

**Project Description  
for Public Scoping of the  
Proposed New  
Integrated Cement  
Plant Project  
of Republic Cement & Building  
Materials, Inc. (RCBM) Teresa Plant**

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## 1. BASIC PROJECT INFORMATION

### 1.1 PROJECT INFORMATION

Name of Project	:	Proposed New Integrated Cement Plant Project “ECC-CO-1601-0002”	
Project Location	:	Brgy. Dulumbayan & Prinza, Teresa, Rizal	
Project Area	:	Within the existing 145-hectare area of RCBM Teresa Plant	
Project Type/Nature	:	Resource Extractive – Cement Processing Plant	
Cement Silo Capacity (2 units)	:	10,000 MT each	
Total Production Capacity of the Proposed Project	:	5.0 Million MT per Year (MMTPY) with New Finish Mill	
		Cement Mill	Cement Production (MMTPY)
		Mill C	1.70 MMTPY
		Mill D	
		New Mill	2.63 MMTPY
		Total Cement Production	4.33 ≈ 5.0 MMTPY

### 1.2 PROPONENT PROFILE

<b>Name of Proponent</b>	:	Republic Cement and Building Materials, Inc.
<b>Address</b>	:	Brgy. Dulumbayan, Teresa, Rizal
<b>Contact Details</b>	:	
<b>Authorized Representative for ECC Application</b>	:	Jimmy N. Torres - Vice President - Operations/Plant Manager

Republic Cement & Building Materials, Inc. [formerly Lafarge Republic, Inc.; "Republic Cement" or "Company" or "RCBM", for brevity] is a corporation organized under the laws of the Philippines. It was registered with the Securities and Exchange Commission (SEC) on May 3, 1955 primarily to engage in the manufacture, development and sale of cement, marble and all other kinds and classes of building materials, and the processing or manufacture of materials for industrial or commercial purposes. On February 4, 2005, the SEC approved the extension of the corporate term of the Company for another 50 years or until May 3, 2055.

On June 26, 2012, the Securities and Exchange Commission (SEC) approved the amendment of the Company's articles of incorporation to change the Company's corporate name from "Republic Cement Corporation" to "Lafarge Republic, Inc." On November 12, 2015, the SEC approved the amendment of the Company's articles of incorporation to change the Company's corporate name from "Lafarge Republic, Inc." to "Republic Cement & Building Materials, Inc."

Moreover, Certificate of Filing of the Articles and Plan of Merger executed on May 30, 2007 which states the transfer of assets and liabilities of Fortune Cement Corporation, FR Cement Corporation, and Lloyds Richfield Industrial Corporation to Republic Cement Corporation was approved by the SEC on July 31, 2007 (**Annex A**). Subsequently, the ECC Change of Company Name from Republic Cement Corporation (RCC) to Republic Cement & Building Materials, Inc. was also granted by DENR-EMB on July 7, 2017 (**Annex B**).



## 2. PROJECT DESCRIPTION

### 2.1 THE PROJECT

The Teresa Plant is a cement manufacturing plant that uses the dry process. Based on the DENR-EMB Memorandum Circular 005 or the Revised Guidelines for Coverage Screening and Standardized Requirements, the proposed project is categorized as a “Resource Extractive” undertaking due to the mining and quarrying activities involved during project operations. Moreover, its overall production rate of 3.5 million metric tons per year of cement makes it an “Environmentally Critical Project (ECP)”.

Republic Cement & Building Materials, Inc. (RCBM) Teresa Plant secured its ECC with Index No. ECC-CO-1601-0002 (**Annex C**) issued by the DENR Central Office on January 04, 2018 for the Cement Manufacturing Plant Project expansion located in Brgy. Dulumbayan, Teresa, Rizal. The ECC supersedes ECC with Reference No. 9508-008-105C issued on May 08, 1996 and covers the cement manufacturing not to exceed 1.7 million metric tons per year.

This Environmental Compliance Certificate (ECC) application, through the submission of an EPRMP, is for the construction of a proposed New Integrated Cement Plant (Project) that will increase the Teresa Cement Plant's production to 5.0 million metric tons of cement per year. A photo of the project site is provided as **Figure PD-1**.

### 2.2 PROJECT LOCATION AND AREA

#### 2.2.1 GENERAL LOCATION AND ACCESSIBILITY

The existing RCBM Teresa Plant, which covers a total land area of about 1,151,577 sqm., is geographically located at longitude 121°12'17" E and latitude 14°32'37" N and is situated at Barangay Dulumbayan, Municipality of Teresa, Province of Rizal. Barangay Dulumbayan is bound in the north by Barangay May-Iba, in the east by Barangay Calumpang Sto. Cristo, and in the southwest by Barangay Mahabang Parang (**Figure PD-2**). The proposed New Integrated Cement Plant Project will be located within the existing RCBM Teresa Plant which includes the plant facilities such as raw materials crushing, storage and extraction, grinding facilities, raw meal storage, pyro-processing & clinker storage, clinker transport and storage, coal grinding, cement grinding, and cement storage and dispatching.

Passing through the Marcos Highway, the RCBM – Teresa Plant will be located 11 kilometers from Antipolo Robinsons Place. Landmarks along the way are the Antipolo Cathedral and the Pinto Art Museum. **Figure PD-3** is a vicinity map.

#### 2.2.2 GEOGRAPHIC COORDINATES OF THE PROJECT AREA

**Figure PD-4** shows the geographical coordinates of the cement plant boundary as well as the proposed location of the new cement plant area.



**Figure PD – 1. Project Site Photo**

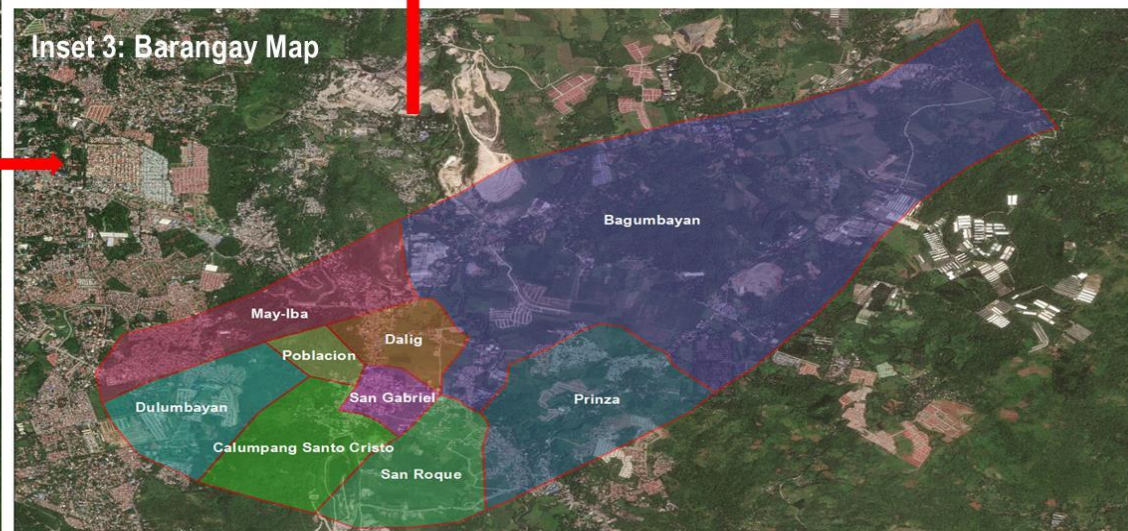
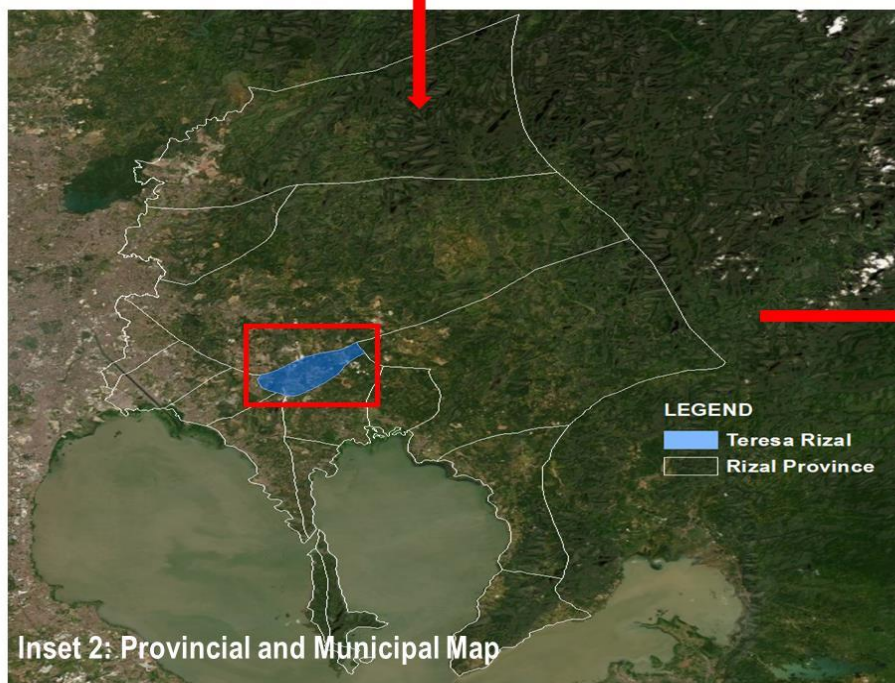
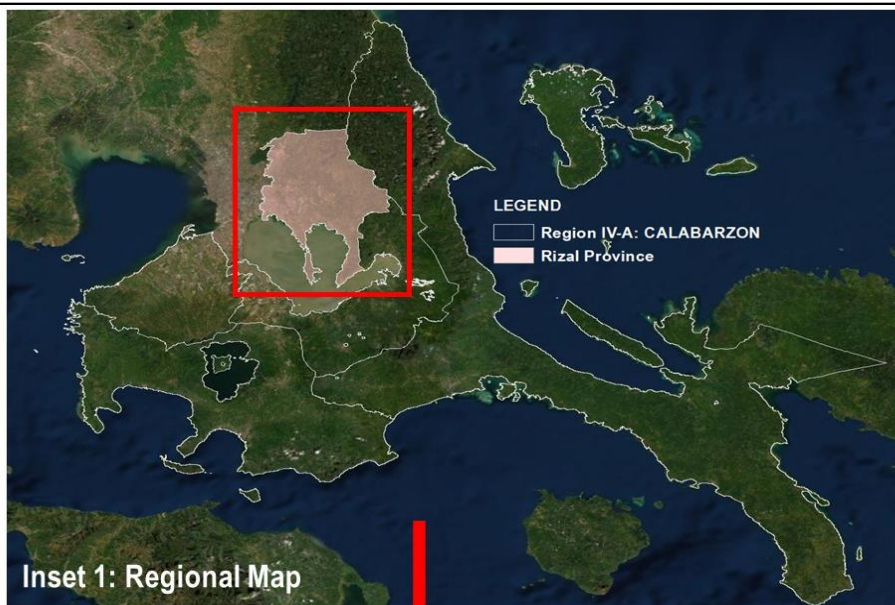
**ENVIRONMENTAL PERFORMANCE REPORT AND MANAGEMENT PLAN  
PROPOSED NEW INTEGRATED CEMENT PLANT PROJECT**

**SCALE:** Not drawn to scale

**DATA INFORMATION/SOURCE:**  
Source Figure: RCBM, 2020  
Modified by: APERCU  
CONSULTANTS INC. (2020)







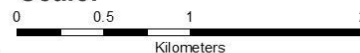
**Figure PD-2 Project Location Map**

**ENVIRONMENTAL PERFORMANCE REPORT AND MANAGEMENT PLAN  
 PROPOSED NEW INTEGRATED CEMENT PLANT PROJECT**

**LEGEND:**

As above

**Scale:**



**DATA INFORMATION/SOURCE:**

**Basemap:** ArcGIS Imagery, 2020

**Created by:** Apercu Consultants Inc.





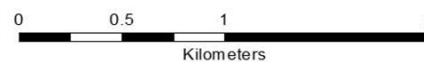




**Figure PD – 4. Cement Plant Boundary**

**ENVIRONMENTAL PERFORMANCE REPORT AND MANAGEMENT PLAN  
PROPOSED NEW INTEGRATED CEMENT PLANT PROJECT**

**SCALE:**



**DATA INFORMATION/SOURCE:**

**Source Figure:** RCBM, 2020

**Modified by:** APERCU  
CONSULTANTS INC. (2020)

### 2.2.3 IMPACT AREAS

**Direct Impact Area (DIA)** includes the area of Barangay Dulumbayan, Municipality of Teresa, Province of Rizal where the New Integrated Cement Plant facilities are to be constructed and operated within the existing RCBM Teresa Plant with a total land area of 1,151,577 sqm. A refinement of the direct impact areas will be established based on the results of the air quality modelling and water assessment. Since the proposed project is within the Teresa Plant property, primary impact area will be the area where the various component will be sited, including areas that will be affected by dust emissions and possible safety risks during the construction phase.

The **Indirect Impact Area (IIA)** generally refers to the influence area of the project that could be indirectly affected by the proposed development. This could also include areas in the vicinity of the DIA. Examples of these may include communities or settlements outside of the DIA which can also be benefited by the employment opportunities created by the project and sub-tributaries of the river system which can be indirectly affected by project induced. The secondary impact area includes the nearby Brgy. May-Iba, Brgy. Calumpang Sto Cristo, Brgy. Mahabang Parang and the nearby river.

## 3. PROJECT RATIONALE

The construction of a New Integrated Cement Plant aims at supplementing the current/existing operation, particularly enhancing the cement production capacity.

RCBM believes that the construction of the New Integrated Cement Plant Project will contribute to the national and local economy development, the sustainable development agenda, and the current development thrusts of the Philippines as this project will be able to:

- Increase the cement production capacity to 5.0 million metric tons of cement per year;
- Support and meet the fast-growing demand of urbanization by increasing cement production capacity that will contribute to increased local employment and increased tax revenue for the host community;
- Meet the increasing market demand, especially for cement, of the Philippine Government for its Build-Build-Build Projects.

Cement plants are known to be energy intensive and highly dependent on fossil fuels. The increasing cost of fossil fuels has led to the use of waste resources in many cement plants as an alternative to fossil fuels and raw materials. Waste resources in cement plant are classified into Alternative Fuel Resources and/or Raw Materials (AFRs) and Non-Alternative Fuels or Raw Materials (non-AFRs) which can either be hazardous or non-hazardous in nature.

The New Integrated Cement Plant envisions the use of waste resources from the currently existing plant. From an economic perspective, the use of waste resources lessens the unit cost of cement production since it can be used as a substitute for fuels and raw materials. By using a waste co-processing facility, the combustible components of the wastes replace fossil fuels, rendering the energy efficiency in cement kilns high while the non-combustible components of the wastes in part replace traditional raw materials. By way of partial substitution of conventional fossil fuel and traditional raw materials, there is a strong and significant semblance of cost savings from fuel and raw materials, thus, a financial return on investments in the long run can be realized.

Aside from economic benefits, the use of waste resources in clinker production has positive impacts on the environment as it promotes environment-friendly waste disposal systems especially in areas where establishment of waste disposal facilities are financially and technically constrained. Disposal of hazardous waste has been an issue for many cement plants and this problem can be addressed by establishing a waste co-processing facility since cement kilns provide an appropriate thermal environment for the degradation of many kinds of waste resources without compromising the quality of the clinker produced. This environmental benefit from a waste co-



processing facility has been evident from previous studies and/or experimentation on the use of waste resources as alternative fuels and raw materials in clinker production. In addition, a co-processing facility could also address or mitigate the potential problem on air pollution with the use of efficient air pollution control facilities that are required for cement plant operation. Lastly, by using alternative fuels and alternative raw materials it will bring down the carbon dioxide (CO<sub>2</sub>) significantly versus utilizing 100% of fossil fuels and raw materials.

Thus, the general objective of the New Integrated Cement Plant for RCBM Teresa is to promote energy and material recovery from waste resources with the secondary objective of providing technically and environmentally sound wastes disposal services through cement co-processing of both hazardous and non-hazardous AFRs and non-AFRs.

