a mutual undertaking of Mabuhay FilCement Inc. and DENR – EMB to clean-up the remaining *esteros*/rivers of the Philippines to promote the sustainability of both the industrial and environmental sectors. The aim of these agencies is to engage the private industrial sector to adopt and maintain a natural waterway, specifically Sabang River as the closest to the plant.



Figure 5.1: Adopt A River Program (May 2016) at Sabang River

Run 2 Plant campaign is a fun run event which engages participants to not only run for personal health improvement but at the same time, help environmentally by planting at designated lots in San Fernando as pit stops, to help restore lost trees.

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Figure 5.2: Run to Plant Campaign (September 2016)

The reforestation / tree-planting program is a program, which is proponent-driven, that aims to continuously remedy mined out land areas. The aim for this program is so that as long as a mining area is active, the planting program should be commissioned as well in order to lessen the time gap between the maturity of the planted trees with the time of land areas being declared as mined out.



Figure 5.3: Annual Tree Planting Activity (December 2017)

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Figure 5.4: Reforestation / Tree Planting Activities (Progressive, to date)



As part of the Social Development Program, Mabuhay FilCement Inc. has aided the community's education sector by donating and constructing public school classrooms and the construction of Balungag Elementary School Fencing project.

Figure 5.5: Elementary School Building and Fencing SDMP 2 Classrooms and Fencing Project



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With the awareness of growing solid wastes in the plant, it was the initiative of the proponent to convert wastes into a livelihood project. In this case, with the supply of used cement sack bags which cannot be used for the main supply of cement, the creation of the Ecobag was put into realization. Sack bags are converted into EcoBags by a local Non-Government Organization and was sold for a reasonable amount in which proceeds are a means for additional income.



Figure 5.6: NGO Ecobag Making



Also, as a livelihood activity, sewing machines were donated to the Hunat Farmer's Association, a Non-Government Organization, to recycle clothing material into rugs as additional income outside farming activities, specifically for lay seasons.



Figure 5.7: Donation of Sewing Machine for Rug-making for Hunat Farmer's Association

As requested by the Barangay, filling materials were donated for the construction of the proposed South Poblacion Basketball Court.



Figure 5.8: Donation of Filling Material for the Brgy. South Poblacion Basketball Court Construction



5.3.2 IEC Programs

Information, Education, Communication programs were conducted in the form of focus group discussions, courtesy call meetings and barangay meetings. IECs conducted were in relation to the activities involved in the cement processing plant.



Figure 5.9: Public Consultation (cement plant, February 2017)





Figure 5.10: Barangay Balud Special Sessions (small-scale quarry, January 2018)

Figure 5.11: Resolution Meeting (cement plant, January 2018)





5.3.3 Mabuhay Cement Processing Plant Expansion IEC

Public Scoping

As a requirement, following DAO 2017-15, a Public Scoping was conducted last March 1, 2018, Thursday, 10:00 AM – 12:30 PM. The attendees came from DENR-EMB, Rural Health Unit, Municipal Planning and Development Coordination Office, the DepEd Sector from San Fernando National High School, the barangay officials including the barangay captain and the MMT Head, the barangay councilors and several constituents coming from seven (7) different puroks.

N	NAME	SECTOR	CONTACT
1	Ronald Villaver	Purok Punay	09325568410
2	Filomeno Leyson	Purok Sayaw 2	09335877113
3	Harlene Quirante	Purok Kalapati	09205429402
4	Evelyn Sasil	Purok Kalapati	4889544
5	Retche Abellana	Purok Kalapati	09291047672
6	Alfredo Lopez	Purok Siloy	09952908890
7	Retchel Villafuerte	Purok Pericko	0995526951
8	Antonieta Villafuerte	Purok Pericko	09155269515
9	Kenneth Tagimacruz	Rural Health Unit (LGU) / Sanitary Inspector	
10	Dante Lariosa	Barangay Councilor	09055627352
11	Dioscoro Esbra	Barangay Captain	09085912120
12	Fred Barriga	EMB-7	(032) 3453905
13	Atty. Unalee Monares	EMB-7	(032) 3453905
14	Ranzel Dioko	EMB-7	(032) 3453905
15	Rogelio Manugas	Barangay Staff	4889015
16	Lydia Geraldizo	Purok 2 Lawin	09126697188
17	Belinda Cosca	Barangay Councilor	
18	Michael Lougiber	Barangay Councilor	
19	Ted Servano	Purok Lovebirds	
20	Ma. Crescel Soriano	DepEd/ San Fernando National High School	09565383538
21	Glemarie Villariasa	Municipal Planning and Development Coordination Office Staff	09979358133
22	Vidala Mantua	Ex-Barangay Councilor	09427072030
23	Paterno Esbra	Barangay Councilor	09236393174
24	Jupiter Pasilan	Barangay Secretary	

Table 5.9: Public Scoping Stakeholders Attendance

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Table 5.10:Summary of Concerns, Suggestions, Issues Raised and Presented During Public Scoping

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
N/A	Zoning Since the Zoning for Brgy. South Poblacion is Industrial III, is it possible that another cement plant be placed in the area?	Jupiter Pasilan Barangay Secretary	 Atty. Unalee Monares (EMB) Unless there is a municipal ordinance that will prohibit the establishment of another cement factory in Barangay Poblacion, then it is possible. Joan Jaque (Mabuhay FilCement Inc. consultant) Since the Comprehensive Land Use Plan of the Municipality is still being crafted, the Barangay Council of South Poblacion can recommend to the LGU to limit to two or prohibit the establishment of an additional cement plant in their barangay aside from the existing one. Glemarie Villariasa (MPDC Staff) Informed the participants that the CLUP of the Municipality of San Fernando is still being updated.
Air-Dust	In relation to dust emission, the people are not sure which cement plant is producing the dust. When Taiheiyo is asked, they point to Mabuhay and vise versa. "Unfortunately, the dust has no label"	Jupiter Pasilan Barangay Secretary	Engr. Rainier Estrada (Plant Manager) Admittedly, we are also emitting dust, however we are trying our best to limit it within the allowable standard. In fact, Mabuhay has been operating two years without the kiln production, which is where most dust generation is from. Both parties should be able to show proof of clean operation.
N/A	Issued ECCs have a set of conditions. For every condition not complied with, how much is the penalty? Also, can we request a copy of the ECC so that we can monitor for any violation?	Michael Lougiber Barangay Councilor	Atty. Unalee Monares (EMB) Per condition, penalties will range from PhP 10,000 to PhP 50,000. Yes, the ECC is a public document and they can get a copy. (A copy of the ECC was given to the Barangay Secretary after the scoping)

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
N/A	What assurance can we get from the report of Mabuhay FilCement Inc that the information they are disseminating is accurate and true? Can we also have a copy of the minutes of the meeting of the MMT?	Michael Lougiber Barangay Councilor	Atty. Unalee Monares (EMB) As a member of the Multi-partite Monitoring Team, the Barangay Captain can initiate visits to the plant for any concerns related to the environment. He can also share to his constituents the minutes of their meetings. Documents regarding environmental concerns, such as monitoring tests and reports should also be provided to the Barangay.
People- Health	The mentioned penalties for the non- compliance of each condition seems too cheap for Mabuhay FilCement Inc Has the company paid any penalties so far? And how does the monitoring agency quantify the violation of the company in terms of, not only for the land, water and air, but for the people's health aspect? "Dust is causing us sickness such as coughs and also damaged our plants specifically our malunggay plant, we could no longer cook our horse raddish (malunggay) since it is covered with dust coming from cement plants)"	Filomeno Leyson Purok Sayaw 2 resident	 Atty. Unalee Monares (EMB) The penalties for non-compliance of the ECC may seem low. But aside from ECC Violations, the company will also be liable to other laws such as the Clean Air Act and Clean Water Act that have penalties that could range up to PhP 200,000 per day of non-compliance. With the monitoring of the environmental aspects, you can approach DENR with your concerns and write your complaints so DENR EMB can conduct investigations of these allegations. But as far as health is concerned, other agencies will be held liable for that, you can approach DOH for that matter. For as long as the standards for the emissions to the environment is complied with, we cannot give them sanctions or penalties. Engr. Rainier Estrada (Plant Manager) In the plant, we conduct health check ups for our workers for them to secure a Fit-To-Work Clearance. By far, most if not all of our workers have not acquired any sickness, although they are the most vulnerable and more highly exposed to the cement processing production. If there are any complaints about sicknesses arising from these activities, it should be reported immediately so we can investigate. Which would furthermore compel the proponent to push forward our health drives. Mabuhay FilCement Inc. is a company that will no doubt extend help to those who reach out and would work side-by-side on composing the best

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
N/A	After the ECC is granted to the company, what other hold does the LGU have with respect to our say in the project, other than to raise our complaints and concerns to DENR EMB and other agencies?	Michael Lougiber Barangay Councilor	Atty. Unalee Monares (EMB) After the releasing of ECC, the client are required to secure other permits from different offices needed the start of the project, part of which will be the Barangay Clearance, thus again, would involve the LGU. After acquiring such permits, the proponent must submit a copy of these other permits to DENR-EMB.
Land	With regards to traffic management, Mabuhay FilCement Inc. does not provide or properly designate security guards to safely guide the ingress and egress of delivery trucks to signal incoming motorists on the highway. Also, delivery trucks have been parking along this road which we have prohibited.	Dioscoro Esbra Barangay Captain	Engr. Rainier Estrada (Plant Manager) The plant has its own parking lot however many truck drivers refuse to use it. Management disallows this and gives drivers warnings and would even suspend violators. Although in recent cases, most of the delivery trucks parking along the highway are not of those from Mabuhay. And the main reason for why these trucks are parked along the highway is because of the presence of a canteen where truck drivers usually take their lunch. As common users of the highway, we would also encourage the LGU to impose penalty and sanction to these erring truck drivers, say PhP 1,000-1,500. This can be done in coordination with the LGU and DPWH. This way, drivers would deter from this act since both plant management and LGU will be on the lookout for violators.
Air-Noise	It was mentioned that the cement bag production per day would increase from 30,000 bags to 120,000 bags. This is four times the current amount. I have visited the plant of Taiheiyo and at their plant's expansion, the equipment and machines have become bigger and a whole lot noisier.	Dante Lariosa Resident	Engr. Rainier Estrada (Plant Manager) The plant's expansion will not require an additional area and the improvement is more on the technology that will be used, replacing the current ones with newer technology which is more efficient that will improve the plant's production capacity. Using our technology combined with our process innovation, the noise generation will be minimized. On top of the process innovation, it is also in our plans and our previous applications that we utilize silencers to our equipment. In addition, we install wallings and plant buffer strips to further minimize the noise.