## 4. PROJECT ALTERNATIVES

**Site selection** – The RCBM-Teresa Plant was selected as the site for the Integrated Cement Plant Project to maximize limestone usage. The quarry areas located in the RCBM-Teresa Plant has ample limestone reserves from its MPSA that has already been renewed and valid until June 22, 2025. The Teresa Plant has 3 quarry areas that can support the new project. Finally, the Teresa Plant is the most strategic of all RCBM plants since it is closer to the market.

**Process selection** – No alternatives were considered since the same process being used by the existing plant needs to be utilized.

**Technology selection** – the proposed new integrated cement plant is a dry process, rotary kiln system equipped with 5-stage single string low NOx preheater. The cement grinding is a Combi Circuit (Roller Press and Ball Mill). Alternative technologies were considered such as ball mills, vertical mills and horomills. This technology was chosen mainly because of its operational efficiency, less maintenance requirement, and because it is a widely used and proven technology in the global cement manufacturing industry.

**No project option** – If the project is not pursued, there will be no additional local tax contributions, which serve as fund sources for the development programs of the barangays and municipalities in Teresa. RCBM is one of the biggest taxpayers in Teresa, Rizal with Real Property Tax (RPT) payments amounting to 45.236 million pesos per year plus Business Tax payments of 7.602 million pesos in 2020. Without the expansion, taxes that will be generated will stay as is. Local employment opportunities may also be affected since the projected number of jobs generated during the construction phase of about 500 will not materialize. With or without the expansion, the environment will continue to degrade, but with the project, it will help boost the post economic recovery accentuated by the COVID-19 pandemic. This project will also utilize state-of-the-art pollution control device to manage and control environment related issues.

The operation of a co-processing facility in the RCBM-Teresa Plant will expand its waste type acceptance criteria that will provide more economic and environmental benefits for RCBM. Cement kilns provide an ideal environment for the complete destruction of any kind of waste resources. The closed combustion system in the kiln provides better control and monitoring while the sustained high temperatures and long residence time ensures efficient and total combustion of gaseous products that may be formed during combustion of waste resources. The kiln combustion system likewise provides an alkaline condition that effectively scrubs the combustion gases. In this sense, the decision to expand the list of waste resources is considered more pro-active and more economically advantageous to RCBM.

## 5. PROJECT COMPONENTS AND PROCESS

### 5.1 EXISTING FACILITIES AND OPERATIONS

The existing cement plant operations of the RCBM Teresa Plant employs the most efficient cement manufacturing technology, the dry process, with pre-heater and pre-caliner systems. A simple diagram of the cement process flow is shown in **Figure PD-5** while **Figure PD-6** shows the plant lay-out.

Cement manufacturing is achieved through the four general processes of raw mix preparation, burning, milling and packing – all of which are described in more detail in the succeeding sections. **Figure PD-7** shows the mass balance of the whole process of RCBM including the proposed project.

#### 5.1.1 RAW MIX PREPARATION

The raw mix preparation starts with the quarrying operations followed by crushing, stacking, and reclaiming; and grinding, drying, and homogenization of raw materials.

##### 5.1.1.1 QUARRYING

###### MINING METHOD

The method of extraction employed is the open pit and/or open cut mining and/or quarrying method where the limestone deposit is extracted along a series of benches. The extraction of the in-situ limestone deposit particularly within Quarry 1 and Quarry 3 involves the following cycle of activities: drilling controlled blasting, dozing, loading, hauling and dumping into the crusher.

On the other hand, the extraction of the lower grade limestone along Quarry 2 area involves very minimal drilling and blasting activities owing to the softer characteristic of the deposit where rip dozing or even direct digging by the excavator as main loading equipment is enough to break and/or extract the in-situ limestone materials.

All quarrying operations are currently being undertaken by Delta Earthmoving Inc., the Company's Quarry Service Contractor as covered by a Memorandum of Agreement/Quarry Service Contract which commenced in January 2009 for an initial period of five (5) years and was extended for another ten (10) years or up to the end of December 2023.

The height of the active working benches is maintained between 5 to 10 meters with a minimum width of about 20 meters to provide enough space for the safe movement of the major quarry equipment, such as the dozer, loader, backhoe, and off-highway trucks (OHT's). The benches are inclined at angle of not more than 70-degrees, while the quarry/pit slope is maintained at a maximum of 60-degrees from the horizontal to ensure the safety and stability of the working benches and the entire quarry workings.

There are two MPSA's granted for the RCBM Teresa Plant:

MPSA No. 159-2000 which was granted on 23 June 2000 and is valid until 22 June 2025

MPSA No. 138-1999 which was granted on 4 October 1999 and is valid until 19 September 2024

The quarry operation is under the separate ECC with Reference No.: 9906-013-302.



## **DRILLING AND BLASTING**

Drilling of holes for blasting is achieved using track-mounted hydraulic crawler drills. Blasting pattern currently applied is dependent on the characteristic of the limestone deposit to be blasted including its proximity to the nearby structures particularly the Plant equipment and especially from within Quarry 3 area. Orica Philippines Inc., the largest provider of commercial explosives and blasting systems is the sub-contractor of Delta Earthmoving, Inc. for blasting. Orica uses Ammonium Nitrate –Fuel Oil Mix (ANFO) as the main blasting agent and is initiated using the NONEL Initiation Systems. Powder factor ranges from 0.10 to 0.14 kilograms explosives/metric ton limestone material.

The resulting ground vibration is measured at different locations using a Blast Vibrometer. Vibration limit is set at 3 mm/sec for Quarry 3 and 6 mm/sec for Quarry 1.

Secondary blasting of big boulders is not allowed at any time within the RCBM Teresa Quarries. Breaking of big boulders is done using track-mounted hydraulic rock breakers.

Explosives used in the blasting are stored at the magazine and blasting activities are conducted only during the daytime.

## **LOADING AND HAULING**

Blasted limestone muck is loaded using track-mounted hydraulic excavators unto a fleet of 40-ton Off-Highway Trucks (Caterpillar 770) for subsequent hauling of both the high-grade and the low-grade limestone materials from the respective quarry areas towards the crusher about 500 meters to 1 kilometers away using an access road that is within plant boundaries.

Normally, two to three loading areas are active to be able to sustain crusher target throughout and target quality of limestone at the pre-homo stockpile.

### **5.1.1.2 CRUSHING, STACKING, AND RECLAIMING OF RAW MATERIALS**

The raw material from the quarry is first crushed in a hammer crusher to reduce size from 1000 to below 50 mm. The main crusher is capable of producing 10,000 MT per day of limestone:

- Main Crusher
  - Double rotor hammer crusher
  - 2x700KW motor
  - Rated Capacity of 800 TPH

The crushed limestone from the crusher is delivered into the circular pre-blending storage by a series of belt conveyors. The purpose of this is to obtain a more homogenous quality of limestone. The stacker boom creates the circular stockpile of limestone. The stacked materials are scraped and reclaimed by a scraper conveyor that will deliver it to the storage bin.

### **5.1.1.3 GRINDING, DRYING, AND HOMOGENIZATION OF RAW MATERIALS**

In the grinding process, a vertical roller mill technology is used with a nominal capacity of 315 tph. The raw materials namely, limestone, dacite, diorite and copper slag which will be outsourced, are proportioned using weight feeders for each material then transported via conveyor to the vertical roller mill. All the materials are ground and dried inside the mill. The hot gases from the kiln system are piped into the mill, and this hot air is used for drying the raw mix. A separator then divides the fine and course product. The latter is sent back to the mill for regrinding, while the fine meal is filtered and eventually stored and homogenized in a pre-blend silo. The pre-blend silo, which uses

a single inverted cone technology with a capacity of 10,000 metric tons, continuously homogenizes the material to ensure uniform quality of the raw meal. The raw meal extracted from the pre-blend silo, now called kiln feed, is then sent to the kiln bin using an air slide and a bucket elevator.

### 5.1.2 BURNING AND COOLING OF RAW MATERIALS

Using a second bucket elevator, the kiln feed is sent to the preheater, which with the use of cyclones, gradually heats the material in preparation for burning. Burning or pyro-processing of the preheated material occurs at the rotary kiln which consists of 1 preheater and 5 stage cyclones. The rated capacity of the kiln is 3,600 metric tons per day. The material is heated to 1,450°C producing hard granules called clinker. The clinker then undergoes cooling by bursts of air in the cooler. The cooler can quench the hot materials down to 100 – 120°C. The cooled clinker is then transported via a conveyor system and stored at a material storage area. Clinker is the basic material required to produce all types of cement.

There are two types of fuels used in the clinkering process, the conventional fossil fuels such as coal and bunker fuel oil and alternative fuels such as petcoke, refuse derived fuel, tyre derived fuel, and biomass. Coal is the main fuel used and is sourced from Indonesia or Semirara Antique. The alternative fuels are by-products of industries and/or domestic households and sourced mainly locally.

To enable the processing of the raw coal and petcoke fuel, the plant has a vertical roller mill coal plant facility with a capacity of 25 tph. In addition, the plant also operates a rice husk, a tire shredder, and Refuse Derived Fuel (RDF) facility for processing and feeding the alternative fuels and shredded tires.

The burning and cooling process has also a waste heat recovery facility that converted the heat from exhaust gases from the preheater and cooler using heat exchangers to form steam and run a steam turbine generator. This waste heat recovery facility has two heat exchangers located at preheater and cooler which can produce 10.1 tons per hour steam and a steam turbine generator with capacity of 4.5 MW.

### 5.1.3 CEMENT MILLING

Clinker is then transported to Finish Mills C and D, the specifications of each are described below:

- Finish Mill C
  - Ball Mill with roller press as pregrinder
  - Dimension: 4.2 m x 7.2 m - Rated Capacity of 120 TPH
  - Year installed: 1998
- Finish Mill D
  - Horizontal Mill (Horomill)
  - Rated Capacity of 106 TPH
  - Year installed: 2015

The other two small mills which is also a ball mill were not used anymore since the efficiency is low after the commissioning of finish mill D in 2015. A small amount of gypsum (3-5%) is added to the clinker to regulate cement setting time. The mixture of clinker with gypsum will produce cement. Republic Cement also uses different cementitious materials such as fly-ash, limestone, pozzolan, EP dust, escombros, volcanic tuff, shale, microsilica, slag and other pozzolanic material in order to reduce its carbon footprint while maintaining world class quality standard. Finally, the cement is stored in silos sorted according to each type of cement.

**Table PD-1**  
**Material Balance**

Cement Raw Material	Type 1P Cement	Type OPC Cement
Clinker	56-76 %	91 %
Gypsum	4 %	4 %
Cementitious Materials	20-40 %	5 %

#### **5.1.4 PACKING AND DISPATCH**

Cement product is distributed in two ways, either in bags or in bulk. Cement products are packed at the pack house that is fitted with 3 rotopackers and each rotopacker consists of 8 spouts for the cement bag product each weighing 40 kg. The packing and dispatch system include an auto-palletizer for safer, faster and more efficient loading of the 40-kg bag cement product onto pallets. The rotopackers are equipped with a dust collection system cable of maintaining the housekeeping-and-cleanliness conditions in the area.

Cement is also dispatched in bulk directly to bulk trucks. The bulk loading facility is also equipped with a dust collection system capable of maintaining the housekeeping and cleanliness in the area.

## DRY PROCESS:

### Raw Material Preparation

1. Quarrying (Limestone, shale)
  - Drilling & Blasting
  - Loading & Hauling
2. Crushing
3. Stacking and Reclaiming
4. Grinding and Drying
5. Homogenization

### Burning & Cooling

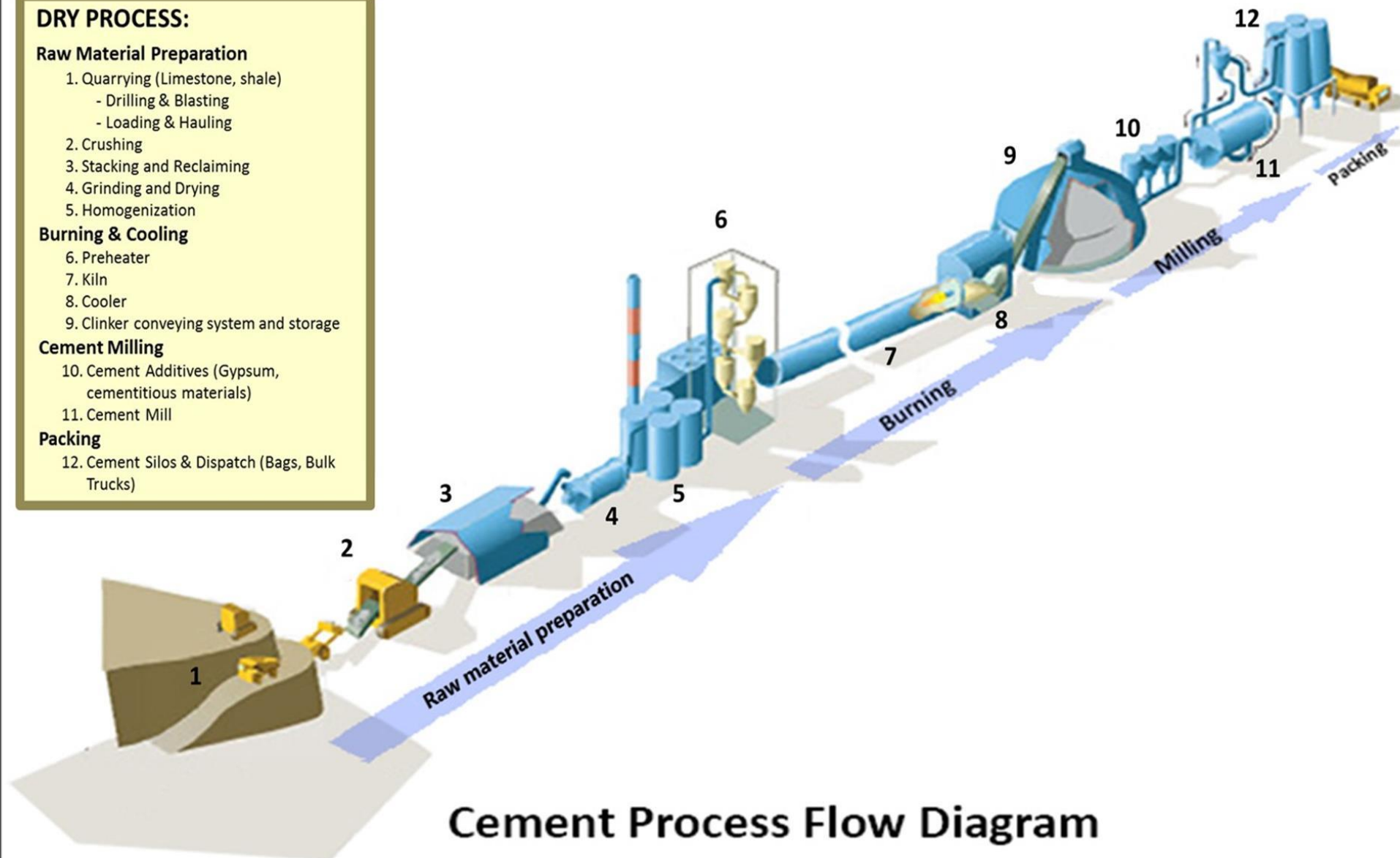
6. Preheater
7. Kiln
8. Cooler
9. Clinker conveying system and storage