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
N/A	What are the requirements for ECC? Why is it that even without the Mayor's Permit, the proponent can already acquire an ECC?	Kenneth Tagimacruz Municipal Sanitary Inspector	Engr. Ranzel Dioko (EMB) As practiced before, EMB would require those applying for ECC permits to first secure other permits from the LGU and other agencies. This has become tedious and was amended. Hence, the ECC can be processed prior, however, after the ECC is acquire the proponent is required to secure other permits from LGUs and other agencies before they can proceed with the project operation.
Project Description, Land, Water	NO COMMENT	NO COMMENT	NO COMMENT

Public Hearing

As a requirement, following DAO 2017-15, a Public Hearing was also conducted last August 13, 2019, Tuesday, 10:00 AM – 12:30 PM. The attendees came from DENR-EMB, DENR-Central Office, the municipal administrator, councilors, Rural Health Unit, Municipal Planning and Development Coordination Office, the barangay officials including the barangay captain and the MMT Head, the barangay councilors and several constituents coming from seven (7) different puroks and other residents from other barangays.

N	Name	Sector	Contact no.
1	Marciana Comodas	LGU – San Fernando	
2	Miraflor Paradero	LGU – San Fernando	09285044501
3	Rosalie Cujes	LGU – San Fernando	
4	Margelyn Dacalos	LGU – San Fernando	
5	Procorpia Villaria	LGU – San Fernando	
6	Paner Jennyvile	LGU – San Fernando	09553713089
7	Angel Lapera	LGU – San Fernando	
8	Edna Villafuerte	Sitio Luknay resident	
9	Fe C. Reston	LGU – San Fernando	
10	Gamaliela Gurerate	LGU – San Fernando	
11	China Panilagan		09308604767
12	Lydia P. Geraldino	Purok 2 Lawin Chairman	09126697188
13	Vivian Catong	Purok 1 Aguila Secretary	09352900976
14	Donna S. Mamugay	Purok Talong resident	09757815749
15	May Eleanor Generalao	Purok Aguila resident	09999258978
16	Gilbert Cortes	PNP	
17	lan Nudalo	PNP	
18	Ma. Jelyn Paradero	Motor Pool	
19	Rosaura Canos	Motor Pool	
20	Delailah Bolo	LGU Engineering Office	
21	Edna Tangub	LGU Engineering Office	
22	Ethel Ochia	LGU Engineering Office	
23	Alice A. Brobo	MSWDO	
24	Dela Cerna O. Felian	Utilities - LGU	
25	Mario Villaver	FARMC (NGO)	
26	A VM	SB Representative	
27	Jocelyn Saducas	MPDC Office Representative	

Table 5.11: Public Hearing Stakeholders Attendance

N	Name	Sector	Contact no.
28	Simeon Lauronal	LGU – Engineering Office Head	
29	Regina Paula D. Eugenio	DENR EMB – Central Office representative	(02) 920 2240
30	Mary Therese Gonzales	DENR EMB – Central Office representative	
31	Filomeno C. Leyson	Purok Federation President	09052971893
32	Jane S. Paradela	Purok Federation Auditor	09062711382
33	Kenneth N. Tagimacruz	LGU - RHU	0933423576
34	Philip Jude Medalla	LGU – San Fernando Councilor	
35	Dioscoro A. Esbra	LGU – South Poblacion Barangay Captain	09084102640
36	Rogelio C. Manugas	South Poblacion Kagawad	2668749
37	F/Insp Shoji M. Mendrados	BFP	4889227
38	Myriam Zapanta	LGU – Engineering Office	
39	Vilma Abaquita	lgu- bau	
40	Roselyn Remeticado	lgu- bau	09353485796
41	Alicia Sulri-sulri	lgu- bau	
42	Ciangeline Daño	lgu- bau	09361437758
43	Ma. Corazon Bargamento	LGU – San Fernando	
44	Ma. Josefa Bojora	LGU – San Fernando	09232927015
45	Janine Carmel Villasurda	LGU – San Fernando	09458553670
46	Procopia A. VIllari	LGU – San Fernando	
47	Maryrose Cobelo	LGU – San Fernando	
48	Mariecris C. Colon	LGU – San Fernando	
49	Rosauro L. Dividina	DENR EMB – Region 7 Hearing officer	260 9777
50	Lilibeth B. Sasumar		
51	Neizel Caballero	LGU – Fire / Aid	488 9727
52	Mario Barolo	LGU – San Fernando	
53	Delima Saturnino	LGU – San Fernando	
54	Julieto C. Obaob	SAFRA 09066388021	
55	Elsa S. Sarol	LGU- BAU Representative	
56	llene Quillo	LGU- BAU Representative 09326071621	
57	Hermelina S. Panen	LGU – Engineering Office	
58	Jervin Sibubna	LGU San Fernando Utility	09977469907

N	Name	Sector	Contact no.	
59	Sarah C. Castarias	LGU San Fernando	488 5030	
60	Glicerma Geraldino	LGU San Fernando Utility	09231220886	
61	A. EM Padillo	LGU San Fernando Utility		
62	Manolito Lumapas	LGU San Fernando Utility		
63	Marivic Sarita	LGU San Fernando Utility	09557267460	
64	Barrie N. Villarin	LGU – San Fernando	09226585328	
65	Maria Lanie Redoble	Brgy. Panadtaran Representative	09055634737	
66	Sheramei Marayon		09063130966	

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EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
Project Description	Why is the title cement processing not cement manufacturing?	Mr. Neil Papas Municipal Administrator San Fernando	Engr. Mark Anthony Genayas , Plant Manager Manufacturing and processing is not far off. We are using the term "processing" because cement production is also processing.
			Mrs. Rosemarie Encallado , VP Administration and Finance We are using the term "processing" to be safe, so we can either manufacture or make our own clinker for processing or process imported clinker.
Land	Since you are using the roads for access of your trucks, do you have budget to repair and maintain the roads and make them thicker, specifically for the pier to the plant roads?	Mrs. Yoly Purok Federation Secretary San Fernando	Engr. Joselito Palacio , EHS Manager From the pier to the plant roads, we are accessing the main highway which is under the jurisdiction of DPWH. We cannot do any maintenance works for this highway because we may be penalized. However, we can give cement for the barangay-level roads. Moreover, we will also have to see which roads to prioritize first, since our excess cement bags are also to be divided amongst other stakeholders.
Water	On record, there are about 1,000 households in San Fernando. And as per NWRB, in about 2-5 years time, with the current extraction rate, saltwater intrusion will definitely occur. What will you do for the community since by that time, the residents cannot have access to potable water because of this phenomenon. Will you be providing each household a supply of mineral water?	Engr. Simeon Lauronal Head Municipal Engineer Municipality of San Fernando	Engr. Joselito Palacio, EHS Manager From the start of the operation of the plant, we were granted a permit by NWRB for our deepwell extraction. Also as presented earlier by our consultant, we are currently extracting about 0.37% of the annual groundwater recharge. Groundwater recharge is the percentage of rainwater that infiltrates our aquifer. This may also be attributed to the fact that our plant is practicing water recycling for our processes. This is probably why were granted a permit by NWRB. We are extracting less than 1%. A piggery may even be extracting more water than we are. Engr. Lysa Inot, PCO Previous to 2006. NWPB, studies, show, that saltwater intrusion is

Table 5.12:Summary of Concerns, Suggestions, Issues Raised and Presented During Public Hearing



EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
			happening in San Fernando. However in recent studies after 2006 from NWRB, this was found to have subsided, which is why the moratorium for San Fernando was lifted. Please check with your staff in NWRB on your application. And with our permit, we will not be extracting beyond what is allowable. Please also consider that there are household deepwells which are also factors in augmenting the groundwater supply of the municipality. Atty. Unalee Monares, DENR 7 Hearing officer This is within the jurisdiction of NWRB.
Air	The plant production will increase from 30,000 bags to 120,000 bags per day. How can we be assured that the dust and noise will be addressed?	Mr. Dioscoro Esbra Barangay Captain South Poblacion, San Fernando	 Engr. Mark Anthony Genayas, Plant Manager Regarding the noise, for our proposed mills in the pyro-processing, there won't be a huge difference when it comes to input. The finished mill will also be an enclosed system. And regarding the dust, the Electrostatic Precipitator will be rehabilitated from using electrodes to bag-type filters, increasing its capacity from 90 micrograms per normal cubic meter to 20 micrograms per normal cubic meter. Dust will always be there, but we have enclosed areas as preventive measures. 1.8 Million MTPY is the maximum production capacity, but we are only aiming lower than that in actual production. And regarding the traffic, we are making the national highway as our top priority. We will only let our trucks out when the road is clear. Engr. Joselito Palacio, EHS Manager It was also mentioned earlier that there will be a Multi-Partite Monitoring Team (MMT). The MMT membership will be coming from the barangay, NGOs, LGU and headed by MENRO. The plant operations and activities will be monitored within the MMT. There will be many eyes who will be looking into how the plant is run.

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
Air	In my experience, I planted horse raddish or malunggay, but cannot even cook it because it is hardened by the cement dust. What I want for Mabuhay to do is to provide a doctor to ensure us that the dust the Mabuhay Plant is emitting will not harm our lungs or our respiratory system. Our Purok Federation office now is like a PCSO office. We aid our neighbors who need help for medicine or if they need to be brought to the hospital. If something happens to our people, Mabuhay will not even go house to house to and offer to cover for our medical needs or even for burial assistance. And now that Mabuhay will be expanding, quarrying will also follow. If a tree is cut, there is an effect. How much more if a mountain is bald after quarrying?	Mr. Filomeno Leyson Purok Federation President South Poblacion, San Fernando	Engr. Joselito Palacio , EHS Manager We will make sure that our emissions will not go beyond what is required by law and that we will not affect the people's health aspect. Please also consider that we are not the only industry in the area, not that we are avoiding the responsibility, but because those industries are far more bigger than us. We are also conducting medical missions, although we have divided it into two since we cannot conduct one medical mission for the whole of South Poblacion because of its size.
Air	I am not against expansion. But if there is to be such an expansion, it should be done far away at least about 10 kilometers from the densely populated areas, such as here in South Poblacion-the location of the seat of government and the market. You can evidently see the effect of air pollution here from the roof, inside and outside of the houses and even from the leaves of the trees. The living condition here now is bad. Only one cement plant should be allowed in a municipality and it's like you're adding another three cement plants since your production is increased from 30,000 bags per day to 120,000 bags per day. DENR EMB Central office should look into this. Before issuing them an ECC, Mabuhay should first rectify and correct their mistakes. The people of San Fernando would love clean and fresh air.	Mr. Duter Hotalyo San Fernando Multi- Purpose Cooperative Chairman Panadtaran, San Fernando	Atty. Unalee Monares , DENR 7 Hearing officer The question is also answered by the previous statements of Mabuhay.
Air	I have been to Taiheiyo Cement Plant and I've learned that the Electrostatic Precipitator is the main air pollution device that	Mr. Neil Papas Municipal Administrator	Engr. Mark Anthony Genayas , Plant Manager The EP will be rehabilitated from using electrodes to bag-type,

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
	can immediately eradicate the dust problem. Since it is energy intensive, it is not fully functionalized because of cost implications. We urge Mabuhay to fully functionalize their EP to resolve these problems.	San Fernando	increasing its capacity from 90 micrograms per normal cubic meter to 20 micrograms per normal cubic meter. This process will make it more efficient since it will be using more of a physical barrier instead of using electrodes.
			Engr. Joselito Palacio , EHS Manager We are also required from the Clean Air Act to install and utilize a Continuous Emission Monitoring System (CEMS). This is a monitoring system that is connected to DENR EMB 24/7 that will notify them if the EP is not functioning and if the emissions are not passing the regulatory standards. We assure you that we will be compliant and that the EP will always be running when we operate our kiln.
PEOPLE	We hope that Mabuhay will not only have a CSR but have an SDMP. And now, since it is still a CSR, we recommend you to be aligned with the mayor's 10-point socio-economic agenda.	Mr. Neil Papas Municipal Administrator San Fernando	Mrs. Rosemarie Encallado, VP Administration and Finance We assure you that we will really support the 10-point agenda of the Mayor. We have already supported through the building of elementary schools and through the land donation of South Poblacion barangay hall.
PEOPLE	Our office supports the Fernando First Policy, that is to uplift the living conditions of the community here in San Fernando, mainly because the people are poor. You mentioned that you will prioritize the employment of the residents of San Fernando, only if they are qualified. I suggest that you also include in your social development plan the provision of scholarships, especially for the children. So by the time the expansion is operational, the people are also skilled and qualified.	Mrs. Alicia Brobo MSWD Head San Fernando	Mrs. Rosemarie Encallado , VP Administration and Finance We assure you that we will support your suggestion. We can collaborate and make a program on how to accomplish this. We really put importance in the next generation. That is why, although many of you do not know, we have supported this through the building of classrooms.
PEOPLE	I hope before DENR EMB will issue Mabuhay an ECC, they should first rectify their mistakes. Everyone is mandated, as per statement of President Rodrigo Duterte, to follow the environmental laws. If you go to the pier, the open discharge is a	Mr. Duter Hotalyo San Fernando Multi- Purpose Cooperative Chairman	Agreed

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
	great insult to the people. The findings of the people who died there is Broncho-pneumonia, that is because of air pollution. DENR and MGB should do their job, so what happened to Naga (landslide) will not happen in San Fernando.	Panadtaran, San Fernando	
PEOPLE	We are affected by the dust. We cannot cook our horse raddish or malunggay because it is now covered in cement and we cannot afford to buy meat because our budget is tight. What can we benefit from this project?	Mr. Arnel Cano Resident Barangay Tongo, San Fernando	 Mrs. Joan Jaque, EIA Consultant As per suggestion of MSWD, we can finalize the CSR based on the agenda of the LGU. With your request and the request of others, we can organize and set priorities since our funding is still limited. However, once our large-scale quarry ECC is approved, with requirements moving us up to SDMP, we can have a larger allocated budget. Atty. Unalee Monares, DENR 7 Hearing officer You can bring this up in the MMT meetings so all the concerns can be collated at once and included in the financial program in the CSR.
OTHERS	Is it a pre-requisite to have consent from the LGU before they are issued an ECC? We have conditions that we want them to comply with first before they are issued an ECC. We want to include our conditions in the ECC since the penalty fees for ECC violations will have more credence or weight in comparison to just LGU ordinances.	Mr. Philip Jude Medalla Councilor San Fernando	 Engr. Therese Gonzales, DENR EMB Central Office Casehandler The ECC is merely a planning tool that we will forward to the LGU for purposes of making decisions on the permitting requirements of the project. The LGU will be the ones to issue permits. And in the Environmental Impact Assessment, what we are looking into is the feasibility of the mitigating measures for the expansion of their production, on whether or not these can be accommodated. Engr. Regie Eugenio, DENR EMB Central Office Casehandler Having LGU consent as a pre-requisite was done before, but was already amended. However, we are still getting input from the municipality through consultation during the review process to include your conditions into the ECC drafting. We can invite you during the next review committee meeting to include your concerns and conditions.

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
			Likewise, you can also review your conditions for the permitting from the LGU. The LGU and DENR can also partner in the monitoring of the cement plant. If the plant is not compliant, DENR alongside LGU can conduct an investigation.
OTHERS	I have also noticed in the Public Hearing, the previous ECC conditions were not discussed. I suggest that these should also be presented for us and the people to validate if what is written in the books is what is also happening on ground.	Mr. Philip Jude Medalla Councilor San Fernando	Engr. Regie Eugenio , DENR EMB Central Office Casehandler We understand that the ECC conditions were not highlighted in the presentations, but mainly on the mitigating measures for the environmental effects. But basically, we are monitoring their management plan and it was shown in their monitoring that they are compliant to the standards, which is an indicator that they are compliant to the ECC conditions in following these environmental laws. Your suggestion to include the ECC conditions in the public hearing is noted. This will not be the last public consultation, since they will still be required to conduct IECs and FGDs.
OTHERS	Since my assumption of office in 2016, Mabuhay has never sent any representatives to join our monthly meetings with the Rural- Based Organizations with other stakeholders. In these meetings, our local farmers and fishermen, who are affected by the industrialization of San Fernando, are able to express their concerns and needs for their livelihood. We hope for Mabuhay to also be able to extend help to these farmers and fishermen the same way other stakeholders like Solid Earth have.	Mr. Sarol Municipal Agriculture San Fernando	 Engr. Joselito Palacio, EHS Manager It is surprising to hear this because I have not received any invitation to these meetings. However, now that this was clarified, we assure you that we are more than willing to meet with you and support this cause. You can send your invitations to our guardhouse. We are also hoping that if our large-scale quarry ECC application is also approved, we can also now move up to SDMP. For now, we are only at CSR, our funding is still limited. But, in any rate, although we are small, we will give wholeheartedly. Atty. Unalee Monares, DENR 7 Hearing officer The numbers are flashed on the screen so you can directly contact the representatives of Mabuhay.
OTHERS	It is true that the lot of our barangay hall was donated by	Mr. Dioscoro Esbra	MFI Legal Office Representative

EIA Module	Comments/Issues Raised/Suggestions	Sector/Person	Proponent and Participants Response
	Mabuhay. However, we are having problems because in the papers from the previous barangay captain on the donation of the land stated "inter vivos". I was told that it meant "only when Benedicto (Mabuhay CEO) is alive". We are worrying that if Benedicto dies, then the barangay hall will also no longer belong to us.	Barangay Captain South Poblacion, San Fernando	"Inter vivos" means it was donated in the lifetime of Mr. Benedicto. This is in contrast to if Mr. Benedicto donates it after he has died which is "Last Will and Testament". So the land will remain under the ownership of South Poblacion. Atty. Unalee Monares , DENR 7 Hearing officer It means it was donated during his lifetime. You can check with your title. If it is titled under the name of the barangay, this cannot be revoked.
OTHERS	In case, by accident, Mabuhay is granted an ECC, are you willing to close your plant if you exceed the standards in the environmental laws?	Mr. Duter Hotalyo San Fernando Multi- Purpose Cooperative Chairman Panadtaran, San Fernando	 Engr. Joselito Palacio, EHS Manager We will see to it that we will comply with all the standards because the penalty for each condition in the ECC of about PhP50,000 pesos per day is a huge amount. If being penalized with this amount will persist, the plant will eventually close down. Millions of pesos was invested in the establishment of the plant. That is why we are careful to maintain and repair our equipment that it may serve its purpose so it does not bugdown easily. We conduct regular PMS (Preventive Maintenance Servicing). Just like your vehicles, we cannot simply afford for the plant fail for no apparent reason and without trying to fix it. Atty. Unalee Monares, DENR 7 Hearing officer This is put on records. We will have DENR EMB Central Office consider that.



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6.0 ENVIRONMENTAL COMPLIANCE MONITORING

6.1 Environmental Performance

6.1.1 Performance Rating / Indicator

Basic environmental auditing shall be undertaken at the site by Mabuhay FilCement Inc.. MFI will be rated based on their performance to EMP implementation and based on the provisions of the Procedural Manual for DAO 2003-26, known as "Revised Industrial EcoWatch System". Its compliance to pertinent EMB rules and regulations should be properly rated with performance indicators:

Table 6.1: Performance Indicator Guideline

Performance Indicators	Broad Category	Color
Efforts boyond logal requirement	Excellent	Gold
	Outstanding	Silver
Effort lovel sufficient to comply	Very Good	Green
Enort level sufficient to comply	Good	Blue
Effort not sufficient for compliance	Bad	Red
To effort to comply	Very Bad	Black

6.1.2 ECC Compliance

Table 6.2: Compliance Monitoring Matrix of ECC Conditions

N	Conditions	Complied		Dreaf of Compliance
IN			No	
Envi	ironmental Management			
1	Provide and maintain buffer zones along the entire periphery of the project site as well as between the nearest water bodies, subject to existing/appropriate local government regulations. This shall be kept with dense vegetative cover and planted with additional endemic species to enhance their conditions and service as dust buffers and noise barriers.	~		Proponent properly observed the required buffer zones along the entire periphery of the project site. As per monitoring period the company already planted 3,745 trees and 2,118 no. of trees propagated.
2	Implementation of a Contingency Program, that includes emergency response measures in case of major failures shall be submitted prior to implementation.	1		Proponent already established a Fire Brigade Team that also serve as the Emergency Response Team.
3	Undertake a continuing Information, Education and Communication (IEC) Program to inform and	1		Budget include in the approved ASDMP.