### Cement Milling

10. Cement Additives (Gypsum, cementitious materials)
11. Cement Mill

### Packing

12. Cement Silos & Dispatch (Bags, Bulk Trucks)



**Cement Process Flow Diagram**

**Figure PD - 5. Cement Process Flow Diagram**

#### LEGEND:

As above

**SCALE:** Not drawn to scale

#### DATA INFORMATION/SOURCE:

Source Figure: RCBM, 2020



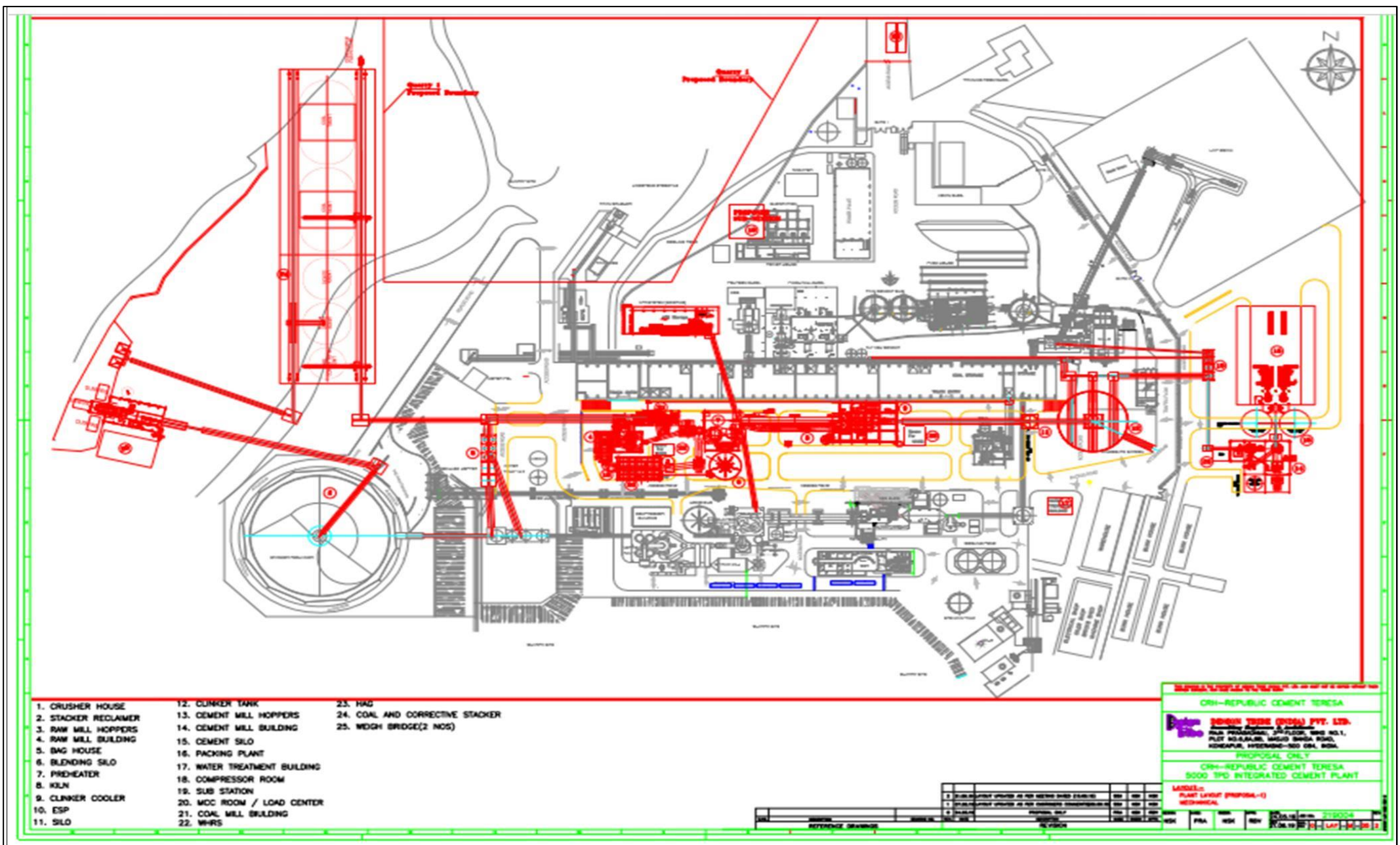


Figure PD - 6. Plant Lay-out

LEGEND:

As above

SCALE:

DATA INFORMATION/SOURCE:

Source Figure: RCBM, 2020

Modified by: APERCU

CONSULTANTS INC. (2020)

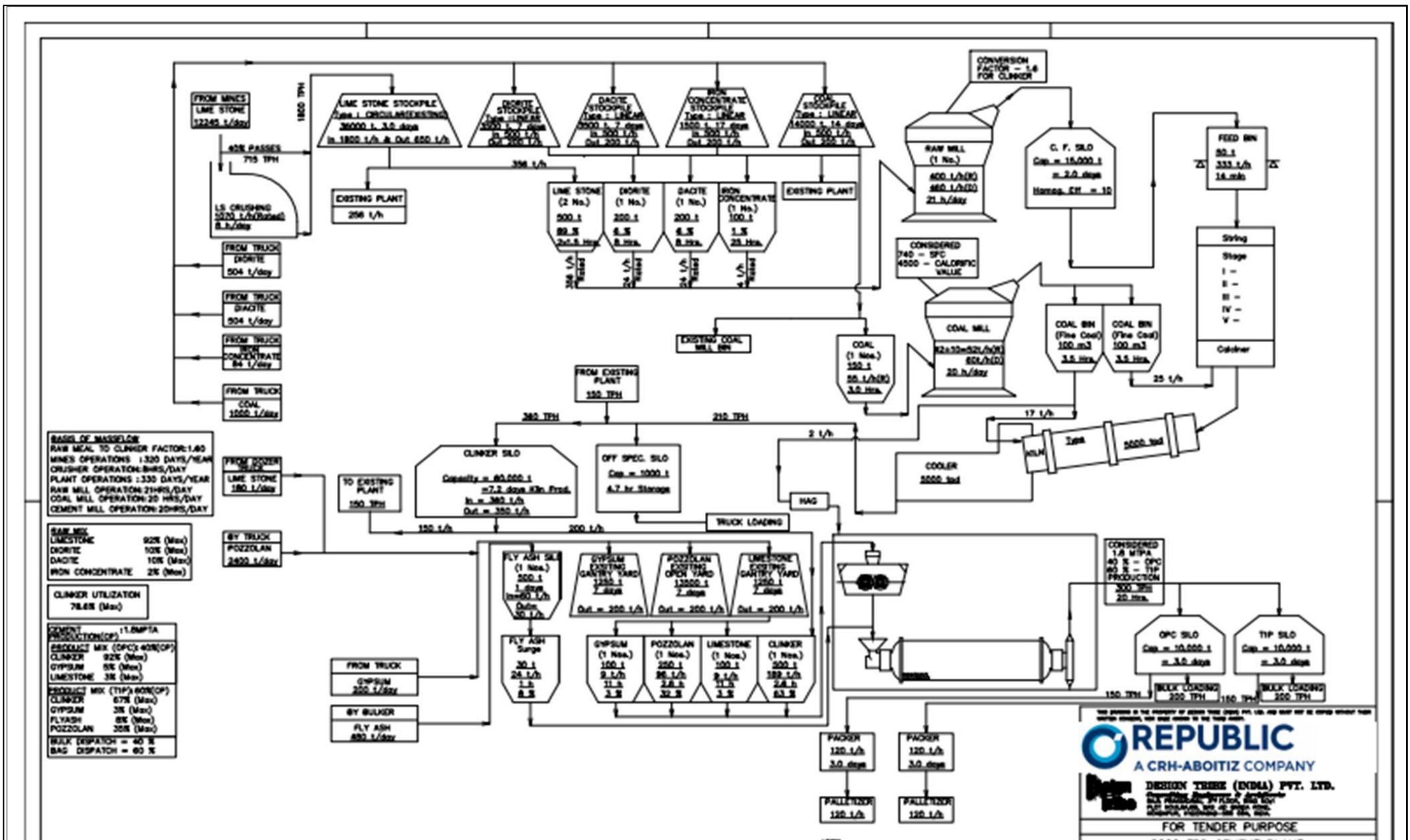


Figure PD - 7. Mass Balance

LEGEND:

As above

SCALE:

DATA INFORMATION/SOURCE:

Source Figure: RCBM, 2020

Modified by: APERCU

CONSULTANTS INC. (2020)

## 5.2 EXISTING FACILITIES AND OPERATING HOURS

Table PD-2 shows the list of major components, support facilities (such as energy/power generating facility, water supply system), pollution control devices and other environmental management safeguards used in the existing operation.

**Table PD-2**  
**Project Components and Modification in Operating Hours**

Process	Components	Existing	
		Rate	Operating hours/day
<b>Crushing, Stacking and Reclaiming</b>	<b>Limestone Crushing Plant</b>		
	Apron Feeder	800.0 tph	24
	Primary Hammer Crusher	800.0 tph	24
	Assorted Conveyor Equipment		24
	Crusher Dust Collector	530 m <sup>3</sup> /min	24
	<b>Ls Mix Reclaim and Transport</b>		
	Assorted Conveyor Equipment		24
	<b>Additive Feed &amp; Reclaim System</b>		
<b>Grinding, Drying and Homogenization</b>	Assorted Conveyor Equipment		24
	Assorted Feed Bins		24
	Vertical Roller Mill	315.0 tph	24
	Raw Mill Bag Filter	560000.0 m <sup>3</sup> /h	24
	High Efficiency Separator	315.0 tph	24
	Package Water Spray System	15.7 m <sup>3</sup> /h	24
	Bucket Elevator Raw Mill Recirculating	630.0 tph	24
	Quadropol Cyclone Dust Collector	D = 5.5 m	24
	System fans & Associated Ductwork	400.0 tph	24
	Raw meal product Elevator	360 tph	24
	Package Air Compressor	237.0 m <sup>3</sup> /h	24
	<b>Raw Meal Silo</b>		
	Assorted Conveyor Equipment		24
	RM Silo Dust Collector	525 m <sup>3</sup> /min	24
	<b>Kiln Feed System</b>		
	Assorted Conveyor Equipment		24
	Assorted Feed Bins & Hoppers		24
<b>Burning and Cooling of Raw materials</b>	Silo Extraction Elevators Dust Collector	86 m <sup>3</sup> /min	24
	Kiln Feed Bin Dust Collector	73 m <sup>3</sup> /min	24
	Feed Elevator Dust Collector	200 m <sup>3</sup> /min	24
	<b>Preheater / Precalciner</b>		
	5 Stage Preheater Cyclone System		24
	In-line Calciner		24
	Precalciner Burner Assembly	10.1 tph	24
	Spray Cooling Tower	D=6.8m x H=27.3m	24
	Spray Tower Water Injection	25 m <sup>3</sup> /h	24
	Assorted Conveyor Equipment		24
	Assorted Ductwork		24
	<b>Rotary Kiln</b>		
	Rotary Kiln System	3600.0 tpd	24
	Burner Assembly	209 Gj/hr	24
	Baghouse	405.61 – 486.73 Nm <sup>3</sup> /h	24
	<b>Clinker Cooler</b>		
	Clinker Cooler	3600.0 tpd	24
	Clinker Crusher Hammer	3600.0 tpd	24
	Cooler Air Fan System		24
	<b>Clinker Cooler Dust EP</b>		
	Electrostatic Precipitator	320000.0 m <sup>3</sup> /h	24



	Assorted Conveyor Equipment		24
	<b>Clinker transport</b>		
	Assorted Conveyor Equipment		24
	Clinker Surge Bin	500 m <sup>3</sup>	24
	Clinker Surge Bin Dust Collector	180 m <sup>3</sup> /min	24
	Clinker Surge bin discharge Dust collector	65 m <sup>3</sup> /min	24
	Clinker Transport Dust Collector 1	180 m <sup>3</sup> /min	24
	Clinker Transport Dust Collector 2	135 m <sup>3</sup> /min	24
<b>Cement Milling</b>	<b>Covered Clinker Material Storage</b>		
	4 OHEC		24
	Assorted Material Bins		24
	Reclaim Dust Collector	5.0 m <sup>3</sup> /s	24
	<b>FM C Pregrinder</b>		
	Assorted Conveyor Equipment		24
	Assorted Material Bins & Feeders		24
	Roller Press	120.0 tph	24
	Fresh Feed Dust collector	424.0 m <sup>3</sup> /min	24
	Roller press Separator Dust collector	790 m <sup>3</sup> /min	24
	Roller press Material transport Dust collector	180 m <sup>3</sup> /min	
	Roller press Separator	150 tph	24
	Ball Mill	120 tph	24
	Ball Mill Dust Collector	1242 m <sup>3</sup> /min	24
	Mill C Separator Dust Collector	977 m <sup>3</sup> /min	24
	Mill C Separator	150 tph	24
	<b>FM D / Horomill</b>		
	Assorted Conveyor Equipment		24
	Assorted Material Bins & Feeders		24
	Cement Roller Mill (Horomill)	106.0 tph	24
	TSV Separator	650.0 tph	24
	Process Dust Collector	254123 m <sup>3</sup> /h	24
	Weightfeeder Dust Collector	142 m <sup>3</sup> /min	24
	Clinker feeder Dust collector	166 m <sup>3</sup> /min	24
	Hot Air Generator (Fumace)	43.2 GJ/hr	24
	Cement Silo Dust Collector	167 m <sup>3</sup> /min	24
	Cement Extraction Dust Collector	56 m <sup>3</sup> /min	24
	<b>Twin Silo</b>		
	Assorted Conveyor Equipment		24
	Twin Silo 1 Dust collector	200 m <sup>3</sup> /min	24
	Twin Silo 2 Dust Collector	165 m <sup>3</sup> /min	24
<b>Packing</b>	<b>Packing Plant Section</b>		
	Assorted Conveyor Equipment		24
	Assorted Material Bins & Feeders	120.0 tph	24
	Roto Packer 1	2400.0 bag/h	24
	Roto Packer 1 Dust Collector	330 m <sup>3</sup> /min	24
	Compressed Air Supply System	400.0 m <sup>3</sup> /h	24
	Roto Packer 2	2400.0 bag/h	24
	Roto Packer 2 Dust Collector	330 m <sup>3</sup> /min	24
	Roto Packer 3	2400.0 bag/h	24
	Roto Packer 3 Dust Collector	400 m <sup>3</sup> /min	24
	Twin Silo Extraction Dust Collector	90 m <sup>3</sup> /min	24
<b>Waste Heat Recovery</b>	Steam turbine generator	4.5 MW	24
	SP Boiler	10.1 tph	24
	AQC Boiler	10.1 tph	24
<b>Power Plant</b>	5 Units Generator Set	4 MW	Back-up

Legend: tpd = metric ton per day; tph = metric ton per hour; m<sup>3</sup>/s = cubic meter per second; m<sup>3</sup>/h = cubic meter per hour



### 5.3 ALTERNATIVE FUELS AND RAW MATERIALS

RCBM is constantly looking at opportunities to reduce its environmental footprint with measures including the use of alternative fuels and alternative raw materials, educating the public on more efficient ways to use cement, and introducing alternative cement product types that use less clinker, among others.

For some time, RCBM has been marketing their fly ash cement under the type 1P or the blended category which uses less clinker content than the traditional Portland cement. Adding cementitious materials such as fly ash, limestone, pozzolan, EP dust, escomro, volcanic tuff, shale, microsilica and other pozzolanic materials in the cement mix reduces the need for clinker.

It is during the clinker manufacturing process that the most carbon dioxide is emitted since coal is burned in order to reach the high process temperatures required to calcine limestone and produce clinker. Within its manufacturing process, RCBM is aggressively pursuing carbon footprint reduction in two key ways: (1) by minimizing the clinker factor of its cements by developing and selling blended cements with more environmentally friendly cement additives with equivalent market advantages of durability and workability, and (2) use of alternative fuels and raw materials in the cement manufacturing process.

RCBM uses alternative fuels to complement coal and these include tire-derived-fuel and plastic-derived-fuel such as scrap tires and nonrecyclable plastics, refuse-derived fuel and biomass such as rice hulls as well as other manufacturing and industrial wastes allowed under its co-processing and TSD permit.

The sustainable approach to operating has the following effects and advantages:

1. Reduced use of fossil fuel, hence reduced CO<sub>2</sub> and other greenhouse gas emissions (Aligned with Our commitment under Sustainability Ambitions);
2. Maximize energy recovery from industrial by-products and qualifying wastes;
3. Reduced dependence on fossil fuels, i.e. oil and coal; prolong non-renewable fossil fuel sources.
4. Use of RDF and plastic derived fuels will divert volumes from sanitary landfills in the Philippines and hence becoming a part of the waste management solution in the country;
5. Minimize flooding caused by improper disposal of garbage; and
6. Conserving natural resources and energy.