N	N Conditions Complied Yes No		Complied Proof of Compliance	
IN			No	
	explain to all stakeholders, especially its local residents about the project's mitigating measures embodied in its EIS, the conditions stipulated in this Certificate and the environmental and human safety measures in cement manufacturing for greater awareness, understanding and sustained acceptance of the project;			
Gen	eral Conditions			
4	The cement processing operations shall conform with the provisions of R.A. No. 6969 (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990), R.A. No. 9003 (Ecological Solid Waste Management Act of 2000), R.A. No. 9275 (Philippine Clean Water Act of 2004) and R.A. No. 8749 (Philippine Clean Air Act of 1999). Air, water and noise quality monitoring devices including Continuous Emission Monitoring System (CEMS) shall be installed at strategic locations in the plant and its periphery.	~		Granted a Hazardous Waste Generator ID GR-R7-22-00685 last June 30, 2017 and a Discharge Permit Exemption last February 14, 2017. Permit to Operate (POA-17-G- 072237-015) for Air Pollution Source and Control Installation will expire on July 13, 2021. CEMS already installed last September 3-5, 2016 however not yet commission due to the shutdown of the clinkering operation since May of 2016. Emission Test Requirements Exemption at cement mills & packing house areas by EMB VII last July 10, 2017.
5	The proponent shall comply with the environmental management and protection requirements of the pertinent provisions of the Philippine Mining Act of 1995 (R.A. No. 7942) and its implementing rules and regulations (DAO No. 96-40, as amended), as well as the Memorandum of Agreement (MOA) between the EMB and MGB executed on April 16, 1998. These include, among others the submission of the following within sixty (60) days upon receipt of this Certificate.	\$		Proponents compliance with this provision is still ongoing since the proponents mining component is still under Exploration Permit.
5.1	Submission of Environmental Protection and Enhancement Program (EPEP) and Final Mine Rehabilitation/ Decommissioning Plan (FMR/DP) to the MGB, for approval. EPEP also include Risk Management Plan / Program to address environmental risks and, in case of accidents, equipment malfunctions, machine failures and other emergencies.	J		Compliance is still ongoing. Still preparing the following document: EPEP and FMR/DP. However, the proponent has an approved AEPEP 2017 that will be the basis of MMT activities.

N	Conditions	Complied		Complied		Proof of Compliance	
IN	CONTRACTOR		No				
5.2	Setting up of a Multi-Partite Monitoring Team (MMT), Mine Rehabilitation Fund Committee (MRFC), Contingent Liability and Rehabilitation (CLR), and Environmental Trust Fund (ETF). The MMT shall specifically include a representative from the local DOH.	v		MMT & MRFC is functional and regularly conducted a quarterly monitoring. Deposited a Contingent Liability and Rehabilitation Fund (CLRF) and an Environmental Monitoring Fund at Philippine Veterans Bank on March 9, 2017.			
5.3	Organization of Mine Environmental Protection and Enhancement Office (MEPEO), which shall completely handle the environment-related aspect of the project. In addition to the monitoring requirements as specified on the EMP, the MEPEO shall also monitor the actual project impact vis-à-vis the predicted impacts and management measures in the EIS. This shall be included in the Environmental Monitoring Report for submission to EMB (CO and RO VII)	1		Organized in coordination with MMT.			
5.4	Submission of Social Development and Management Plan (SDMP) to MGB Regional Office VII for approval	1		Proponent has an approved ASDMP 2017.			
Rest	trictions						
6	The project shall have no quarry component and limestone shall be primarily sourced from Bayan Cement Producers Corporation (BCPC) or from other legitimate sources while other raw materials (such as shale, silica, gypsum, etc.) shall be sourced from external sources.	<		Small Scale Quarry Permit			
7	Any expansion or modification shall be subjected to the provision of the Revised Procedural Manual for DAO 2003-30.	√		Proponents compliance is still ongoing. Currently amending EIS documents in relation to production capacity expansion. Already submitted first drafted EPRMP under initial screening last October 26, 2018.			
8	In case of transfer of ownership of this project, these same conditions and restrictions shall apply and the transferee shall be required to notify the EMB within 15 days as regards to the transfer of ownership and secure the approval of EMB.	~		N/A			

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6.1.3 Compliance Monitoring Matrix (Environmental Monitoring Plan)

Project	Mitigating Measures		Effective?		Decommendation
Impacts	Planned	Actual	Yes	No	Recommendation
	Planting and maintenance of the trees.	Implemented overall green buffers along perimeter of project site.	1		To improve existing practice and planting of taller buffer trees
Land	Proper disposal of solid waste and implement garbage segregation.	Implement proper waste segregation through MRF and utilization of compost pit for canteen waste. Coordinate NGO for Grocery bag making using damaged cement bags to minimize waste.	1		To improve Material Recovery Facility and Composting
	Implement water conservation methods.	Re-use the recycle water and implement rain water harvesting.	1		To improve existing practice
Water	Provision of adequate wastewater treatment facility.	Operation wastewater treatment facility in which approximately recycle 88% of process water.	√		Ongoing process modification to increase the efficiency of waste water treatment facility.
Air 8	Planting of tree along the perimeter of the project site.	Implement the tree planting activities at the plant periphery and enclose all raw material storage. Utilization of Air Pollution Control Facilities. Extension of the plant perimeter fence to minimize noise.	J		Ongoing improvement for storage enclosure.
Noise	Low trip volume is anticipated, thus, air pollution from mobile sources is minimal.	Implement speed limit to all mobile/heavy equipment. Proper maintenance of heavy equipment. Conduct road sprinkling at plant and quarry area. Properly maintain all air pollution control device-dust collector.	J		Continue existing practice

Table 6.3: Compliance Monitoring Matrix

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6.1.4 Environmental Quality Performance Levels (EQPLs) Performance

Key Environmental	Potential Impacts Per Environmental	Parameter to be	EQPL Range and Management Measure		
	Sector	monicorea	Alert	Action	
I. CONSTRUCTION PHASE Site development					
1.1 Air quality- generation of dust, emissions of exhaust gas	Increase air pollutants	TSP, CO			
1.2 Noise	Increase noise levels	dB for class C areas			
1.3 Land-topography & soil	Erosion, flow of sediments, earth materials to neighboring areas	Movement of soil, sediments			
	Erosion-landslide, mass movement	Mass movement, geologic failure		N/A	
1.4 Water	Disruption of natural drainage pattern, flooding	Water flow, water volume-flooding		N/A	
	Ground, surface (inland) water contamination	E. Coli, coliform, pH, TSS, COD, BOD		N/A	
II. Operation Phase					
2.1 Air quality-generation of dust, vehicle emissions	Increase air pollutants	TSP, CO			
2.2 Land-debris, solid wastes	Erosion, flow of sediments, debris, waste to brgy road	Movement of soil, sediments, debris, wastes			
2.3 Water Quality	Disruption of natural drainage pattern, flooding	Water flow, water volume-flooding		N/A	
	Water contamination	E. Coli, coliform, oil- grease, TSS, BOD COD		N/A	

Table 6.4: EMoP, EQPL with Performance Indicator

* N/A – no event reached that EQPL level

6.1.5 Overall Performance Rating

Table 6.5: Overall Performance Rating

N	Key Aspects	Remarks	Performance Rating (1 - 5)
1	Cement Plant Operation	 Exceeded Production Capacity Installation of Pollution Control Devices 	4.0
2	Contingency Program (safety, health and emergency response)	- Fire brigade and emergency response training - Risk management program	5.0
3	Information, Education	- Complaints Management and Information	3.5

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N	Key Aspects	Remarks	Performance Rating (1 - 5)	
	and Communication (IEC) Drive	Dissemination		
4	Environmental Aspect: Ambient Air	 Ambient Air - No clinkering activity since June 2016 - Has emission exemption certificate from EMB (stack) - Regular tree planting activities - Regular dust mitigation activities 		
5	Environmental Aspect: Ambient Noise	 No clinkering activity since 2016 Noise generally comes from highway vehicles, etc. 	4.5	
6	Environmental Aspect: Water	 Had a discharge exemption (below 5 cu.m. discharge); currently applying for a discharge permit Clean-up drive for Sabang River / Adopt-A-River Program participation Practicing Recycling / Water Conservation 	4.5	
7	 Environmental Aspect: Land Waste Management (segregation, composting) Implementation of recycling in coordination with NGOs and LGU / Materials Recovery Facility Regular housekeeping 		4.5	
8	Environmental Aspect: Hazardous Wastes - Regular collection and treatment of hazardous waste - Late construction of Hazardous Waste Facility		4.0	
9	Environmental Aspect: - Active SDP programs People - Support NGO Programs - Local employment opportunities		4.5	
10	Transportation Management - Local complaints on parking along high despite provision of parking lots within p rules - Abiding to truck ban - Compliance to General Hauler Policies		4.0	
11	Formation of MRFC & MMT, Establishment of CLRF & EGF		4.0	
12	Monitoring Reports / MMT	 Non-submission of of some monitoring reports Incomplete sampling parameters/locations 	3.5	
AVERAGE RATING 4.1				

6.1.6 MMT Requirements / Commitments

The MMT activities comprises of monitoring air, water parameters and production process of plant and quarry projects. From these activities, suggestions and mitigating measures are made to further alleviate the project's negative effects to the community. Also, from the MMT, projects and programs are adapted by the proponent as it was only fitting for the need and nature of the plant project. Involved stakeholders in these programs belong mostly from LGU and NGOs in the area.

Below is a summary of the MMT Activities conducted from 2013 to 2018.

Table 6.6: Summary of MMT Activities (2013-2018)

Date	Activities	Remarks			
2013					
10/17/2012	Mabuhay letter addressed to MGB on the formation of MMT and MRFC	Ms. Teresita T. Pintor, MFI			
11/08/2012	Official reply from MGB to form MMT, MRFC, CLRF	Loreto B. Alburo, CESO VI, MGB			
	NGO – presentation of concerns (road, quarry rockfall, noise levels)				
11/29/2013	Selection of Sampling Stations Air: Upper Luknay Basketball Court, Catholic Church, Kapangian Water: Last chamber septic tank, Sabang River (Sitio relocation and under highway bridge) Noise: Luknay corner property, South Poblacion Barangay Hall, Sitio Relocation				
	Site Inspections of project sites				
	Site Inspections of sampling locations	Sampling sites to be approved by MRFC; no sampling			
2014					
	Review of 2013 MMT reports and previous minutes of the meeting				
03/31/2014	Conduct of ambient air sampling				
	No noise sampling	noise meter not available			
	No water quality sampling due to dry season	No discharge, dry river			
	Review of previous 2014 MMT reports				
09/25/2014	No ambient air sampling	due to intermittent rain no visible dark smoke emission at stack			
	No noise sampling conducted	Noise meter not available			
	Two (2) water sampling conducted	Conforming to DENR Standards			
	Plant operation just resumed after 6 weeks major repairs				
2015					
03/13/2015	Ambient Air Sampling conducted	Conforming to DENR Standards			
	Water Sampling; Upstream and Downstream Sabang River;	Downstream exceeded DENR			
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Date	Activities	Remarks		
	Expecting High TSS due to ongoing riprapping and SAG extractions	standards		
	Quarry processing observations			
	NGO Requested assistance for goat grazing to be coordinated with DOA			
	Agreement of noise sampling during shutdown of plant			
	Negotiation of local and foreign suppliers for CEMS installation for target date 2Q 2015			
	Review of previous MMT report and minutes of the meeting			
0/1/20/2015	Ambient Air Sampling conducted	Conforming to DENR Standards		
04/23/2013	Two (2) water sampling conducted; expecting low TSS	Conforming to DENR Standards		
	Quarry processing observations			
05/04/2015	Ambient Air Sampling conducted	Conforming to DENR Standards		
	Review of previous MMT report and minutes of the meeting			
07/27/2015	Ambient Air Sampling conducted	Conforming to DENR Standards		
	Two (2) water sampling conducted; heavy rain night before	Conforming to DENR Standards		
	Quarry processing observations			
11 /11 /2015	Ambient Air Sampling conducted			
	Two (2) water sampling conducted			
11/ 11/ 2013	Quarry processing observations			
	Acquisition of seedlings for rehabilitation			
	2016			
	Ambient Air Sampling conducted No more clinkering operation since May 28, 2016	Non-conforming to DENR Standards		
	Two (2) water sampling conducted	No effluent from MFI Conforming to DENR Standards		
11/11/2016	Quarry processing observations	No quarrying operation		
	Conduct of cleaning and desilting of drainage canal at highway			
	CEMS was installed last September 3-5, 2016	No use because no clinkering		
2017				
	Establishment of satellite seedling nursery	2218 propagated seedlings		
1 st Quarter	Compost Pit for site identification			
March 15,	Heavy Equipment maintenance on-going			
2017	Construction of additional drainage structure			
	Installation of storage perimeter walling and dust collector			

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Date	Activities	Remarks
	Construction of plant perimeter fencing	
	Construction of additional water reservoir	
	Purchase of filter bags for duck collectors	
	Clean-up drive; "Adopt-a-River Program"	Sabang River, May 2016, 2017
	Ambient Air Sampling, January 27, 2017	Passing DENR Standard
	Establishment of satellite seedling nursery	900 Mahogany seedlings
	Compost Pit for site identification	
	Heavy Equipment maintenance on-going	
	Construction of additional drainage structure	
	Installation of storage perimeter walling and dust collector	
2 nd Quarter	Construction of plant perimeter fencing	
June 7, 2017	Construction of additional water reservoir	
	Purchase of filter bags for duck collectors	
	Clean-up drive; "Adopt-a-River Program"	Sabang River, May 2016, 2017
	Ambient Air Sampling, March 15, 2017	Passing DENR Standard
	Water Samples	Passing DENR Standard
	Seedling planting and propagation	5843 seedlings
	Heavy Equipment maintenance on-going	
	Construction of additional drainage structure	
	Installation of storage perimeter walling and dust collector	
ard o	Construction of plant perimeter fencing	
3 ^{re} Quarter September	Construction of additional water reservoir	
13, 2017	Purchase of filter bags for duck collectors	
	Clean-up drive; "Adopt-a-River Program"	Sabang River, May 2016, 2017
	Emission Test Exemption at finish mill and pack house area released	July 10, 2017, EMB-7
	Water and Ambient Air Samples (previous)	Passing DENR Standard
	No ambient Air Sampling	Defective equipment
4 th Quarter November 20, 2017	Trees propagated – 2118; Trees planted – 3745; Seedlings - 2118	
	Compost Pit Construction	Completed
	Maintenance of Heavy Equipment	Regularly done
	Construction of additional Drainage Structure	Completed
	2018	
1 st Quarter	Seedling planting and propagation	Propagated: 2218 seedlings

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Date	Activities	Remarks
March 9, 2018		Planted: 3845 seedlings
	Heavy Equipment maintenance on-going	
	Construction of additional drainage structure	Completed July 20, 2017
	Installation of storage perimeter walling and dust collector	Completed
	Construction of plant perimeter fencing extension	Pending
	Construction of additional water reservoir	Pending
	Purchase of filter bags for duck collectors	7000 pcs. bags
	Clean-up drive; "Adopt-a-River Program"	Sabang River, May 2016, 2017
	No ambient Air Sampling	Defective equipment

6.1.7 Remedial Actions for Exceedances

As resulted from monitoring tests and community complaints, here are the following remedial actions made by MFI during the operation of the existing cement processing plant.

Issue	Remedial Actions Recommended and/or Implemented			
Land				
	Maintenance and repair of barangay roads used for access by MFI			
Destruction of barangay roads due to use for access by trucks	Road resurfacing; putting filling material in potholes as temporary solutions prior to the now completed barangay road concreting project			
O-liderente meneration	Recycling of bag filters to curtains and plant pots			
Solid waste generation	Recycling of damaged cement bags into ecobags			
Water				
Freeion	Riprapping activities (along River)			
ELOSION	Tree planting activities (along quarry area buffer)			
River Degradation	"Adopt-a-River Program" Sabang River; regular cleaning activities			
Air				
Dust generation from provincial	Intensified road watering during dry season and/or during high volume traffic / delivery schedules			
road (outside plant area)	Repair of residents' artesian wells (for additional source for water sprinkling)			
	Implementation of truck covering during mobilization			
Dust generation from plant	Improvement of housekeeping			
activities	Replacement of bag filters for Dust Collectors			
	Regular maintenance of Electrostatic Precipitator (EP)			

Table 6.7: Environmental Remedial Actions

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Issue	Remedial Actions Recommended and/or Implemented	
Undocumented dark smoke emissions (resident claim)	Installation of CCTV with online uploading, for the meantime of no CEMS installation	
Insufficient data for Ambient Air Quality due to wrong sampling location	Installation of wind bags for determination of ambient air sampling station (MMT minutes of the meeting attached in Annex)	
	People	
	Feasibility study of goat raising	
Livelihood Programs (NGOs, POs)	Donations of sewing machines	
	Assistance in Swine Fattening Project	
Community Davelopment Draigate	Donations of cement bags for Chapel renovation and repair	
	Cleaning and desilting of Drainage canal in main highway	
	Provide / Update (if necessary) Government Permits corresponding to complaints (i.e. discharge, emission, etc.)	
Community Complaints	Provide incident reports for specific dates of recorded complaints	
	Initiate dialogue between Community Relations Officer (CRO) and affected residents to address grievances	

6.1.8 Complaints Management System

Local complaints are done first by reporting to the barangay official who can consolidate concerns and present during MMT meetings, in which the barangay caption is a member of. Also, a suggestion and comment box and billboard is placed in the barangay hall in which MFI PCOs can regularly collect. The billboard is also used to present the current or updated news of the cement processing plant which aids in informing the public in the ongoing activities, specifically, the process of the ECC application as an IEC activity. Furthermore, contact information of the MFI PCO and Plant manager is provided to the barangay officials and the landline to the public.

Figure 6.1: Tarpaulin Posting at Barangay Hall with Project and Contact Details



6.1.9 Compliance Monitoring Documentation

Materials Recovery Facility. The MRF is for the staging area of Recyclables from Plant activities. Here, the 3Rs is practiced: Reduce, Reuse, Recycle. One example for recycling is the conversion of used cement bags to Ecobags.



Figure 6.2: Solid Waste Management (MRF)

Figure 6.3: Recycled Used Cement Bags to EcoBags



Landscape Greens and Buffer Tree Maintenance. With the daily dust generating activities of the plant, the maintenance of the buffer trees and landscape greeneries can significantly reduce fugitive dust from leaving the plant and at the same time, maintain open spaces for infiltration of storm water.



Figure 6.4: Perimeter Buffer Trees

Figure 6.5: Buffer Trees for Additional Dust Suppression



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Figure 6.6: Planters Strip at Plant Site

Figure 6.7: Maintained Landscape Greens and Open Spaces



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Figure 6.8: Landscape Greens at Plant Site Office

Figure 6.9: Tree Seedling Nursery for the Progressive Rehabilitation Program and for Plant Buffer Areas





Road Water Sprinkling. This activity is done most especially for hot days and during ingress and egress of delivery trucks. The purpose it serves is to suppress air dust particles from leaving the plant site with leaving trucks.



Figure 6.10: Fugitive Dust Suppression

Wastewater Treatment. Below are the installment locations of Septic Tanks at key locations for storage and treatment of wastewater and for future collection of sludge for disposal. Treatment of domestic wastewater with minimal production from handwashing and flushing is treated by individual septic tanks per toilet room. Septic tanks accommodate anaerobic bacteria to treat certain parameters in domestic wastewater to the extent that would suffice allowable levels for discharge to Sabang River or to Public Drainage as per DAO 2016-08 standards.





Environmental Performance Report and Monitoring Plan

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Water Conservation Practices. After recycling industrial water used for cooling processes, it is treated for domestic use. Signages are placed in each toilet facility to promote water conservation practices. As well as the usage of collected rainwater for road sprinkling.



Figure 6.12: Installation of Water Conservation Signages in Toilets

Employment for Locality. About 55.68% of the population of the plant's existing group of employees and staff are residents of San Fernando, Cebu. It was prioritized that all employees of Mabuhay Cement Processing Plant would be coming from the locality.

Table 6.8: MFI Employment from Locality

Profile of Employee from Locality					
Employee Locality	MFI	%	ABLE (AGENCY)	%	
Talisay to Cebu	20	22.72	6	3.61	
Minglanilla	4	4.55	1	0.6	
Naga	10	11.36	19	11.45	
Carcar	1	1.14	5	3.01	
Sibonga to South	2	2.27	1	0.6	
San Fernando	49	55.68	134	80.72	
Toledo	2	2.27			
TOTAL:	88	100%	166	100%	

Increased Revenue for LGU. Proper tax remittance to the Bureau of Internal Revenue (BIR). Mabuhay FilCement Inc. awarded as "one of the identified topp 500 Medium Taxpayers of this Revenue Region" on May 2018.