### 5.4 NEW CEMENT LINE (PROJECT)

The new cement line (Project) in Teresa Plant proposes to produce 5.0 Million Metric Tons per Year of cement and the facilities are to be constructed within the premises of the existing 1.7 Million Metric Tons per year cement plant. The proposed project will be sharing the limestone quarry and the source for correctives and additive materials.

The new cement line is achieved through seven general processes of raw mix crushing, storage and extraction, raw mill area, raw meal storage, pyro-processing and clinker storage, clinker handling, storage and extraction, coal mill, cement mill area, and cement storage and dispatch – all of which are described in more detail in the succeeding sections. Figure PD-7 shows the mass balance for the existing RCBM Teresa plant as well as the proposed project.

#### 5.4.1 RAW MATERIALS CRUSHING, STORAGE, AND EXTRACTION

The plant raw materials are divided into four (4) categories: limestone, corrective materials, additive materials, and coal.

#### 5.4.1.1 LIMESTONE

This will be the main raw material in the clinkerization process. Limestone is mined from the Quarry 1, Quarry 2, and Quarry 3 which are all adjacent to the plant. Limestone is currently surface-mined and is transported by 40 MT self-dumping trucks to the plant crusher area.

A new limestone crusher house is proposed to be located in between Quarry 1 and Quarry 2 as shown in **Figure PD-8**. The proposed Crusher House will supply the to the limestone requirements of both the existing (3600 TPD and proposed (5000 TPD) plants. The existing crusher house will no longer be used, and the area will be mined for limestone.

The limestone crusher rated capacity is shown below:

Crusher type:                      Impactor  
 Crusher Rate Capacity:      1070 – 1,785 tph

The crushed limestone from the crusher housed through belt conveyor will be fed to the existing belt conveyor which will be upgraded to 1800 tph (rated) the feeding in the circular stockpile.

Limestone will be stored in the existing limestone circular stockpile, which has a capacity of 36,000 Mt that is equivalent to 3.0 days' worth of supply for both plants.

The existing circular stacker and reclaimer are to be upgraded to 1800 tph and 690 tph (existing Vertical Roller Mill or VRM will run at 288 tph rated capacity with 89% limestone proportion, 256 tph and proposed plant VRM at 400 tph rated capacity with 89% limestone proportion, 356 tph total = 612 tph rated) to meet requirement of both plants.

The existing reclaimer yard conveyor will be upgraded to 650 tph. The limestone from storage with upgraded yard conveyor will be transported to the existing raw mill hopper building and from the hopper building the limestone will be diverted to existing hoppers or to the proposed raw mill hoppers by a diverter and a belt conveyor.

#### 5.4.1.2 CORRECTIVE MATERIALS

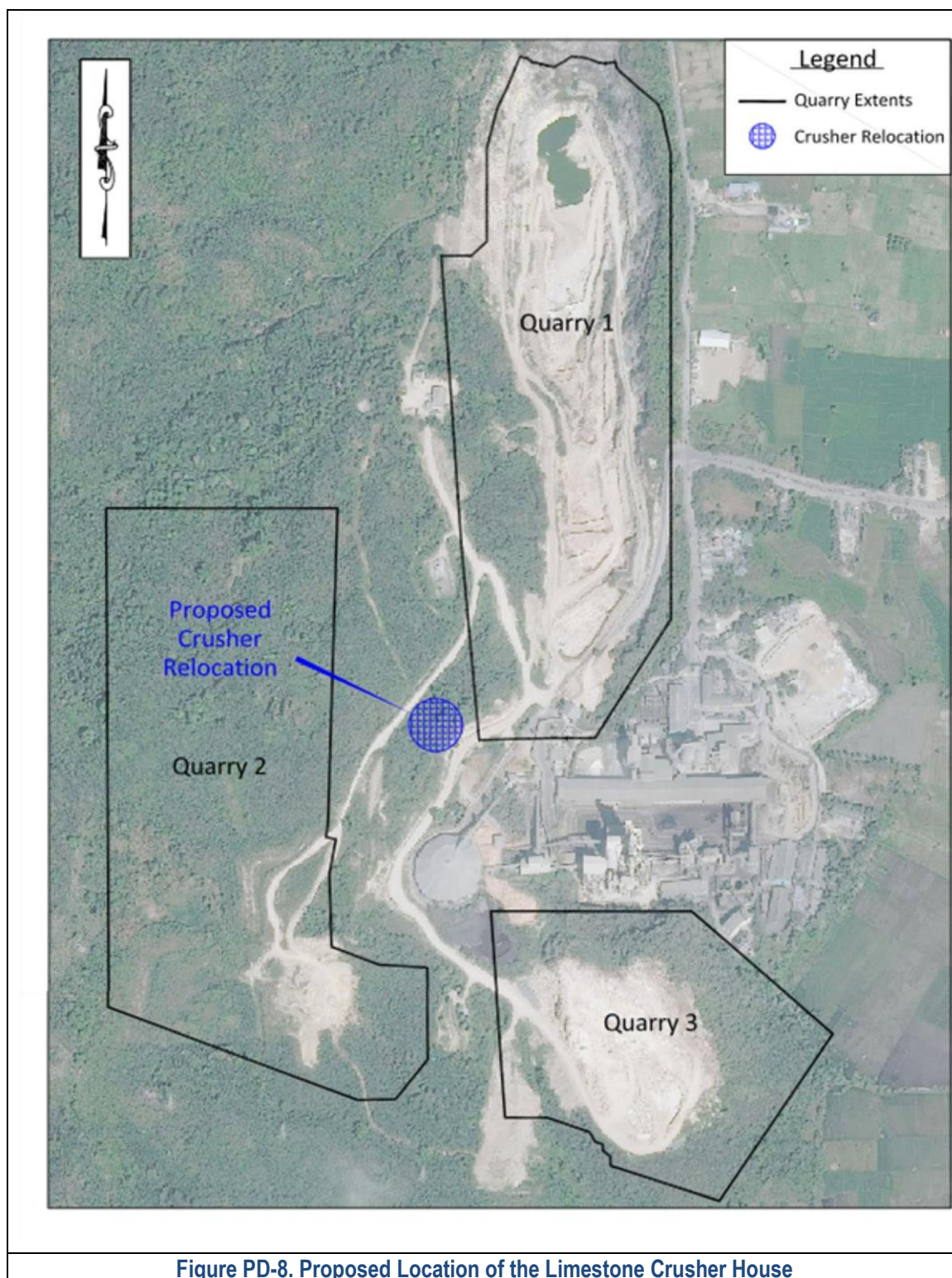
The corrective raw materials used in the plant are the following:

Correctives	Stockpile Capacity
Diorite	3500 MT with 7 days storage capacity
Dacite	3500 MT with 7 days storage capacity
Iron Concentrate	1500 MT with 17 days storage capacity

These correctives are received by 25 MT trucks and are <90 mm size. There is no crushing required for any of the correctives under the existing process. The correctives will be dumped into dumping system which will be located near to the crusher house. The corrective dump will be stored in linear stockpile with stacker system.

There is a separate dumping hopper for correctives and a common storage shed for the correctives and coal and a common portal type reclaimer system envisaged for extraction of correctives and coal. The correctives stored will cater to the needs of both the existing (3600 tpd) and proposed (5000 tpd) plants, while the corrective reclaimer will be transported to the proposed raw mill hopper building where they are either diverted to below hopper of the proposed plant or transported to the existing raw mill hopper building.

The location of the stacker and reclaimer for additives and coal is proposed to be located in between the Quarry 1 and Quarry 2, adjacent to proposed limestone crusher (**Figure PD-8**) which requires vertical cutting and flattening of a part of hillock and mesh protecting the vertical cut portion of the hillock.



**Figure PD-8. Proposed Location of the Limestone Crusher House**

#### 5.4.1.3 ADDITIVE MATERIALS

The additives used in the plant are the following:

Correctives	Stockpile Capacity
Diorite	3500 MT with 7 days storage capacity
Dacite	3500 MT with 7 days storage capacity
Iron Concentrate	1500 MT with 17 days storage capacity

These additives are received by 25 MT trucks and limestone will be transported from the existing circular stockpile by truck, all the additives do not require any crushing under the existing conditions at site.

Gypsum and limestone will be stored in the existing gantry shed where material is stacked and extracted by grab crane. The extraction is into existing dumping system where the material fed into proposed conveyor to feed into the cement mill hopper building.

Pozzolan is stored in the existing open yard and fed to the hopper building from the top existing horomill by a diverter and a set of conveyors.

The Fly ash, which are received by bulkers, will be directly unloaded into the proposed 500 Mt steel bin near the cement mill building using a pneumatic system. The bin extracted into the surge bin and further transported to the Mill.

#### 5.4.1.4 COAL

Coal is delivered by 25 MT trucks and are <90mm and do not currently require crushing in this size. The coal is separately dumped into the dumping system which will be located near the crusher house and conveyed through a common conveyor to storage. The dumped coal is stored and extracted in a linear stockpile equipped with a stacker and reclaimer system (that is shared for correctives.).

There is a separate dump hopper envisaged on the reclaimer yard conveyor for petcoke which will be transported to the coal mill. The capacities of the stockpile are:

Coal: 2X7000 MT with 14 days storage capacity

#### 5.4.2 RAW MATERIAL GRINDING

The Raw Material Grinding System is needed to grind limestone and correctives to obtain raw meal at an acceptable size and proportion for calcination in the kiln. Raw material grinding is done by a Vertical Roller Mill (VRM).

Feed hoppers extraction arrangement shall be designed in accordance to the raw material specifications. Raw material shall be fed to the raw mill through weigh feeders and set belt conveyors.

Raw Materials	Capacity	Mill Hoppers
Limestone	87-92% (Considered 89%)	2x500 T
Diorite	3-10% (Considered 6%)	1x200 T
Dacite	3-10% (Considered 6%)	1x200 T
Iron Concentrate	0-2% (Considered 1%)	1x100 T

A secondary reject re-circulation system with metal detector downstream the reject bin will be provided to separate the reject material from the first reject handling system. A belt weigher will be provided on reject handling belt conveyor below raw mill. The above reject system will be used for calibration also.

A VRM with a rated of capacity 400 tph and a designed capacity of 460 tph is will be used for drying and grinding of raw materials. Product fineness shall be 15% residue on 90-micron sieve and 1-2% residue on 212 micron sieve with a product moisture content of not more than 1%. The VRM is equipped with a high efficiency dynamic separator. External oil circulation system shall be considered for lubrication.



The ground raw meal will be air swept and collected through the high efficiency low-pressure drop cyclones. The cyclones will be provided with inspection access and also wear protection lining at inlet section. The roller mill will be equipped with bucket elevator for external recirculation sized for minimum 50% of mill production capacity.

The raw meal collected in cyclones will be extracted by a set of rotary air lock and air slides/ chain conveyors and transported by bucket elevator to the top of Raw Meal silo. A screw sampler will be provided at inlet of bucket elevator for collecting samples of mill product. Sample collection and transport shall be automated.

Raw mill system is designed for maximum moisture content of 8% in raw materials considering average of the moistures. Gases for drying will be taken from the exhaust gases of the preheater.

During direct operation of the mill, the entire kiln gases will be de-dusted by a pulse jet type bag house. Kiln exhaust gases will be cooled by fresh air prior to passage through bag house. In compound mode, vent gases from the mill will be de-dusted in the bag house itself.

The dust from the bag house will be extracted by means of rotary airlock and chain conveyors. The kiln dust will be sent to the Raw Meal silo feeding bucket elevator during compound operation through a chute / chain conveyor. During direct operation (Vertical Roller Mill is not running), kiln dust will be transported to the blending silo by bucket elevator. Chain conveyors will be provided for transport of hot calcined kiln return dust from bag house to hot dust bin during direct operation.

Gas Inlet and outlet of raw mill / kiln bag house shall be on same side. Bag house chimney shall be supported with preheater building. Bag house shall be sized so as to achieve outlet emission of <20 mg/Nm<sup>3</sup> with (n-1) modules operative. Bag house consider is Pulse jet type.

### **5.4.3 RAW MEAL STORAGE, PYRO-PROCESSING AND CLINKER STORAGE**

#### **5.4.3.1 RAW MEAL SILO**

A continuous flow inverted cone type homogenizing silo of capacity 15,000t with 2.0 days storage is considered for storing and homogenizing of raw meal. A 3D scanner-type level monitoring system and a high-level switch will be provided to indicate the level of raw meal in the silo.

The raw meal silo system will reduce the quality variation in the raw meal so that the kiln feed of a sustained desired quality is within the permissible range. Degree of silo emptying will be minimum of 98%. Blending efficiency of the silo will be 10:1 ratio. Roots blowers are provided to supply air needed for the purpose of silo aeration and standby roots blowers will be provided for silo aeration.

#### **5.4.3.2 KILN FEED**

Raw meal is extracted by a set of flow control gates and air slide, and fed to the kiln feed bin, located under the meal silo. The kiln feed bin with a capacity of 50MT will be aerated by stand-by roots blowers.

The kiln feed will be with equipped with a gravimetric feed control system.. Material from the kiln feed bin will be extracted through two sets of shut-off gates and dosing valves. The material will be weighed using either a "Roto" weigh scale (piester or coriolis) or a Solid Flow meter.

After extraction and metering of the kiln feed material, it will be fed to the preheater through belt type bucket elevators. At the elevator discharge, an air slide is provided to pre-heater feeding with 5th stage cyclone feeding options. Screw samplers are provided downstream of the kiln feed, before the kiln feed bucket elevators and the

Raw Meal Silo Feeding Bucket Elevators, for the extraction of raw meal samples. Sample collection and transport will be automated.

#### **5.4.3.3 HOT DUST (KILN AND COOLER RETURN DUST)**

The hot kiln return dust from the raw mill / kiln bag house will be extracted by means of rotary airlock and chain conveyors. The kiln dust is sent to the raw meal silo feeding bucket elevator during compound operation (Vertical Roller Mill is running) and direct operation (Vertical Roller Mill is not running) through chute / chain conveyor. Chain conveyors were provided for transport of hot calcined kiln return dust from bag house to Raw Meal Silo Feeding Bucket Elevator.

The extraction of kiln dust from the bin will be through a slide gate and rotary air lock equipped with a solid flow meter. An auto sampler will be provided downstream of the hot dust bin before feeding to kiln feed bucket elevator.

#### **5.4.3.4 PRE-HEATER, KILN, AND COOLER**

A dry process, rotary kiln system equipped with 5-stage single string low NO<sub>x</sub> preheater with 4th or 5th stage cyclone feeding options, inline pre-calciner and 3-pier rotary kiln and TA duct is to be provided for clinker production. Preheater and pre-calciner system will be designed to achieve acceptable gas velocities for 5,000tpd production with the low pressure drop cyclones. Desirable gas velocity in the tertiary air duct shall be between 20-25 m/s.

The kiln will be equipped with online scanning and tyre-slip movement system. CCTV with arrangement for its display to CCR will be provided for online monitoring of kiln burning zone. Radiation Pyrometers will be provided at the kiln inlet and the kiln outlet (differentiated by two colors). The design thermal loading in the kiln will be based on 40% firing in- the kiln and 60% firing in the precalciner.

WHRS (Pre-Heater/Air Quenching Cooler) is envisaged in the plant as the hot gases from both the preheater and the cooler mid tap was being used for drying of the raw material due to high moisture and for the excess hot gases will be routed to the turbine to generate own power.

#### **5.4.3.5 FUEL DOSING AND FIRING SYSTEM**

The multi-channel burner will be a modern design with low NO<sub>x</sub> emissions and suitable for coal as main fuel for start-up application. In order to complete the system, it includes fuel firing into kiln and pre-calciner.