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Figure 6.13: BIR Certification Top 500 Medium Taxpayer

	REPUBLIC OF THE PHILIPPINES Department of Finance BUREAU OF INTERNAL REVENUE Revenue Region No. 13 – Cebu City	SALAMAT SA'YO
	May 28, 2018	
MABUHAY FILCEM 7-E Benedicto, Zapatera TIN: 224-928-005	ENT INC. 1, Cebu City	
Gentlemen:		
In pursuance to the policies and procedu was created to monitor returns/lists.	Revenue Memorandum Order (RMO) No. 17-2017 dated July res in monitoring compliance of Top 500 Medium Taxpayers, a the tax payments and compliance in the filing of required retu	17, 2017 which prescrib Regional Monitoring Tea urns and other informatio
In connection th	ereto, as one of the identified Top 500 Medium Tauran	
Regional Monitoring To	am would like to inform you that as per our records, your	this Revenue Region, the period

Notice of Adverse Findings

During the operation of the cement processing plant, violations were made and penalties we incurred. Below shows the details on the adverse findings and their corresponding justifications from the proponent.

Table 6.9: Adverse Findings / Non-Compliance and Penalties and Status

	Status
ECC Condition no. 4 / R.A. 6969 (Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990), No hazardous waste shed found Proponent explained that since the commercial operation of the plant on January 2013, they had not accumulated a substantial amount of hazardous waste until late 2016. This was when the volume of used oil increased due to operations and were safely stored in a temporary area shielded from rain and placed in heavy duty steel drums with appropriate covers. Also included were busted fluorescent lamps. The proponent also had oil-purifying equipment that separated oil from oil sludge to extend the life of used oil for the operation. Construction for the HazWaste Facility was constructed on January 2018 and functional. The HZ generator ID was also approved by EMB 7. Penalty was still imposed due to non- compliance since the ECC release on 2009.	PhP 50,000.00 complied / paid
No submission of Compliance Monitoring Report (CMR) since issuance of ECC EIAMD records show submission of CMR online on March 22, 2018. Hence	NAF was set aside.
	ECC Condition no. 4 / R.A. 6969 (Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990), No hazardous waste shed found Proponent explained that since the commercial operation of the plant on January 2013, they had not accumulated a substantial amount of hazardous waste until late 2016. This was when the volume of used oil increased due to operations and were safely stored in a temporary area shielded from rain and placed in heavy duty steel drums with appropriate covers. Also included were busted fluorescent lamps. The proponent also had oil-purifying equipment that separated oil from oil sludge to extend the life of used oil for the operation. Construction for the HazWaste Facility was constructed on January 2018 and functional. The HZ generator ID was also approved by EMB 7. Penalty was still imposed due to non- compliance since the ECC release on 2009. No submission of Compliance Monitoring Report (CMR) since issuance of ECC EIAMD records show submission of CMR online on March 22, 2018. Hence the NAF for non-submission of CMR online was set aside.

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Dated	Adverse Findings / Violations	Penalty / Status
July 31, 2018	Exceeding Annual Cement Production (July - December 2017)	PhP 50,000.00 complied / paid
	Proponent was currently in the process of amending the ECC to increase annual production capacity, but encountered a problem with the consultant last 2016. A new consultant was hired in 2017.	
TOTAL PENALTY INCURRED		PhP 100,000.00

Scanned Copies of issuance and paid receipts are found in the annex.

6.2 Self-Monitoring Plan

With the plant expansion, proposed sampling locations shall remain the same as in the previous operation. The location of discharge points and emission locations will remain in the same area. Specific locations and sampling parameters are stipulated in chapter 3 of this report. (See Environmental Management Plan)

6.2.1 Entity to be Accountable for Environmental Management in the Area

During the construction phase of the project expansion, implementation of the environmental management plan shall be the joint responsibility of Mabuhay FilCement Inc. through the Project Management Team and the Contractor.

The Contractor will be oriented about the project and the necessary environmental activities to be undertaken during the pre-bidding conference so that all assumed costs for the environmental measures shall be included in the project scope of work and cost estimates of the contractor. The environmental management activities and specifications will be given to the bidders during pre-bid conferences.

The Contractor shall be responsible for compliance with all environmental regulatory requirements. This includes but is not limited to the protection of resources, air and water quality, implementation of effective noise and traffic controls, proper management of soils, hazardous materials, and solid wastes.

The Contractor with the Pollution Control Officer shall also conduct monthly site safety and environmental meetings to ensure that all the identified impacts and corresponding mitigation and enhancement measures presented and discussed are properly implemented.

Responsibility for EMP implementation shall shift to the Proponent (Mabuhay FilCement Inc.) when the Mabuhay Cement Processing Plant Expansion is operational. The Safety and Pollution Control Officer (SPCO) shall be designated, primarily responsible for monitoring the EMP performance and efficiency.

Contractors mentioned here are all entities involved in the construction of additional facilities and installation of mechanical and electrical components to the project expansion. Should the proponent opt to commission in-house contractors, the governing entity responsible for the monitoring of the compliance of the activities to DENR standards will be the PCO / SPCO in coordination with the Cement Processing Plant Manager.

The PCO will initiate the required environment enhancement programs within and outside the property, if



necessary. In addition, he/she shall represent Mabuhay FilCement Inc. in any networking activities in relation to environmental protection and management of the Complex. Finally, the PCO shall make sure that the conditions stipulated in the ECC are strictly followed and adhered to. Mabuhay FilCement Inc., will also take full responsibility to inform EMB-DENR Central Office and the LGU of any development or changes that the project will undertake.

6.2.2 Monitoring Parameters

Below are the following monitoring parameters for the qualitative laboratory data to be sampled for water and air and noise quality. These parameters shall follow DAO 2016-08 guidelines.

Water Quality

Water Quality Guidelines	
All domestic wastewater (PSIC no. 37000)	BOD, Fecal Coliform, Ammonia, Nitrate, Phosphate, Oil and Grease, Surfactants
Freshwater (Primary Parameters)	BOD, COD, Chloride, Color, Dissolved Oxygen, Fecal Coliform, Nitrate, pH, Phosphate, Temperature, Total Suspended Solids
Groundwater	(Except BOD and Dissolved Oxygen) Ammonia, Chloride, Color, Fecal Coliform, Nitrate, pH, Phosphate, Oil and Grease, Surfactants, Total Suspended Solids

Ambient Air and Noise Quality

Ambient Air and Noise Quality Guidelines			
Ambient Air	Total Suspended Particles (TSP), PM10, SO2, NO2		
Ambient Noise	70 decibels		

Sampling locations for the discharges, water, air and noise quality can be found in the third chapter of this document.

6.3 Multi-Sectoral Monitoring Framework

Mabuhay FilCement Inc. will also continuously be actively involved in the Multi-Partite Monitoring Team (MMT). The establishment of such body was initiated by the proponent with the following membership:

- DENR (MENRO);
- Representative for the Local Government Units (LGU), preferably the Barangay Captain and CENRO or their representatives;
- Project Proponent's Representative; and,
- Non-Governmental Organization (NGO).

Note that there are no representative names since assignments may change, although the positions will remain the same.

As of May 9, 2019, as requested by Mabuhay FilCement Inc. on letter dated March 3, 2019 to Mines



and Geosciences Bureau (MGB), previously the MMT head, to aid in the reconstitution or reestablish a new MMT framework as per DAO 2018-18, MGB has not provided any communication on the matter. There has been no formal removal of previous MMT head and turn-over to new MMT Committee. Mabuhay FilCement Inc. has been continuously requesting aid from EMB and MGB to rationalize the new mandate.

Below is a tentative MMT Framework.

Table 6.10: MMT Framework

REPRESENTATIVES	ROLE / SCOPE OF MMT RESPONSIBILITIES	BASIS OF Selection	STRATEGY / APPROACH IN MONITORING
PENRO – Technical Staff	Validate the tree planting requirement of the project and other issues and concerns under the scope of the agency	DAO 2018-18	Do monitoring work assigned
CENRO – MMT HEAD	Facilitates and lead the MMT members in undertaking actual monitoring activities and act on issues/problems that shall arise relative to the project	DAO 2018-18	Supervise and oversee monitoring works
MENRO – Technical Staff	Conducts ocular site visit to validate the proponent's compliance with the ECC conditions and Environmental Management and Monitoring Plan	DAO 2018-18	Do monitoring work assigned
LGU REPRESENTATIVE – Brgy. South Poblacion, San Fernando	Participate in actual monitoring work, prepare, concur or sign the MMT monitoring reports, provide the necessary information about the local policies, plans, programs, affecting MMT monitoring results and standards, advise the MMT of any complaints, information or reports from the LGUs concerning the project	DAO 2018-18	Do monitoring work assigned
LGU REPRESENTATIVE – San Fernando	Participate in actual monitoring work, prepare, concur or sign the MMT monitoring reports	DAO 2018-18	Do monitoring work assigned
NGO	Participate in actual monitoring work, prepare, concur or sign the MMT monitoring reports	DAO 2018-18	Do monitoring work assigned

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6.4 Environmental Guarantee and Monitoring Fund (EGF/EMF) Commitments

Mabuhay Filcement Inc. established a Contingent Liability and Rehabilitation Fund (CLRF) in lieu of Environmental Guarantee Fund (EGF) of the amount of Two Million Pesos (Php 2,000,000.00) in a form of Rehabilitation Cash Fund (RCF) (Refer to DAO 2015-02 Section 4C). The purpose of the fund is to compensate damages caused by the plant operation. Also, to defray the expenses intended for progressive rehabilitation for the protection and enhancement of affected environment prior to the implementation of final mine rehabilitation decommissioning plan for the existing small-scale quarry. Thus, it also serves as a guarantee for socioeconomic development at host and neighboring communities at plant and quarry sites.

The proponent established an Environmental Monitoring Fund (EMF) of One Hundred Fifty Thousand Pesos (Php 150, 000.00) in a form of Monitoring Trust Fund (MTF). This fund is intended for monitoring activities including MMT of existing plant operations to ensure and validate performance in line of environmental compliance.

Deposits have been made with Veterans Bank. Below are the bank deposit certificates for both accounts.