Coal is envisaged as the main fuel for the new cement plant. Fine coal, after grinding, will be stored in two (2) fine coal bins for firing at the kiln, at the pre-calciner and at the HAG of the cement mill. For coal dosing in the kiln and precalciner, four (4) "Roto" weigh scales (piester or coriolis) (2w+1standby), one (1) separately for HAG will be provided. Measuring accuracy of the weigh scales will be a +/- 0.5%. Fuel firing system were designed taking into consideration the fuel characteristics foreseen for the project.

#### **5.4.3.6 CLINKER COOLER**

A new generation, high heat recuperation efficiency (up to 75%), modular pit-less type clinker cooler will be built. The cooler will be capable of coping with the fluctuations and disturbances that occur during kiln operation. The clinker cooler is designed to guarantee an outlet clinker temperature of 65°C above ambient temperature at the nominal capacity of 5,000tpd. The cooler system will be without bottom hoppers and / or drag chains under the cooler with hydraulic drive.

An efficient roll type clinker crusher will be provided at the end of the clinker cooler. The crusher shall have a minimum of four rollers, with all rollers reversible except for first and last ones, with automatic roller reversing mechanism just in case there's material clog in the system. The crusher shall be retractable type and shall cover full cooler width. The tertiary air extraction at kiln hood.

The cooled clinker will be conveyed via pan conveyor with a rated capacity of 210 tph. The clinker cooler waste gas can be de-dusted through ESP. The ESP de-dusting system shall be designed for maximum dust content in cleaned exit gas of 20 mg /Nm<sup>3</sup>. A suitable mid-air tapping from cooler after null point shall be taken for hot gases to WHRS system.

#### **5.4.4 CLINKER TRANSPORT AND STORAGE**

A pan conveyor with a 210 tph rated capacity is envisaged for the collection of clinker from cooler. The pan conveyor is arranged in a manner that the clinker can either be fed to the off spec silo or transported to the clinker tank.

A continuous weighing system is to be provided in the pan conveyor from the cooler. One (1) pre-stressed clinker silo with a capacity of 60,000t and one (1) off-spec clinker silo of 1000t capacity will be used for clinker storage. The off-spec clinker from the proposed Off-Spec. silo can be extracted by clinker truck loading system.

Clinker is extracted from the clinker silo through openings that are provided with pin gates and clinker discharge sector gates. Three (3) pan conveyors are on standby for clinker extraction from the silo. The clinker extraction system from the clinker tank has the provision to either feed to the new cement mill or feed to the existing cement mills. Belt conveyors will then be used to transport the clinker from the clinker tank to the cement mills.

#### **5.4.5 COAL GRINDING**

Coal grinding is envisaged in Vertical Roller Mill (VRM). The following are the consideration of the coal for sizing, 4500 kcal/kg calorific value and 740 specific heat consumption. One (1) nos. raw coal hoppers with capacity of 150 t with 3.0 hours storage time considered for storage of Coal received from Coal stockpile.

Coal grinding was envisaged in Vertical Roller Mill (VRM). Coal was extracted by belt type weigh feeders. Gases for drying will be taken from the exhaust gases of the preheater. The primary preference of the Pre-Heater gases was given to Coal Grinding to use the inertness of the Pre-heater gases.

Pulverized fine coal will then be swept to the bag house for collection from the mill / dynamic separator, from where it will be extracted by means of rotary airlock and screw conveyors. The bag house will be suitably earthed. The fine coal bins were equipped with agitators for material extraction, from where fine coal shall be fed to Pre-calciner and kiln for firing.

Suitable CO<sub>2</sub> inertisation system shall be provided for fine coal storage and handling system (fine coal bins and bag house). Suitable quantity of explosion flaps shall be considered for safety against fire explosion. No rupture disc is acceptable.

#### **5.4.6 CEMENT GRADING**

Cement Grinding System is required to grind Cement and additives so as to obtain the two (2) grades of Cement (OPC@ 3800 blaine size and T1P @ 4000 blaine size). Cement grinding is envisaged by a Combi Circuit (Roller Press and Ball Mill) with a Hot gas generator.

The cement mix for the following will constitute 40% for OPC and 60% of T1P of the total production, respectively.

	OPC	T1P
Clinker	90-92%	60-67%
Gypsum	3-5%	3%
Limestone	3%	-
Fly-Ash	-	8%
Pozzolan Limestone	-	30-35%

#### 5.4.7 CEMENT STORAGE AND DISPATCH

The cement shall be transported to cement silos by a system of bucket elevators, diverting gates and a set of air slides. An auto screw sampler is provided at the cement silo feed elevator inlet chute. Sample collection and transport to lab will be automated. The two (2) grade of cement produced are transported to two (2) separate silos each with a capacity of 10000 MT capacity, one for OPC and T1P. 3D scanner type level monitoring system and a high-level switch are to be provided to indicate the level of cement in each silo.

Two (2) packers, each with a capacity of 120 TPH capable of packing 2400 bags per hour will be used. The bags are transported via conveyor system to the palletization systems consisting of two (2) 120 TPH units where the bags are arranged on pallets and stored in the bag storage shed for further loading onto trucks.

#### 5.5 WASTE CO-PROCESSING FACILITY

Hazardous AFRs and non-AFRs facilities of Teresa Plant's cement manufacturing and wastes co-processing capability, initial lists of these hazardous AFRs and non-AFRs are provided below.

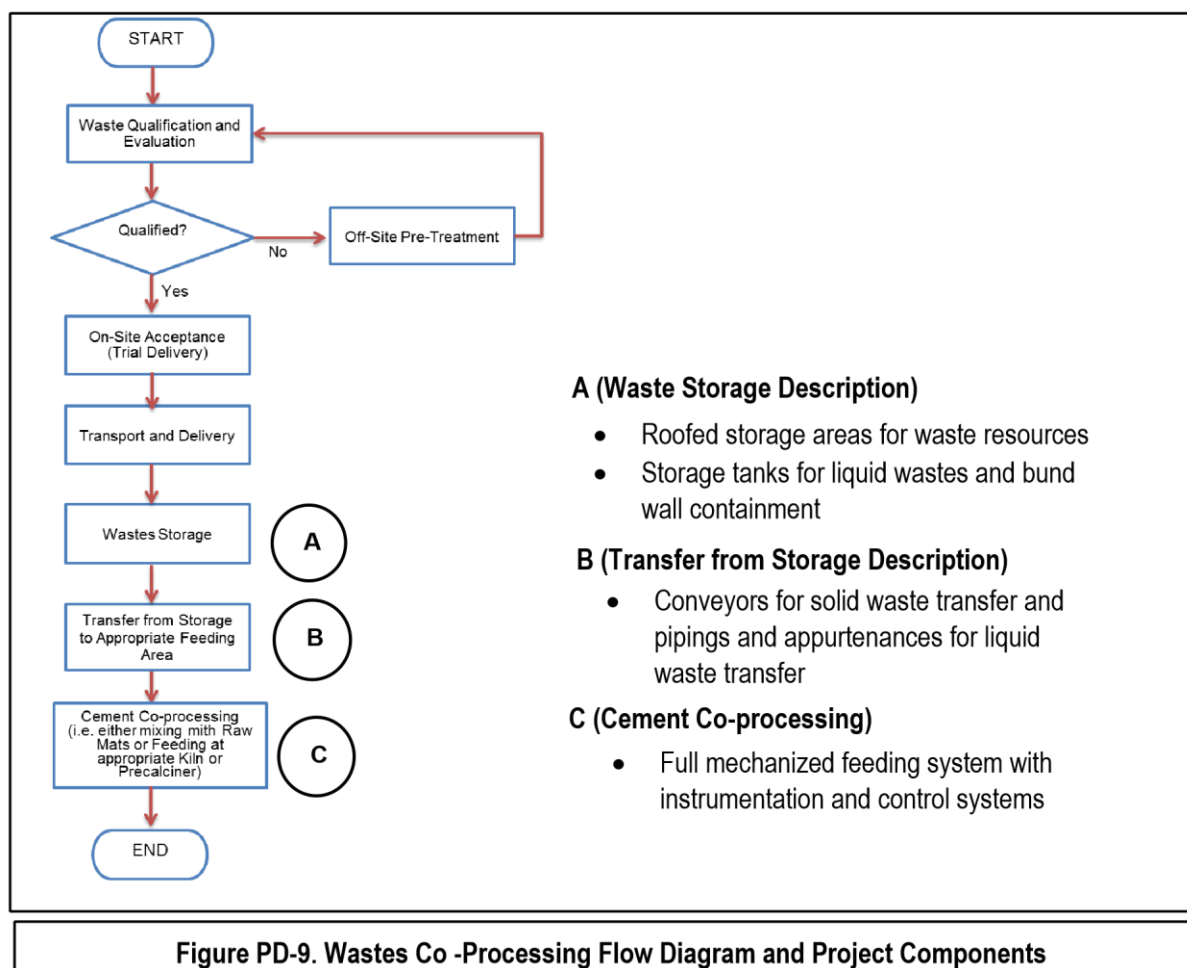
- Hazardous Wastes Materials (as identified under RA 6969)** - The Hazardous identification is based on DAO 36 of RA 6969 regulation on the "Control of Toxic and Hazardous and Nuclear Wastes".
  - Acid and Alkali Wastes
  - Wastes with Inorganic Chemicals
  - Inks/Dyes/Adhesives/Pigments/paints/Latex/Organics
  - Wastes Organic Solvent
  - Oil and Oil contaminated wastes materials
  - Empty containers
  - Organic Chemicals
  - Pharmaceuticals and Drugs
  - Pesticides and Pesticide contaminated materials
  - Immobilized wastes materials
  - PCB
- Non-alternative Fuels nor Raw Materials (non-AFRs)** - These are the miscellaneous additional wastes which this classification may be co-processed at the cement kiln for disposal purposes subject to prior approval and compliance to specific requirements of the EMB.
  - Food processing rejects or wastes
  - Expired chemicals
  - Expired raw materials
  - Expired Finished Goods/Products
  - Others



The proposed waste co-processing project will not cause changes in the existing set-up of the RCBM-Teresa Plant. This facility includes the following:

- roofed storage areas for waste resources,
- storage tanks for liquid wastes with bund wall containment,
- conveyors/hoist system for solid waste transfers, pipings and appurtenances for liquid waste transfers; and
- mechanized feeding system with instrumentation and control systems. Figure PD-9 shows the co-processing flow diagram.

Figure PD-9 shows the co-processing flow diagram.



### 5.5.1 WASTE QUALIFICATION AND EVALUATION

During wastes qualification and evaluation, the following information will be collected prior to acceptance:

- MSDS
- Waste samples
- Third Party Lab Test complying with the Plant Wastes Acceptance Criteria

Prior to wastes acceptance, the following chemical analysis will be conducted:

- a) pH
- b) Ash content
- c) Calorific value
- d) Mercury
- e) Volatile heavy metals (i.e., Mercury, Cadmium and Thallium)
- f) Flash Point
- g) Chlorine
- h) Sulfur
- i) Moisture content
- j) PCB
- k) Viscosity

Table PD-3 to Table PD-14 provide the list of Waste Acceptance Criteria for each type of waste.

**Table PD-3**  
**Plant's Wastes Acceptance Criteria (Chemical Characteristics)**

Parameters	Unit of Measure	Limit
<b>Legal Legislations</b>		
Total mineral substitution	in %	> 2 %
Ash Content *	in %	>50%
Total mineral Oxide *	in %	>75%
Gross CV	kcal/kg	>2000 kcal/kg.
<b>Environment, Safety and Health Limits</b>		
Antimony	in ppm	< 10,000
Arsenic	in ppm	< 60
Chromium	in ppm	< 120
Mercury	in ppm	≤ 10
Thallium	in ppm	< 1.5
Vanadium	in ppm	< 100
Cadmium	in ppm	< 1,000
Zinc	in ppm	< 2,500
Tellurium	in ppm	
Cobalt	in ppm	
Selenium	in ppm	
Tin	in ppm	
Nickel	in ppm	< 10,000
Copper	in ppm	< 5,000
Lead	in ppm	< 5,000
Total Heavy Metals	in ppm	2,000 - 10,000
Total Volatile Metals	in ppm	0
PCB	in ppm	< 50
Flash Point	in deg. C	> 60 deg. C
<b>Process Limits</b>		
Chlorine	in %	2 max
Sulfur	in %	1 max
P205	in %	0.5

**Table PD-4**  
**Acceptance Criteria for Acid Waste**

Acid Waste / Acid Contaminated Waste		
Parameters	Unit of measure	Limits
pH (if liquid)		6-8
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Flash Point	°C	>60
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content (if solid)	%	50 max
PCB	ppm	< 50
Viscosity (if liquid)	cSt	40-60

**Table PD-5**  
**Acceptance Criteria for Alkaline Waste**

Acid Waste / Acid Contaminated Waste		
Parameters	Unit of measure	Limits
pH (if liquid)		6-8
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Flash Point	°C	>60
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content (if solid)	%	50 max
PCB	ppm	< 50
Viscosity (if liquid)	cSt	40-60

**Table PD-6**  
**Acceptance Criteria for Inorganic Chemical Waste**

Wastes with Inorganic Chemicals		
Parameters	Unit of measure	Limit
Calorific Value	kcal/kg	>2000
Mercury	ppm	<10
Mercury +Cadmium + Thallium	ppm	<100
Ash Content	%	<50
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content (if solid)	%	50 max
PCB	ppm	< 50
P2O5	%	0.5
Viscosity (if liquid)	cSt	40-60

**Table PD-7**

**Acceptance Criteria for Inks/Dyes/Pigments/Paints/Latex/Adhesives/Organic Waste**

<b>Inks/Dyes/Pigments/Paints/ Latex/Adhesives/Organic Waste</b>		
<b>Parameters</b>	<b>Unit of measure</b>	<b>Limit</b>
pH (if liquid)		6-8
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Flash Point	°C	>60
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content ( if solid )	%	50 max
PCB	ppm	< 50
Viscosity (if liquid)	cSt	40-60

**Table PD-8**

**Acceptance Criteria for Organic Solvents**

<b>Organic Solvents / Material Contaminated with Solvents</b>		
<b>Parameters</b>	<b>Unit of measure</b>	<b>Limit</b>
pH (if liquid)		6-8
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Flash Point	°C	>60
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
Viscosity	cSt	40-60

**Table PD-9**

**Acceptance Criteria for Oil Waste**

<b>Waste Oil/ Waste Contaminated with waste oil</b>		
<b>Parameters</b>	<b>Unit of measure</b>	<b>Limit</b>
Ash Content	%	<50
Calorific Value	kcal/kg	>2000
Flash Point	°C	>60
Mercury	ppm	<10
Mercury +Cadmium + Thallium	ppm	<100
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
PCB	ppm	< 50

**Table PD-10**

**Acceptance Criteria for Empty Containers Contaminated by Class D, L, M**

<b>Empty Containers Contaminated by Class D, L, M</b>		
<b>Parameters</b>	<b>Unit of measure</b>	<b>Limit</b>
Ash Content	%	<50
Calorific Value	kcal/kg	>2000
Mercury	ppm	<10
Mercury +Cadmium + Thallium	ppm	<100
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
PCB	ppm	< 50
Asbestos	mg	0

**Table PD-11**

**Acceptance Criteria for Immobilized Waste**

<b>Immobilized Waste Material</b>		
<b>Parameters</b>	<b>Unit of measure</b>	<b>Limit</b>
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
PCB	ppm	< 50

**Table PD-12**

**Acceptance Criteria for Organic Chemical Waste**

<b>Organic Chemical Waste / Waste Contaminated with Organic Chemicals</b>		
<b>Parameters</b>	<b>Unit of measure</b>	<b>Limit</b>
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Flash Point	°C	>60
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
PCB	ppm	< 50
Viscosity (if liquid)	cSt	40-60

**Table PD-13**  
**Acceptance Criteria for Pharmaceutical and Drugs Waste**

Pharmaceutical and Drugs Waste		
Parameters	Unit of measure	Limit
pH		6-8
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
Viscosity (if in liquid)	cSt	40-60

**Table PD-14**  
**Acceptance Criteria for Wastes Contaminated with Pesticides**

Wastes Contaminated with Pesticides		
Parameters	Unit of measure	Limit
pH (if liquid)		6-8
Ash Content	%	<50
Mercury	ppm	<10
Calorific Value	kcal/kg	>2000
Mercury +Cadmium + Thallium	ppm	<100
Flash Point	°C	>60
Chlorine	%	2 max
Sulfur	%	1 max
Moisture Content	%	50 max if in solid form
PCB	ppm	< 50
Viscosity (if liquid)	cSt	40-60

## 5.6 SUPPORT FACILITIES

### 5.6.1 WATER SUPPLY

The water requirement for the new Cement Plant has been estimated at about ~3,500 m<sup>3</sup> /day which will be sourced from the existing deep wells (Table PD-15). A Reverse Osmosis (RO) water plant shall be installed for treatment of water as part of the new cement plant. The RO water will be pumped to plant treated water tanks. Utility system include storage tanks, return water tank, pumps, cooling tower.

The plant cooling water installation shall be provided with a closed circuit system i.e. make-up water shall be supplied while re-circulating water shall be in a closed loop. Appropriate chilling cooling system with radiators shall be provided to cool the return hot water from the plant. At least one chilling unit with radiator shall be provided as stand-by. All water pipe line should be overhead line. Any underground pipeline should be HDPE only.

Water supply piping shall be designed to relevant Indian standards and shall be of outside and inside corrosion protected pipes. The whole water supply has to be designed and installed in such a manner, that it shall be protected and proof against mechanical, electrical and chemical attack and shall be tested for 1.5 times operating pressure.

**Table PD-15**  
**Existing Deep Wells in RCBM Teresa Plant**

Existing Deep wells	Estimated Capacity
Bunkhouse	Not operational
WHR	1552.46 m <sup>3</sup> / day
Power Plant	1239.80 m <sup>3</sup> / day

Note: All the deep wells had NWRB permit.

**Table PD-16** shows the typical water consumption of RCBM-Teresa Plant with an average total consumption of 2,783 m<sup>3</sup>/day. Around 55% will be used for Cooling the Equipment, 40% of which will be utilized for the Process Water, 3.3% for the domestic, 1% Gardening, and 0.7% for washing purposes.

**Table PD-16**  
**Water Consumption of RCBM Teresa Plant**

	Water Consumption (m <sup>3</sup> /day)	Percentage (%)
Process Water (GCT, VRM)	1113	40.0
Washing	19	0.7
Domestic	92	3.3
Cooling	1531	55.0
Others (Gardening)	28	1.0
<b>Total</b>	<b>2783</b>	<b>100.0</b>

RCBM Teresa Plant has two wastewater discharge points: Meralco Substation and Oil & Water separator being the main discharge with an estimated volume of 176.91 m<sup>3</sup>/day during normal operation condition. Both wastewater discharge points are going to Morong River stream which was classified Class C waterbody.

## 5.6.2 ELECTRICAL SUPPLY

The tentative total power requirement of the clinkerization unit at Teresa, Philippines is estimated to be 30MW, which is planned to be taken from Govt. Electricity Board.

## 5.7 POLLUTION CONTROL DEVICES

RCBM is committed to ensure that the project will operate in an environmentally responsible manner. The succeeding section describes the pollution controls and waste management processes that are in place to meet the DENR standards.

### 5.7.1 DUST COLLECTORS

RCBM is a cement plant that has a significant number of dust collectors at the various facilities (**Table PD-17**). A dust collector is a system used to enhance the quality of air released from the equipment/facilities by collecting dust and other impurities from air or gas.

In the simplest form, a dust collection system is designed to purify air or gas by removing the contaminants or dust particulate from the collected air. Thus, the proper operation of dust collectors is important to every stage of the process in a cement industry like RCBM.

**Table PD-17**

**Existing and Proposed Dust Collectors of RCBM Teresa Plant**

<b>Facility Being Served / Source</b>	<b>APCF / Control</b>	<b>Quantity</b>
<b>Existing</b>		
Titan Crusher	Jet Pulse Dust Collector	1 unit
Transfer Station (belt conveyor)	Jet Pulse Dust Collector	1 unit
Limestone transport transfer house (belt conveyor)	Jet Pulse Dust Collector	1 unit
Feedbin	Jet Pulse Dust Collector	1 unit
Raw Meal Silo	Jet Pulse Dust Collector	1 unit
300T Kiln Feed Bucket Elevator	Jet Pulse Dust Collector	1 unit
Kiln Feed Weigh Bin	Jet Pulse Dust Collector	1 unit
250T Kiln Feed Bucket Elevator	Jet Pulse Dust Collector	1 unit
Rice Husk Silo	Jet Pulse Dust Collector	1unit
Coal Dosing	Jet Pulse Dust Collector	1 unit
Pre-calciner coal dosing	Jet Pulse Dust Collector	1 unit
Main burner coal vessel	Jet Pulse Dust Collector	1 unit
Petcoke dosing	Jet Pulse Dust Collector	1 unit
VRM/Kiln Baghouse	Jet Pulse Dust Collector	1 unit
Clinker Cooler	Electrostatic Precipitator	1 unit
Cooler Discharge	Jet Pulse Dust Collector	1 unit
Clinker Surge Bin	Jet Pulse Dust Collector	2 units
Clinker transport (pan conveyor)	Jet Pulse Dust Collector	2 units
Cement Raw Material transport (conveyor 1)	Jet Pulse Dust Collector	1 unit
Cement Raw Material transport (conveyor 2 and 3)	Jet Pulse Dust Collector	2 units
Cement Raw Material transport (bucket elevator)	Jet Pulse Dust Collector	1 unit
Polycom Separator	Jet Pulse Dust Collector	1 unit
Polycom System (belt conveyor)	Jet Pulse Dust Collector	1 unit
Finish Mill C	Jet Pulse Dust Collector	1 unit
Finish Mill C auxiliary	Jet Pulse Dust Collector	1 unit
Cement Transport (bucket elevator)	Jet Pulse Dust Collector	1 unit
Horomill Limestone Silo	Jet Pulse Dust Collector	1 unit
Horomill Bucket Elevator Transport	Jet Pulse Dust Collector	1 unit
Horomill Belt Conveyor Material Transport	Jet Pulse Dust Collector	1 unit
Horomill Clinker Silo	Jet Pulse Dust Collector	1 unit
Horomill Clinker Transport Belt Conveyor	Jet Pulse Dust Collector	1 unit
Horomill (Mill D)	Jet Pulse Dust Collector	1 unit
Horomill Fresh Clinker Belt Conveyor Transport	Jet Pulse Dust Collector	1 unit
Horomill Clinker Feed Bucket Elevator and Belt Conveyor	Jet Pulse Dust Collector	1 unit
Horomill Clinker Diversion Bin	Jet Pulse Dust Collector	1 unit
Horomill Fly Ash Feeding System	Jet Pulse Dust Collector	1 unit
Horomill Cement Silo	Jet Pulse Dust Collector	1 unit
Horomill air slide cement transport	Jet Pulse Dust Collector	1 unit
Twin Silo 1 & 2	Jet Pulse Dust Collector	2 units
Packhouse Bucket Elevators	Jet Pulse Dust Collector	3 units
Bulk Loading System	Jet Pulse Dust Collector	4 units
Coal Mill	Jet Pulse Dust Collector	1 unit
<b>Proposed</b>		
Limestone transport	Jet Pulse Dust Collector	3 units
Raw Material Transport	Jet Pulse Dust Collector	2 units
Raw Material Bins and Conveyor	Jet Pulse Dust Collector	4 units
Raw Material Transport (Belt Conveyor)	Jet Pulse Dust Collector	2 units
VRM/Kiln Bag House	Jet Pulse Dust Collector	1 unit
Baghouse Dust Transport	Jet Pulse Dust Collector	1 unit



Homosilo and transport	Jet Pulse Dust Collector	1 unit
Raw Meal Weigh bin	Jet Pulse Dust Collector	1 unit
Kiln Feed (Preheater)	Jet Pulse Dust Collector	1 unit
Clinker Cooler	Electrostatic Precipitator	1 unit
Clinker Silo Diversion	Jet Pulse Dust Collector	1 unit
Clinker Silo	Jet Pulse Dust Collector	2 units
Clinker Transport System	Jet Pulse Dust Collector	3 units
Cement Raw Material Bins and Transport	Jet Pulse Dust Collector	4 units
Roller Press	Jet Pulse Dust Collector	1 unit
Ball Mill	Jet Pulse Dust Collector	1 unit
Ball Mill Auxiliary	Jet Pulse Dust Collector	1 unit
Cement Silo and transport	Jet Pulse Dust Collector	2 units
Bulk Loading	Jet Pulse Dust Collector	4 units
Packhouse Weigh Bin and Transport	Jet Pulse Dust Collector	3 units

### 5.7.2 ELECTROSTATIC PRECIPITATOR

An Electrostatic Precipitator (ESP) is a highly efficient filtration device that minimally impedes the flow of gases through the device, easily removing fine particulate matter such as dust and smoke.

RCBM has been using ESPs since the plant started its operation in 1997's. The plant uses two (2) Electrostatic Precipitators, one installed at the raw mill and the other one at the cooler. In 2018, to further minimize particulate matter emissions in the kiln stack, RCBM invested to convert the conventional raw mill Electrostatic Precipitator to a state of the art Bag House system. This will bring down the dust emission level to 20 mg/Nm<sup>3</sup> from the main stack versus the standard of 150 mg/Nm<sup>3</sup>.

### 5.7.3 BAG FILTER

The bag filter is an air pollution control device and a dust collection device using a woven or non-woven filter bag that filters and collects the dust from the process gas. These bags remain reliable as these are physical barriers to dust emission and at the same provide unconstrained operational efficiency

## 5.8 WASTE MANAGEMENT MEASURES

The following section summarizes the wastes generated and the waste management measures of the existing plant, which will also be used during the operation of the clinkerization plant.

### 5.8.1 EXISTING FACILITY

#### 5.8.1.1 SOLID WASTE MANAGEMENT

Waste management comprises the activities required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste.

RCBM has a waste management program that covers all activities that generate wastes in the plant. The program aims to minimize environmental impacts and to protect workers from related occupational safety and health risks from waste generated by the operation. The programs include:

**a. Waste Management Procedure**

The plant has designated wastes storage area per category; solid, hazardous, and scrap metal. Housekeeping of wastes storage areas is part of the environment department responsibility. While the routine inspection of waste storage areas is under EHS Inspection Checklist.

**b. Waste Storage and Handling Requirement**

There are controls implemented in relation to waste storage and handling such as waste containers with proper labels, implementing controls to keep waste storage areas clean, storage of waste in containers that can prevent spillage, provide secondary containment for liquid waste storage area, implement storm water pollution prevention controls and develop spill control procedure.

**c. Hazardous Waste**

Hazardous wastes have additional controls such as:

- Segregate hazardous wastes from non-hazardous wastes
- Provide appropriate emergency response equipment near waste storage areas
- Label container of hazardous waste
- Handle hazardous materials accordingly
- Record turn-over of the hazardous waste for storage
- Monitor the condition of water pollution control devices such as grease trap, oil and water separator.

**d. Electronic Waste Management**

Proper electronic waste management and control is imposed considering the likelihood that these wastes may contain heavy metals.

**e. Biohazard Waste**

Manage all biohazard wastes resulting from first aid procedures or other sources to minimize personnel exposure.

Waste mapping has been done at the RCBM Plant properly identifying types of waste per work area. Solid waste is segregated at source. Recyclable materials go to the Materials Recovery Facility (MRF) for selling to scrap buyer while residual wastes go to RDF Facility and used as alternative fuel.

### 5.8.1.2 WASTEWATER MANAGEMENT

RCBM wastewater management follows a closed-loop system meaning there is no effluent/water discharges to surface water bodies in the vicinity of the plant. All of the wastewater goes to the lagoon/reservoir and eventually recycled back to the system when needed.

### 5.8.2 NEW CEMENT PLANT

Waste Material	Waste Management
<b>Construction Phase</b>	
Excavated materials for foundation of buildings and other structures	These materials can be used as fill materials in other parts of the project site. Those that cannot be used will be disposed in the spoils dumping area to be identified by the proponent and contractor.
Construction wastes (wood, metals, paper, plastics, waste construction materials)	Construction wastes will be hauled from the construction site and will be sold to recyclers whenever possible. Wastes that cannot be sold to recyclers will be disposed through the municipal solid waste disposal system.

Domestic wastes from the construction camp	Food wastes and other biodegradable wastes will be disposed in the compost pit. Compost may be supplied to nearby residents for use as fertilizer in vegetable gardens.
Office wastes from the construction office	Non-biodegradable wastes such as plastics, paper, boxes and cartons will be sold to recyclers. Residual wastes will be disposed through the municipal solid waste disposal system.
Used oils and grease trap waste	Used oils from engine and vehicle maintenance will be stored in drums and will be disposed through a DENR accredited hazardous waste treater.
Busted lamps, used batteries, empty paint containers, medical wastes, expired medicines	These wastes will be stored separately and will be disposed through a DENR accredited hazardous waste contractor in accordance with the guidelines of RA 6969.
<b>Operation Phase</b>	
Coal ash	Waste ash can be recycled and reused as alternative fuel in the kiln.
Domestic wastes from offices and accommodation areas	Food wastes and other biodegradable wastes will be disposed in the compost pit. Compost may be supplied to nearby residents and the new Republic AgroTerraces to be used as organic fertilizer in vegetable gardens.  Recyclable wastes such as plastics, paper, boxes and cartons will be donated to Brgy Dulumbayan for their extra monetary support. Residual wastes will be disposed internally by means of co-processing..
Industrial wastes such as used conveyor belts and barrels, damaged vehicle and equipment parts, etc.	These can be sold to recyclers or through accredited contractors that handle similar waste products.
Office wastes such as plastics, paper, empty toner and ink cartridges, damage office equipment such as computers, printers and peripherals	Paper, plastic wastes will be sold to recyclers while empty ink/cartridges will be returned to the manufacturer/supplier. Used or damaged office equipment can be traded in with the suppliers or disposed through accredited waste contractors.
Used oils and busted lamps	These wastes will be stored separately and will be disposed through a DENR accredited hazardous waste contractor in accordance with the guidelines of RA 6969.

During the operation phase of the clinkerization plant, the existing waste management measures in the place will be the ones to be implemented for the waste management of the project.

## 5.9 SAFETY MEASURES

The Proponent commits to the following safety and management measures:

- Construction will be in accordance with international practice standard and technical specifications and backed by rigorous quality control and quality assurance.
- Construction will be carried out by experienced contractors under strict technical supervision.
- Health and safety will be paramount during the project construction and high standards will be set out in the construction contracts and will be followed up closely by HSE team from contractor and RCBM. This is applicable for all of the construction areas as well as all zones, roads and communities where the project impacts.
- Structures will be designed in accordance with strict safety in terms of earthquakes, extreme flooding and other potentially hazardous geological events.
- All electro-mechanical equipment will have safety devices and controls to warn of potential operation problems.

### 5.9.1 CHEMICAL STORAGE

Proper chemical storage is as important to safety as proper chemical handling to avoid spills and unwanted chemical reaction among incompatible chemicals stored. The plant follows this guideline for a safe chemical storage:

- Chemicals should not be exposed to direct sunlight or localized heat
- Containers of corrosive chemicals should be stored in trays large enough to contain spillage or leakage
- Chemicals should be stored by reactive class (e.g., flammables with flammables, oxidizers with oxidizers)
- An incompatibility-compatibility guide should be available to indicate arrangement of chemicals
- Incompatible chemicals should be physically segregated from each other during storage; and
- Water-reactive chemicals should be kept in a cool, dry place

These guidelines were carried-out for storing the acids, caustics, corrosive, adsorbent, toxic and reagent materials used by the plant. **Annex C** provide the MSDS of the chemicals.

### 5.9.2 STOCKPILE STORAGE OF CEMENT

RCBM, being the proud makers of the country's best-quality cement and building materials, the primarily ingredient is a quality assured manufactured product. However, since cement is chemically easily reactive with water, it has to be stored, transported and handled carefully, to preserve its quality and avoid wastage.

The cement is stored in the cement storage silos. To maximize warehouse capacity, cement in bags can be packed and palletized and stored in the warehouse.