Figure 6.14: MTF Bank Certification

BANK DEPOSIT CERTIFICATION BANK DEPOSIT CERTIFICATION veteransbank veteransbank en and Free from lien, garni BDC-CEB-2018- 0502 BDC Ref. No. BDC-CE8-2018- 0503 00 MABUHAY FILCEMENT INC - MTF MABUHAY FILCEMENT INC - RCF tes is to certify that deposit account/s is is to certify that CEBU CEBU deposit account/s maintained at Philippine Veterans Bank Branch has deposit account's maintained at Philippine Veterans Bank 0021-010974-101 0021-010974-100 ler Account Number with an Outstanding Ba ce of PESOS : TWO MILLION TWO THOUSAND ONE HUNDRED THIRTY FOUR PESOS & 37/100 ONLY ANE HUNDRED FIFTY THOUSAND ONE HUNDRED SIXTY PESOS & 08/100 ONLY P 150,160.08 Inclusive of the uncleared balance of P.A. P 2.002.134.37 inclusive of the uncleared balance of P -0m APRIL 23, 2018 APRIL 23, 2018 s to further certify that the above Total Outs is is to further certify that the above Total Outstanding Bala ig certification is being issued upon the request of said de noss Buresu representing Monitoring Trust Fund (MTF). tion is being issued upon the request of sale depos au representing Rehabilitation Cash Fund (RCF). se specimen signature appears hereunder, over the indicated printed whose specimen signature appears hereunder, over the indicated printed no this 23" _____ day of _____APRI ithis 23" HALL annargh bagerrec affal 2 THE DECLARC SERVICE HEAD STRANCH HEAD (Signature O

Figure 6.15: RCF Bank Certification



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7.0 DECOMMISSIONING / ABANDONMENT / REHABILITATION POLICY

7.1 Abandonment / Rehabilitation Plan

With the nature of the project, abandonment is unlikely to happen. The cement processing plant intends to continuously cater to the continually rapidly rising demand for cement worldwide.

However in extreme cases, where major and destructive natural calamities take place, the project may need to be abandoned particularly when irrepairable damages on the plant takes place or should the government declare to abandon all cement plant projects which is unlikely to happen as well.

In the event of such unwanted or unlikely scenario, the management of Mabuhay FilCement. Inc. in coordination with third parties and Local Government units, have prepared to execute the following activities as follows:

- Cutting off of power and water line
- Removal of debris or loose materials
- Removal of cement manufacturing machinery/components
- Disposal/Collection of Hazardous and Toxic material
- Dismantling of temporary or light weight structures
- Disassembling of equipment and machinery and this will include equipment /and machinery will be disposed and sold to interested buyers
- Demolition of building structure (optional; if structural integrity is not compromised)
- Hauling of construction debris (steel, concrete, roofing materials, etc.)
- Housekeeping/Clearing of area
- Replanting (within area)
- Setting up of perimeter fence to prevent illegal settlers to enter

Likewise, Mabuhay FilCement Inc. may have to do the following management plan to minimize the negative impacts of the abandonment to the environment and people.

Negative Impact	Management/ Measure	Responsible Group	Projected Cost (at present cost)		
Dust	Immediate hauling of debris and destroyed materials within the property	Mabuhay FilCement Inc. and hired material haulers	P 75,000-150,000		
Generation	Use of personnel protective equipment (PPE) during dismantling or demolition activity	Mabuhay FilCement Inc. safety officers	P 50,000		
Solid wastes	Waste recovery and selling/ disposal of recyclable materials	Third party recyclers. (They can sell or give the recyclables)	No cost on the part of the project		
	Waste segregation and provision of	Mabuhay FilCement Inc.	P 30,000		

Table 7.1: Abandonment Management Plan

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Negative Impact	Management/ Measure	Responsible Group	Projected Cost (at present cost)	
	temporary Material Recovery Facilty (MRF) and collection area	and third party recyclers		
	Disposal of residual wastes to the functional future sanitary landfill	Mabuhay FilCement Inc. and LGU	P700-P1000 per ton	
	Proper treatment and disposal of bulk and hazardous	Contracted hazardous waste treaters and bulk wastes managers	P5,000-10,000/ton	
Loss of Jobs	Provision of separation pay and other benefits	Proponent	P20,000/pax	

Below is the handling and disposal scheme for the abandonment of the plant

Waste Material	Disposal Site		
Biodegradable Waste	Mabuhay Cement Processing Plant Site Compost Pit		
Recyclable Waste	Junk yard, NGO (ecobag, etc.), Community Materials Recovery Facility		
Residual, Composite Waste	LGU Collection to Landfill Sites: Naga Landfill – operated by FDRCon Inc., now FDR-IRRM Consolacion Sanitary Landfill – Asian Energy Systems Corp.		
Toxic / Hazardous Waste	RRDS Petro-Chemical Industries, Inc Mandaue City, Cebu		

Table 7.2: Final Waste Disposal Scheme

In the succeeding pages is a detailed breakdown of the plant components and their possible future action for abandonment. Each cement plant component such as buildings, housings, containers, equipment, utilities and areas will have specific actions for when abandonment occurs. Below is a guideline on the actions for each kind of component. Each component is not limited to one action. Actions can be preceded by another such as Disassemble and Sell or Demolish and Dispose. Actions may also indicate as a future choice. The owner can opt to have the component assumed by a new owner or donated to another entity. The Waste Description Chart as shown in **Figure 7.1** is also to be used as a general guide for local daily actions for the waste segregation, storage, collection and treatment of waste materials.

Disassemble	To take apart mechanical pieces or housing/casing of equipment for later assembling/selling
Demolish	To destroy or ruin a building or structure to return to its ground state to avoid hazard of structure to crumble down during abandonment
Maintain	To keep in an appropriate condition by improvements, restorations, renovation for future assumption of new owners, new branding or new usage, for donations or for reselling

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Sell	To transfer goods to purchaser when in good condition or as parts (e.g. junkyard)
Кеер	To retain in original owner's possession for future use in different projects or other purposes, usually for machinery, accessories, etc.
Assume	To give the machinery/equipment/installation for use of new owner
Donate	To make a contribution for the use of other entities
No Action	To keep the installation/area/structure as is since it is not entirely dilapidated/poses as a threat for anyone during abandonment
Dispose	To rid of and of no value for reuse and/or harmful and may pose a threat if reused for other purposes
Recycle	To make suitable for reuse; re-purpose; further use

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Table 7.3: Components Abandonment Action Plan

CURRENT of USASIMULTON DIALTION DIADUCTION	COMPONENTS	CLASSIFICATION	POSSIBLE ACTIONS											
Addministrate Building Building / / / / / / / ACC. Mini los & Drob Color Housing / / / / / / ACC. Mini los & Drob Color Housing / / / / / / CDR Ruin (P) & Building / / / / / / / CDR Ruin (P) & Building / / / / / / / CDR Ruin (P) & Building / / / / / / / CDR Ruin (P) & Building / / / / / / / Control (P) Ruin (P) & Building / / / / / / Control (P) Ruin (P) & Building / / / / / / Control (P) Ruin (P) & Building / / / / / / Control (P) Ruin (P) & Building / / / / / / Control (P) Ruin (P) & Building / / / / / / Control (P) Ruin (P) & Building / / / / / /	COMPONENTS		DISASSEMBLE	DEMOLISH	MAINTAIN	SELL	KEEP	ASSUME	DONATE	NO ACTION	DISPOSE	RECYCLE		
Air Longerser Holseng Holseng /<	Administrative Building	Building		/	/			/	/					
ACC - Knikod & Grate Coder Housing /	Air Compressor House	Housing	/	/		/	/							
Carden Building / <	AQC - Kiln Hood & Grate Cooler	Housing	/	/		/	/							
CCR building/// <th< td=""><td>Canteen</td><td>Building</td><td></td><td>/</td><td>/</td><td></td><td></td><td>/</td><td>/</td><td></td><td></td><td></td></th<>	Canteen	Building		/	/			/	/					
CLP Room Builing /	CCR Building / QA Building	Building		/	/									
Otherer, Slo Container /	CCR Room	Building		/	/									
Clarg Storage Building /	Cement Silo	Container	/	/	/		/							
Clinker Addrive Slon Contrainer / / / /<	Clay Storage	Building		/	/		/							
Dirker Storage Building /	Clinker & Additive Silo	Container	/	/	/		/							
Cont Mill Engingment /	Clinker Stacker / Storage	Building		/	/		. /							
Cool Stacker Building /	Coal Mill	Equipment	/	,	/	/	/	/						
Call Tube Mill Egginment /	Coal Stacker	Building	,	/	/	,	/	/						
Comfort Norrs with Septic Tank Building / <th <="" th=""> <th <="" th=""> /</th></th>	<th <="" th=""> /</th>	/	Coal Tube Mill	Fauipment	/	/	/	/	/	/				
Compositive Container /	Comfort Rooms with Septic Tank	Building		/	/	/	/	/	/					
Copper Slug Storage Building / </td <td>Compost Area</td> <td>Container</td> <td></td> <td>/</td> <td>/</td> <td></td> <td></td> <td></td> <td>/</td> <td>/</td> <td></td> <td></td>	Compost Area	Container		/	/				/	/				
Deep Well Duity / <	Conner Slug Storage	Building		/						/				
Disal Tank Area Control /	Neen Well	Utility		/			/	/		/				
Duck of work of the second s	Diesel Tank Area	Containor	/	/	/		/	/		/				
Jack and a plate in the second seco	Drainago System		/		1			/		/				
Under Under Under Under Under Under Substations Utility /		Cauiomont	1	/	/	1		1		/				
Dillity / </td <td>Electric Dewer Substations</td> <td>Equipment</td> <td></td> <td></td> <td></td> <td>/</td> <td>/</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Electric Dewer Substations	Equipment				/	/							
Directorsatio Production Prod	Electric Power Substations	Utility			/	1		/						
Different Bill Equipment / </td <td>Electrostatic Precipitator - AQC</td> <td>Equipment</td> <td></td>	Electrostatic Precipitator - AQC	Equipment												
Initial mail Edulpment /		Equipment												
Dref Bill Area /	FINISTI MIII	Equipment	/			/	/	/	1	1				
bypesite Storage Building /	Green Beit Area	Area					1		/	/				
Hazardous Waste Facility Building /	Gypsum Storage	Building		/	/		/			1				
Limestone Crusher ine 2 Equipment /	Hazardous Waste Facility	Building	,	/	/			1		/	/			
Limestone Unsher Line 2 Equipment /	Limestone Crusher	Equipment	/	/	/	/		/						
Limestone Stacker Building //	Limestone Crusher Line 2	Equipment	/	/	/	/		/						
Main Station Building /	Limestone Stacker	Building		/	/		/							
Materials Recovery Facility Building / / / / / / / Motor pool Building // // // // // // // Packhouse Building // // // // // // // Parking Area Area // // // // // // // Pozoland Storage Building // // // // // // // Pre-heater Tower Building // // // // // // // Rainwater Catchment Tank Utility // // // // // // // Raw meal Silo Container // // // // // // // Raterial Kin Equipment // // // // // // // Stallite Nursery Area // // // // // // Staff House Building // // // // // // Switch Yard / Main Power Station Utility // // // /	Main Station Building	Building		/	/			/	/					
Mater pool Building / / / / / / / / / Parkhouse Building /	Materials Recovery Facility	Building		/	/			/	/	/				
PackhouseBuilding////////Parking AreaArea/////Pozoland StorageBuilding//	Motor pool	Building		/	/			/				/		
Parking AreaAreaImage: Constraint of the second seco	Packhouse	Building		/		/	/	/						
Pozzoland StorageBuilding///////Pre-heater TowerBuilding/////////Rainwater Catchment TankUtility// <t< td=""><td>Parking Area</td><td>Area</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>/</td><td></td><td></td></t<>	Parking Area	Area								/				
Pre-heater Tower Building / <td>Pozzoland Storage</td> <td>Building</td> <td></td> <td> /</td> <td> /</td> <td></td> <td></td> <td>/</td> <td></td> <td></td> <td></td> <td></td>	Pozzoland Storage	Building		/	/			/						
Rainwater Catchment TankUtility///	Pre-heater Tower	Building	/	/	/		/	/						
Raw meal SiloContainer///	Rainwater Catchment Tank	Utility		/	/			/		/				
RawmillEquipment//	Raw meal Silo	Container	/	/	/			/						
Rotary KilnEquipment//<	Rawmill	Equipment	/			/	/	/						
Satellite NurseryArea/////Silica StorageBuilding//////Staff HouseBuilding///////Switch Yard / Main Power StationUtility///////Switch Yard / Main Power StationUtility////////Switch Yard / Main Power StationUtility////////Tonner Bag StorageBuilding/////////TruckscaleEquipment//////////Unburn Clinker SiloContainer///////////Veco Metering StationUtility// <td< td=""><td>Rotary Kiln</td><td>Equipment</td><td>/</td><td></td><td></td><td>/</td><td>/</td><td>/</td><td></td><td></td><td></td><td></td></td<>	Rotary Kiln	Equipment	/			/	/	/						
Silica Storage Building /	Satellite Nursery	Area			/				/	/				
Staff House Building /	Silica Storage	Building		/	/			/		/				
Switch Yard / Main Power Station Utility / <td>Staff House</td> <td>Building</td> <td></td> <td>/</td> <td>/</td> <td></td> <td></td> <td>/</td> <td></td> <td></td> <td></td> <td></td>	Staff House	Building		/	/			/						
Tonner Bag StorageBuilding/////TruckscaleEquipment//////Unburn Clinker SiloContainer//////Veco Metering StationUtility//////Warehouse/ Machine Shop BuildingBuilding//////Waste Water Treatment FacilityUtility//////Water Recycling TankUtility//////	Switch Yard / Main Power Station	Utility	/	,	/			/						
Truckscale Equipment / <th <="" th=""> / /</th>	/ /	Tonner Bag Storage	Buildina	,	/	/			/		/			
Unburn Clinker Silo Container / <th< td=""><td>Truckscale</td><td>Equipment</td><td>/</td><td>,</td><td>/</td><td>/</td><td>/</td><td>/</td><td></td><td>,</td><td></td><td></td></th<>	Truckscale	Equipment	/	,	/	/	/	/		,				
Veco Metering Station Utility / / / / / Warehouse/ Machine Shop Building Building / / / / / Waste Water Treatment Facility Utility / / / / / Water Recycling Tank Utility / / / / /	Unburn Clinker Silo	Container	/	/	/	/	/	/						
Warehouse/ Machine Shop Building Building / / / / / / Waste Water Treatment Facility Utility / / / / / / Water Recycling Tank Utility / / / / / /	Veco Metering Station	l Itility	/		/			/		/				
Waste Water Treatment Facility Utility / / / / / Water Recycling Tank Utility / / / / /	Warehouse/ Machine Shon Building	Ruilding	/	/	/			/		/				
Water Recycling Tank Utility / / / / Water Decensorie Utility / / / /	Waste Water Treatment Facility							/		/				
Water Deservoir Utility / / /	Water Recycling Tank				/			/						
	Water Reservoir							/						