The following are the proper precaution for the cement stacking.

- Ensure to check that the area is free from other personnel and/or activities to prevent multiple tasks within the area
- Forklifts unload the palletized cement from the scissor lifts and stack them in the warehouse
- First In First Out must be observe by stacking the palletized cement by batch and by type of cement and/or packaging materials

Proper alignment of pallet must be observed to maximize the warehouse capacity. A maximum of two layers is allowed for the stacking due to safety purpose.

### 5.9.3 SECURITY, SAFETY, AND FIRE PROTECTION

The entire cement plant is protected from major security and safety issues. For safety concerns, only authorized personnel will be allowed access to the project site. And since the proposed project is within the existing pant, a "Safety First" policy is strictly followed. Appropriate personal protective equipment (PPE) will be required for all personnel inside the plant and safety orientation will be given to all personnel and contractors before being allowed to work on site.

The Teresa Plant has an Emergency Response Team to respond to any emergencies on site. The Plant also has a smoke detection and fire suppression system that activates in case of fire emergency.

An emergency alarm siren containing 3 short sirens and 1 long siren at the beginning of emergency will be heard as a sign for big fire cases. Designated evacuation areas are scattered inside the plant.

#### 5.9.4 EMERGENCY PREPAREDNESS, AND RESPONSE PLAN

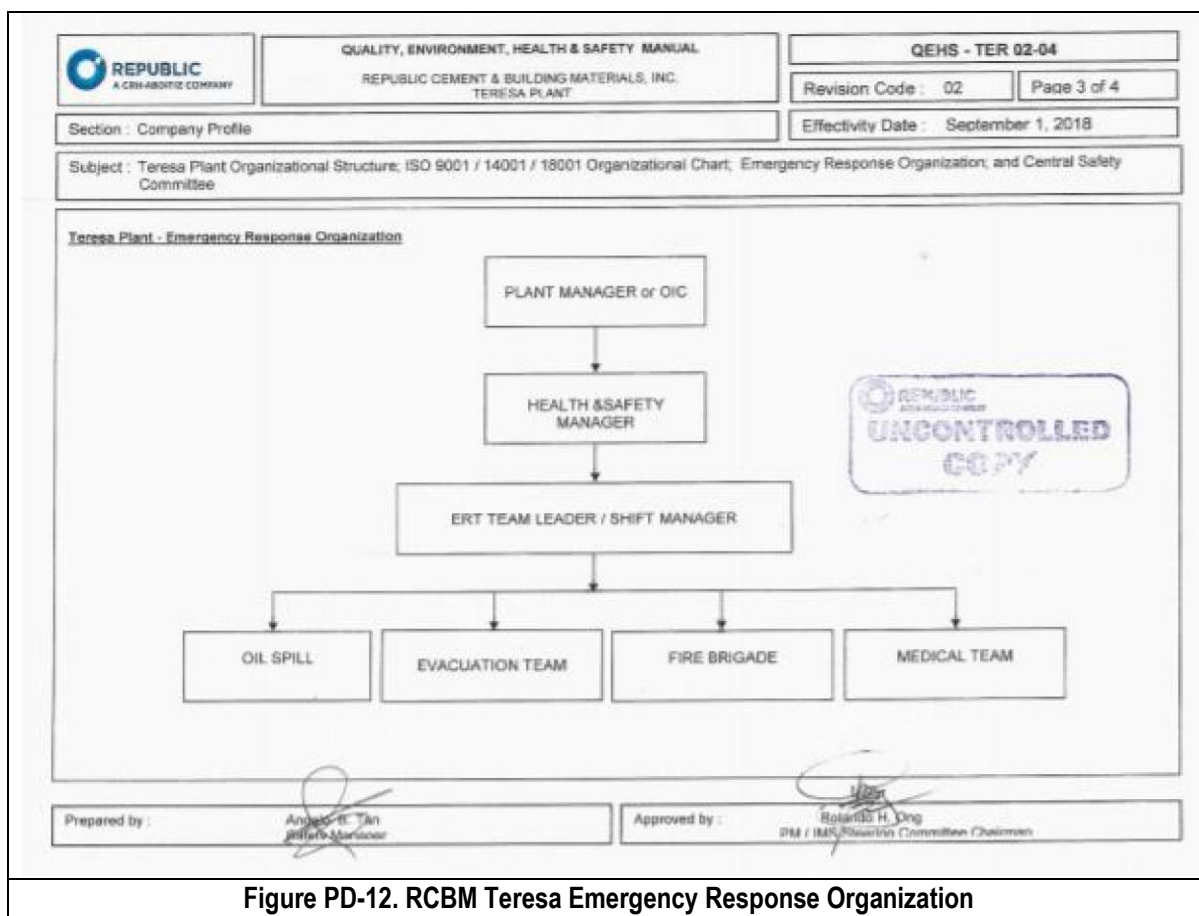
The purpose of the emergency response plan is to provide guidance during an emergency which promotes safety awareness and shows the proponent's commitment to the safety of workers.

RCBM has an existing emergency response plan which covers the whole plant including the proposed project with the objectives of:

- Providing accurate and planned action in an event of emergency;
- Allowing a concerted effort to take all the necessary actions and measures to minimize injury, death and damage, and recurrence of emergency.
- Extending necessary assistance and to address all aspects of real and potential situation that may be either on or off-site or both.

Emergency Response Team (ERT) personnel will then facilitate the safe and orderly implementation of the emergency procedures, including the evacuation of the workforce and visitors when appropriate. The emergency response team is a structured organization who takes command on the declaration of an emergency pending the arrival of fire brigade or other emergency service. These emergencies include safety incidents, fires, medical emergencies, natural disasters, oil spill, bomb threat and civil disturbance.

#### EMERGENCY CONTROL ORGANIZATION



**Figure PD-12. RCBM Teresa Emergency Response Organization**

Annex D shows the entire Emergency Response Plan of RCBM-Teresa Plant.

### 5.9.5 NEW INTEGRATED CEMENT PLANT

The proposed project is within the existing plant, thus the safety measures of the existing plant will also be used for the expansion.

## 6. PROJECT SIZE

The New Integrated Cement Plant project size summary is:

Total Project Area for the New Integrated Cement Plant	Within the existing 145-hectare area	
Total Production Capacity of New Integrated Cement Plant	5.0 Million Metric Tons per Year	
Cement Silo Capacity (2 units)	10,000 Metric Tons each	
Total Cement Production	5.0 Million Metric Tons per Year (MMTPY) with New Finish Mill	
	Cement Mill	Cement Production (MMTPY)
	Mill C	1.70 MMTPY
	Mill D	
	New Mill	2.63 MMTPY
	Total Cement Production	4.33 $\approx$ 5.0 MMTPY

## 7. DEVELOPMENT PLAN

### 7.1 PRE-CONSTRUCTION

During the pre-construction phase, basic and detailed engineering design will be prepared for the components, particularly the clinkerization plant. Procurement of these facilities and other materials will also be done during this phase. The pre-construction activities are:

- Additional engineering designs and optimizations of the feasibility study
- Preparation of construction contract documents for the main works
- Processing of the various permits and licenses
- Sourcing / stockpiling of construction materials

As for the co-processing facility, the following activities are to be taken:

- Conduct of the environmental assessment and the subsequent securing of an Amended Environmental Compliance Certificate for the operation of the proposed waste co-processing facility;
- Securing of different government permits and clearances; and,
- Continuous implementation of the project commitments to undertake activities related to IEC and community relation works



## 7.2 CONSTRUCTION

This phase will mainly see to the construction of the new plant.. Construction activities include:

- a) Setting up of temporary construction facilities such as storage areas, camps workshops, and sewage facilities, site medical facilities
- b) Social and environmental mitigation measures
- c) Construction materials processing
- d) Construction of the main structures
- e) Removal of construction infrastructure
- f) Commissioning of project components

As for the co-processing facility, no major construction works shall be undertaken for this project. Some auxiliary equipment/machineries related to the feeding system for AFR is already in place. Those that will be installed will require simple assembly and civil works.

## 7.3 OPERATION

This phase involves the operation and maintenance of the new integrated cement plant. The main activities during the operation phase are listed below;

- a) Grinding/milling
- b) Storage
- c) Packing and dispatch

As for the co-processing facility, this phase will involve the full utilization using both AFR and Non-AFRs. It will also involve compliance reporting and monitoring to EMB-DENR especially those ECC conditionalities that would require periodic monitoring and feedback reporting to EMB-DENR regional office. Furthermore, the facility will operate within meets and bounds of applicable and pertinent environmental regulatory requirements and protocols.

The rest of the plant will operate in the manner described in **Section 5** of this report.

## 7.4 ABANDONMENT

A detailed decommissioning or abandonment plan will be prepared in the unlikely event that the cement plant is no longer viable to operate and maintain. The plan will specify studies to be undertaken such as site assessment and remediation activity if the site is considered contaminated, the equipment to be recovered or disposed and alternatively and use of the abandoned area. Also, the proponent would be responsible for environmental protection, mitigating measures would be implemented.

In compliance with DAO 2010-21, RCBM Teresa Plant has submitted a Final Mine Rehabilitation and Decommissioning Plan (**Annex E**). The FMRDP will address the rehabilitation of disturbed areas not covered by progressive rehabilitation. Suitable endemic/indigenous forest trees will be planted to promote biodiversity conservation and species diversity to encourage wildlife species of different forms to resettle and inhabit the area, and in order to regain the aesthetic and landscape value of the surrounding.

In consideration to co-processing facility, hazardous AFRs and non-AFRs will be fully consumed prior to abandonment of the facility while other waste materials that are not hazardous in nature will be recycled and sold to interested buyers. On the other hand, residual wastes will be dumped landfill for non-hazardous waste while those hazardous will be treated by third party waste treaters.

## 8. MANPOWER REQUIREMENT

Manpower requirement during construction will be handled by a Contractor(s) with an estimated number of 500 workers hired from the community where possible (except for certain specialists). During operations, RCBM Teresa will tap its existing manpower.

Most of the workers of RCBM Teresa, including workers of its contractors, come from the Province of Rizal.

Nature of Job	Expertise/Skills Needed	Manpower Requirements
<b>Engineering</b>	With degree in Engineering and industry experience	~ 10
<b>Construction</b>	Skilled worker	~ 500
<b>Operation</b>	Tap its existing manpower	~
<b>Maintenance</b>	With degree in Engineering and industry experience	~ 10

## 9. INDICATIVE PROJECT COST

The indicative project investment cost is approximately Php 16,678,040,000.00.

# ***Annex A***

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## SEC Certificate of Filing of Articles & Plan of Merger



REPUBLIC OF THE PHILIPPINES  
**SECURITIES AND EXCHANGE COMMISSION**  
SEC Building, EDSA, Greenhills  
City of Mandaluyong, Metro Manila

**CERTIFICATE OF FILING OF THE**  
**ARTICLES AND PLAN OF MERGER**

**KNOW ALL PERSONS BY THESE PRESENTS:**

**THIS IS TO CERTIFY** that the Articles and Plan of Merger executed on May 30, 2007 by and among:

**REPUBLIC CEMENT CORPORATION**  
(Surviving Corporation)

*and*

**FORTUNE CEMENT CORPORATION**  
**FR CEMENT CORPORATION**  
**LLOYDS RICHFIELD INDUSTRIAL CORPORATION**  
( Absorbed Corporation )

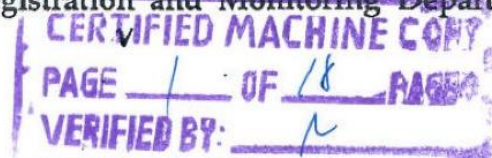
copy annexed, approved by a majority vote of the Board of Directors on April 18, 2007 and by the vote of the Stockholders owning or representing at least two-thirds of the outstanding capital stock of constituent corporations on May 30, 2007 signed by the Presidents certified by their respective Corporate Secretaries, whereby the entire assets and liabilities of **FORTUNE CEMENT CORPORATION, FR CEMENT CORPORATION and LLOYDS RICHFIELD INDUSTRIAL CORPORATION** will be transferred to and absorbed by **REPUBLIC CEMENT CORPORATION** was approved by this Office on this date pursuant to the provisions of Sections 76 to 80 of the Corporation Code of the Philippines, Batas Pambansa Blg. 68, approved on May 1, 1980, and attached to the other papers pertaining to said corporations.

**IN WITNESS WHEREOF**, I have hereunto set my hand and caused the seal of this Commission to be affixed at Mandaluyong City, Metro Manila, Philippines, this 31st day of July, Two-Thousand Seven.

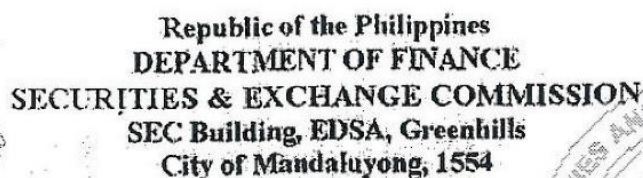
Date: 17-10-2008 Time: 4:1:57 PM

  
**BENITO A. CATARAN**  
Director

Company Registration and Monitoring Department







8/6/5/07

# PAYMENT ASSESSMENT FORM

No. 05312007-987633

DATE 05/31/2007	RESPONSIBILITY CENTER (DEPARTMENT) CRMD
PAYOR: REPUBLIC CEMENT CORPORATION MAKATI CITY	

NATURE OF COLLECTION	ACCOUNT CODE	AMOUNT
LRF (A0823)	131	210,721.94
AMENDED ARTICLES	606	500.00
REQUEST FOR EXEMPTION	606	21,071,194.05
Margor		
TOTAL AMOUNT TO BE PAID		Php 21,282,415.99

Assessed by  
BLESS

OR# 0064819 May 31, 2007 03:32PM SEC No: null  
08wpcdeasls PHP 21,282,415.99 \*\*\*\*\*

**Machine Validation:**

9803 MERGER 20070601-151  
AAI 20070718-137  
JCS 20070601-152

31285 MERGER 20070601-153

142468 11 17-2007-01-154

174 241 H 20070601-155

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# RECORDS

User Name: lafargel

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PAGE 2 OF 18 PAGES

VERIFIED BY: 4



# COVER SHEET

Atty. Fuen  
Ms. Bless  
5/31

9 8 0 3  
S.E.C. Registration Number

REPUBLIC  
CEMENT  
CORPORATION

(Company's Full Name)

18<sup>th</sup> Fir. P B C o M T o w e r 6 7 9 5 A y a l a  
A v e . c o r n e r R u f i n o S t . M a k a t i

(Business Address : No. Street City / Town / Province)

Atty. Angela D. Edralin

Contact Person

(632) 819-5506 to 15

## Increase in Authorized Capital Stock

1 2 3 1  
Month Day  
Fiscal Year

FORM TYPE

Month Year  
Annual Meeting

Period Ended

Dept. Requiring this Doc.

Amended Articles Number/Section

Total Amount of Borrowings

Total No. of Stockholders

Domestic

Foreign

To be accomplished by SEC Personnel concerned

File Number

LCU

Document I.D.

Date: 17-10-2008 Time: 4:2:0 PM

Cashier

www.sec.gov.ph STAMPS

OK FOR PAYMENT

User Name: lafargel

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PAGE 3 OF 18 PAGES  
VERIFIED BY: 1



## ARTICLES OF MERGER

REPUBLIC CEMENT CORPORATION  
FORTUNE CEMENT CORPORATION  
FR CEMENT CORPORATION

and

LLOYDS RICHFIELD INDUSTRIAL CORPORATION



KNOW ALL MEN BY THESE PRESENTS:

Pursuant to and in compliance with B.P. Blg. 68, otherwise known as the Corporation Code of the Philippines, Republic Cement Corporation ("Republic"), Fortune Cement Corporation ("Fortune"), FR Cement Corporation ("FRCC") and Lloyds Richfield Industrial Corporation ("LRIC") [collectively, the "Companies"], being the constituent corporations to the merger, hereby adopt and execute these Articles of Merger.