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Figure 7.1: Waste Description Plan

WASTE DESCRIPTION PLAN





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8.0 ENVIRONMENTAL COMPLIANCE MONITORING

8.1 Institutional Plan for EMP Implementation

The institutional plan for the operation of Mabuhay Fil Cement Plant incorporates management measures to facilitate the prevention, minimization and mitigation of any adverse impact of the plant on the environment. As part of this initiative, MFI is committed to work and collaborate with EMB,, LGU's, NGO's and key stakeholders for the implementation, monitoring and evaluation of its environmental performance.

Moreover, the Safety Health and Environment (SHE) Department was created and tasked to be responsible for all environmental concerns of the Plant. Specifically, the department's prominent roles are as follows:

- Identify the problems and concerns that need to be addressed in relation to the set standards and company's commitment to environmental protection;
- Ensure that the budget and schedule for project implementation are clearly elaborated;
- Properly identify persons responsible for the monitoring of company's compliance against environmental standards.

The physical manifestation of MFI environmental performance is found in the continuing efforts of Multi-partite Monitoring Team. This is a multi-sectoral representation that serves as an armed of DENR to monitor and validate company's accomplishment and compliance with environmental statutory obligation.

It will be the responsibility of the Pollution Control Officer (PCO) to implement the site Environmental Monitoring Plan and also the Environmental Management Plan and to encourage general site environmental awareness. Where necessary, the Senior Manager responsible for environmental matters may be required to instigate change to ensure that the environmental standards outlined in this EIA.

The Environmental Monitoring Plan may also require the employment of a laboratory technician or local laboratory to analyze samples and report these to the PCO. The report of the chemical analyses should clearly reference a standard by which treated waste water quality can be compared.

Although the ambient air quality monitoring may be performed by an outside contractor, Mabuhay FilCement Inc. may decide to install their own ambient air quality monitoring equipment including a meteorological station. In this instance, the laboratory technician will also be responsible for maintaining and calibrating the equipment necessary for monitoring.

The following organizational structure presents the hierarchy of entities directly involved in the EIA and ECC implementation.

Figure 8.1: Legal and Corporate Communications Organizational Structure



LEGAL AND CORPORATE COMMUNICATIONS:

8.2 Organizational Plan

Through community organization, MFI shall involve the members of the existing organizations and PO's in the area. There will be strengthening meetings which will focus on human relations to enhance the spirit of belongingness among the community dwellers.

Like the cooperative, the objective and purpose of cooperativism will be highlighted. Once the people will understand the objective of organizing the project, they will be considered as development partners as well.

A series of seminars/trainings will follow. Technical and financial assistance will be afforded to such organizations and PO's until such time that they can manage by themselves to handle the undertaking that is identified by the group that will be covered in the program. Please see charts below.

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8.2.1 Reporting Procedures

The department heads under the Plant Director and their functions:

- QA Manager Quality Assurance; ensures that manufacturing processes comply with standards at both national and international level (raw materials, processing products, etc.)
- Production Manager responsible for the technical management, supervision and control of industrial production processes.
- EHS Manager Environmental Health and Safety; in-charge of Health and Safety of operations towards the internal and external community
- Maintenance Manager in-charge of mechanical, electrical, instrumentation/calibration and preventive maintenance of mentioned components of the plant operations
- Process Leader in-charge of process engineering of the cement production
- Materials Management Manager responsible for tool keepers and warehouse personnel

The Department Heads under the administration of the CEO:

- Finance and Administration responsible for the planning, organizing, auditing, accounting, for and controlling the company's finances.
- Sales –Maintains relationships with clients by providing support, information, and guidance; researching and recommending new opportunities; recommending profit and service improvements.
- Purchasing Manager in-charge of the resource tapping for purchasing materials, equipment, supplies for the plant and office operations

Simultaneous reporting should be communicated within the department heads. For environmental hazards or exceedances of DENR Standard Emissions and Discharges as pointed out from the PCOs Monitoring and/or as reported from complaints to the CRO both to the EHS Manager, should be immediately communicated to the Plant Manager. The plant manager shall then commission the EHS department and process manager to investigate the source of the problem within the running of the plant. The Production Manager and the Maintenance Manager should be engaged should there be activities that are rooted out from faulty machinery. The QA should be engaged should there be anomalies in the chemical or physical setup of the production process. The Maintenance Department and Materials Management Department shall then be commissioned to troubleshoot plant components to solve the issue as pointed by Plant Manager as presented by QA, Process and Production Manager. The EHS Department shall then inspect the corrective measures done and shall report to the Plant Manager if further action need be done or if issue is arrested. All departments shall then make reports of the specific activities in relation to the troubleshooting and be presented to the EHS department and noted by the PCO, CRO for reporting purposes to DENR and LGU on applied measures to complaints/exceedances.

Meanwhile, as soon as troubleshooting solutions are made, proposals for request of funding is to be made for the Plant Manager and PM to Finance and Administration to CEO and upon approval, to Finance and Administration and to Purchasing Manager and then to Plant Manager for implementation.

8.2.2 Multi-Partite Monitoring Team (MMT) Framework

As of May 9, 2019, as requested by Mabuhay FilCement Inc. on letter dated March 3, 2019 to Mines and Geosciences Bureau (MGB), previously the MMT head, to aid in the reconstitution or re-establish a new MMT framework as per DAO 2018-18, MGB has not provided any communication on the matter. There has been no formal removal of previous MMT head and turn-over to new MMT Committee. Mabuhay FilCement Inc. has been continuously requesting aid from EMB and MGB to rationalize the new mandate.

REPRESENTATIVES	ROLE / SCOPE OF MMT RESPONSIBILITIES	BASIS OF Selection	STRATEGY / APPROACH IN MONITORING
PENRO - Technical Staff	Validate the tree planting requirement of the project and other issues and concerns under the scope of the agency	DAO 2018- 18	Do monitoring work assigned
CENRO – MMT HEAD	Facilitates and lead the MMT members in undertaking actual monitoring activities and act on issues/problems that shall arise relative to the project	DAO 2018- 18	Supervise and oversee monitoring works
MENRO – Technical Staff	Conducts ocular site visit to validate the proponent's compliance with the ECC conditions and Environmental Management and Monitoring Plan	DAO 2018- 18	Do monitoring work assigned
LGU REPRESENTATIVE – Brgy. South Poblacion, San Fernando	Participate in actual monitoring work, prepare, concur or sign the MMT monitoring reports, provide the necessary information about the local policies, plans, programs, affecting MMT monitoring results and standards, advise the MMT of any complaints, information or reports from the LGUs concerning the project	DAO 2018- 18	Do monitoring work assigned
LGU REPRESENTATIVE – San Fernando	Participate in actual monitoring work, prepare, concur or sign the MMT monitoring reports	DAO 2018- 18	Do monitoring work assigned
NGO	Participate in actual monitoring work, prepare, concur or sign the MMT monitoring reports	DAO 2018- 18	Do monitoring work assigned

Table 8.1: Tentative MMT Framework