I

In the manner prescribed by Sections 76 and 77 of the Corporation Code, at least 2/3 of the stockholders and a majority of the members of the Board of Directors of Republic, Fortune, FRCC and LRIC, approved the Plan of Merger (attached to these duly certified Articles of Merger) in the Special Meeting of the Board of Directors held separately on April 18, 2007 and of the Stockholders of the constituent Companies held separately on May 30, 2007. The Plan of Merger is attached hereto and made an integral part hereof.

II

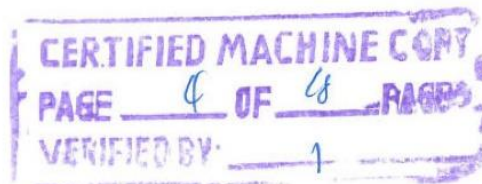
The aggregate number of outstanding shares as of May 30, 2007, the date of the Meeting of the Stockholders of the constituent Companies are set forth below:

Name of Corporation	No. of Subscribed and Outstanding Shares
Republic Cement Corporation	5,786,561,061 common shares (par value PhP1.00 each)  130 redeemable preferred shares (par value PhP100.00 each)
Fortune Cement Corporation	3,752,353,577 common shares (par value PhP1.00 each)  31,158,500 redeemable preferred shares (par value PhP1.00 each)
FR Cement Corporation	20,000,000 common shares (par value PhP100.00 each)  7,143,333 redeemable preferred shares (par value PhP100.00 each)
Lloyds Richfield Industrial Corporation	10,000,000 common shares (par value PhP100.00 each)

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Corporation	Shares Voting for	%	Shares Voting Against	Date of Stockholders' Meeting
Republic Cement Corporation	5,393,293,085 common	93.20	None	May 30, 2007
Fortune Cement Corporation	3,723,921,936 common 31,158,500 preferred	99.25	None	May 30, 2007
FR Cement Corporation	19,691,000 common 7,143,333 preferred	98.86	None	May 30, 2007
Lloyds Richfield Industrial Corporation	10,000,000 common	100	None	May 30, 2007

There were no shares voting against the merger among the constituent Companies.

IN WITNESS WHEREOF, we have hereunto affixed our respective signatures on May 30, 2007, at Makati City, Philippines.

Republic Cement Corporation


By:

  
 John Reinier H. Dizon  
 President  
 TIN: 162-410-949

  
 Ruby Sarah S. Nitorreda  
 Corporate Secretary  
 TIN: 134-517-296

Fortune Cement Corporation


By:

  
 Renato C. Sunico  
 President  
 TIN: 100-218-015

  
 Ruby Sarah S. Nitorreda  
 Corporate Secretary  
 TIN: 134-517-296

FR Cement Corporation  
 Lloyds Richfield Industrial Corporation

By:

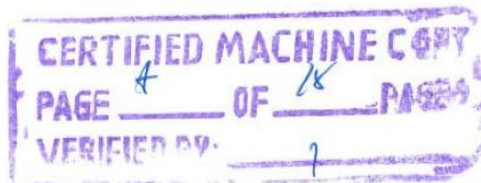
  
 Cirilo M. Pestano II  
 President  
 TIN: 104-732-789

  
 Angela D. Edralin  
 Corporate Secretary  
 TIN: 198-659-470

Date: 17-10-2007 Time: 4:2:2 PM

www.sec.gov.ph

User Name: lafargel





SIGNED IN THE PRESENCE OF

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES )  
Makati City ) S.S.

BEFORE ME, a Notary Public for and in Makati City, this April 25, 2007, personally appeared the following:

Name	Community Tax Certificate No.	Date/Place Issued
John Reinier H. Dizon [for and on behalf of Republic Cement Corporation]	15101976	January 5, 2007/Makati
Renato C. Sunico [for and on behalf of Fortune Cement Corporation]	08469402	January 22, 2007/San Juan
Ruby Sarah S. Nitorreda [for and on behalf of Republic Cement Corporation and Fortune Cement Corporation]	17684579	February 7, 2007/Makati
Cirilo M. Pestano II [for and on behalf of FR Cement Corporation and Lloyds Richfield Industrial Corporation]	17684322	February 5, 2007/Makati
Angela D. Edralin [for and on behalf of FR Cement Corporation and Lloyds Richfield Industrial Corporation]	17689330	February 7, 2007/Makati

all known to me and to me known to be the same persons who executed the foregoing instrument and they acknowledged before me that the same is their free and voluntary act and deed and the free and voluntary act and deed of the corporations represented herein.

WITNESS MY HAND AND SEAL at the date and at the place first above written.

Doc. No. 108  
Page No. 23  
Book No. XXVII  
Series of 2007. 20

Date: 17-10-2008 1:14 PM

ATTY. GERVASCIO B. ORTIZ JR.  
NOTARY PUBLIC  
UNTIL DECEMBER 31/2007  
PTR NO. 0017551  
APPT. M-64/2007 TO 2008  
IBP NO. C56155 - LIFETIME MEMBER  
ROLI NO 40097

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PAGE 6 OF 11 PAGES  
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PLAN OF MERGER

KNOW ALL MEN BY THESE PRESENTS:

This Plan of Merger, made and executed this 30<sup>th</sup> day of May 2007, by and among:

9803 — **REPUBLIC CEMENT CORPORATION** ("REPUBLIC"), a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines with principal office at the 18<sup>th</sup> Floor, PBCom Tower, 6795 Ayala Avenue, Makati City, Metro Manila, Philippines;

31285 — **FORTUNE CEMENT CORPORATION** ("FORTUNE"), a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines with principal office at the 18<sup>th</sup> Floor, PBCom Tower, 6795 Ayala Avenue, Makati City, Metro Manila, Philippines;

142468 — **FR CEMENT CORPORATION** ("FRCC"), a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines with principal office at Brgy. Dulumbayan, Teresa, Rizal, Philippines;

and

174241 — **LLOYDS RICHFIELD INDUSTRIAL CORPORATION** ("LRIC"), a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines with principal office at Bo. Dungo-an, Danao City, Cebu;

(collectively, the "Companies")

**WITNESS That:**

WHEREAS, to simplify the organization and legal structure and promote significant cost efficiency improvements, such as allowing effective sharing of spare equipment, machinery and materials, having a single statutory audit and reportorial requirements, and improving customer service as a unified group with a common identity for marketing and other purposes, the Companies have determined that it is to their best interest to merge into one corporation and that such merger will be mutually advantageous and will redound to the advantage and welfare of REPUBLIC, FORTUNE, FRCC and LRIC and their respective shareholders.

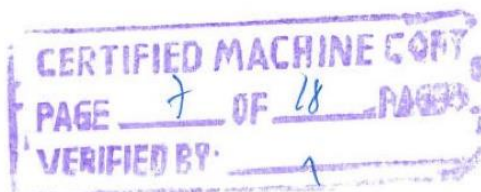
NOW, THEREFORE, the parties hereby set forth and agree on the following plan of merger, to wit:

Date: 17-10-2008 Time: 4:2:5 PM  
ARTICLE I  
AGREEMENT TO MERGE

- 1.1 Merger of REPUBLIC, FORTUNE, FRCC and LRIC. – Subject to the approval by the Securities and Exchange Commission of the merger of REPUBLIC,

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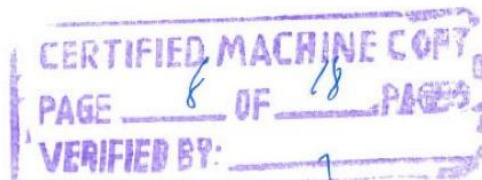


FORTUNE, FRCC and LRIC, CONTINENTAL, the Companies shall be deemed merged into REPUBLIC pursuant to B.P. Blg. 68, otherwise known as the Corporation Code of the Philippines (the "Corporation Code") as of January 31, 2007 (the "Cut-Off Date of Merger") in accordance with the terms and conditions set forth under this Plan.

1.2 Effects of Merger. - Upon approval by the Securities and Exchange Commission of the merger of REPUBLIC, FORTUNE, FRCC and LRIC (the "Effective Date of the Merger"):

- (a) REPUBLIC shall be the surviving corporation (the "Merged Entity") and the separate corporate existence of FORTUNE, FRCC and LRIC shall cease. The name of the surviving corporation shall be "Republic Cement Corporation".
- (b) REPUBLIC shall continue to possess all the rights, privileges, immunities and powers it currently possesses, and shall be subject to all the duties and liabilities as a corporation organized under the Corporation Code.
- (c) All the rights, privileges and powers of FORTUNE, FRCC and LRIC arising out of its government licenses, permits, and registrations as well as all the properties, real or personal, of FORTUNE, FRCC and LRIC, its contractual and property rights, claims, bank deposits, and every asset, right or interest belonging to or due to FORTUNE, FRCC and LRIC as of the Cut-Off Date of Merger shall be, as they are taken by, conveyed, assigned, transferred to and vested in REPUBLIC, without need of further act or deed, by operation of law pursuant to Section 80(4) of the Corporation Code.
- (d) Any liability and obligation falling due from FORTUNE, FRCC and LRIC as of the Cut-Off Date of Merger shall be, as they are hereby, assigned and transferred to and assumed by REPUBLIC, as the surviving corporation. REPUBLIC shall be liable for all such liabilities and obligations of FORTUNE, FRCC and LRIC in the same manner as if REPUBLIC had itself incurred such liabilities and obligations, and any pending claim, action or proceeding brought by or against FORTUNE, FRCC and LRIC may be prosecuted by or against REPUBLIC. The rights of creditors or liens upon the property of FORTUNE, FRCC and LRIC shall not be impaired by the merger; provided, that REPUBLIC shall have the right to exercise all defenses, rights, privileges, set-offs and counterclaims of every kind and nature which FORTUNE, FRCC and LRIC may have or may invoke under existing laws.

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**ARTICLE II**

**CONVERSION OF FORTUNE AND FRCC SHARES INTO REPUBLIC SHARES**

- 2.1 Capital Structure of REPUBLIC. As of the date hereof, REPUBLIC has an authorized capital stock amounting to Eight Billion Pesos (Php8,000,000,000.00), consisting of Seven Million (7,999,978,500) common shares, with a par value of Php1.00 per share and Two Hundred Fifteen (215) redeemable preferred shares, with a par value of Php100.00 per share. As of the date hereof, REPUBLIC has an issued and outstanding capital stock of Five Billion Seven Hundred Eighty Six Million Five Hundred Seventy Four Thousand Sixty One (Php5,786,574,061.00) consisting of Five Billion Seven Hundred Eighty Six Million Five Hundred Sixty One Thousand Sixty One (5,786,561,061) common shares and One Hundred Thirty (130) redeemable preferred shares.
- 2.2 Capital Structure of FORTUNE. As of the date hereof, FORTUNE has an authorized capital stock amounting to Four Billion Two Hundred Thirty Two Million Pesos (Php4,232,000,000.00), consisting of Four Billion Two Hundred Million (4,200,000,000) common shares and Thirty Two Million (32,000,000) preferred shares, both classes of share with a par value of Php1.00 per share. As of the date hereof, FORTUNE has an issued and outstanding capital stock amounting to Three Billion Seven Hundred Eighty Three Million Five Hundred Twelve Thousand Seventy Seven Pesos (Php3,783,512,077.00) consisting of Three Billion Seven Hundred Fifty Two Million Three Hundred Fifty Three Thousand Five Hundred Seventy Seven (3,752,353,577) common shares and Thirty One Million One Hundred Fifty Eight Thousand Five Hundred (31,158,500) preferred shares.
- 2.3 Capital Structure of FRCC. As of the date hereof, FRCC has an authorized capital stock amounting to Two Billion Seven Hundred Fifteen Million Pesos (Php2,715,000,000.00), consisting of Twenty Million (20,000,000) common shares and Seven Million One Hundred Fifty Thousand (7,150,000) preferred shares, both classes of share with a par value of Php100.00 per share. As of the date hereof, FRCC has an issued and outstanding capital stock amounting to Two Billion Seven Hundred Fourteen Million Three Hundred Thirty Three Thousand Three Hundred Pesos (Php2,714,333,300.00) consisting of Twenty Million (20,000,000) common shares and Seven Million One Hundred Forty Three Thousand Three Hundred Thirty Three (7,143,333) preferred shares.
- 2.4 Capital Structure of LRIC. As of the date hereof, LRIC has an authorized capital stock amounting to Three Billion Pesos (Php3,000,000,000.00), consisting of Thirty Million (30,000,000) common shares, with a par value of Php100.00 per share. As of the date hereof, LRIC has an issued and outstanding capital stock amounting to One Billion Pesos (Php1,000,000,000.00) consisting of Ten Million (10,000,000) common shares.



2.5 Exchange of FORTUNE and FRCC Shares for REPUBLIC Shares -

Pursuant to the Merger, REPUBLIC shall issue to each FORTUNE minority shareholders 0.89 common shares for each FORTUNE share and 38.63 common shares for each FRCC shares, whether common or preferred held, provided that resulting fractional shares will be rounded down and will not be issued. REPUBLIC will not issue new shares to itself for its shares in FORTUNE, FRCC and LRIC.

Accordingly, REPUBLIC shall issue approximately 11,936,670 REPUBLIC common shares to FRCC's minority shareholder and approximately 25,304,160 REPUBLIC common shares to FORTUNE's minority shareholders from the proposed increase in capital stock from PhP8 billion, divided into 7,999,978,500 common shares and 215 redeemable preferred shares, both classes of shares having a par value of PhP1.00 per share to PhP8.05 billion, divided into 8,049,978,500 common shares and 215 redeemable preferred shares, both classes of shares having a par value of PhP1.00 per share on or after the Effective Date of the Merger, after complying with the requirements of the SEC.

**ARTICLE III  
ARTICLES AND BY-LAWS OF MERGED ENTITY**

- 3.1 Articles of Incorporation - The Articles of Incorporation of the Merged Entity shall be the Articles of Incorporation of REPUBLIC.
- 3.2 By-Laws. The By-Laws of the Merged Entity shall be the By-Laws of REPUBLIC.

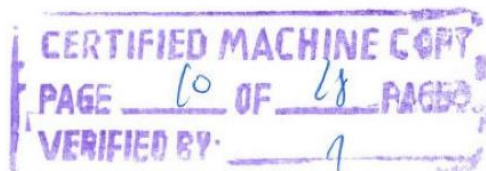
**ARTICLE IV  
PRINCIPAL OFFICE  
BOARD OF DIRECTORS AND OFFICERS  
OF MERGED ENTITY**

- 4.1 The principal office of REPUBLIC shall continue to be located in Metro Manila.
- 4.2 The directors and officers of REPUBLIC, the surviving corporation, shall upon the approval of the merger by the Securities and Exchange Commission, be the same as the directors and officers holding office immediately prior to the merger. Such directors and officers, however, may be changed as the stockholders and/or Board of Directors of REPUBLIC, as the surviving corporation, shall determine in accordance with law.

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**ARTICLE V  
APPROVAL OF BOARD OF DIRECTORS  
AND STOCKHOLDERS**

- 5.1 Approval of Merger. This plan has been approved by the stockholders representing at least 2/3 of the outstanding capital stock and by at least majority vote of the Board of Directors of REPUBLIC, FORTUNE, FRCC and LRIC at the respective Stockholders Meetings of REPUBLIC, FORTUNE, FRCC and LRIC held on May 30, 2007, and at the Special Meetings of the respective Boards of Directors of REPUBLIC, FORTUNE, FRCC and LRIC held on April 18, 2007. REPUBLIC, FORTUNE, FRCC and LRIC agree to cooperate in carrying out the provisions of this Plan to the end that upon the approval of the merger this Plan, may be duly consummated.

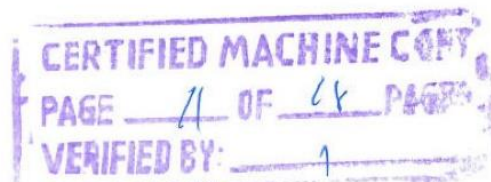
**ARTICLE VI  
MISCELLANEOUS**

- 6.1 Amendment. REPUBLIC, FORTUNE, FRCC and LRIC, by a majority vote of their respective board of directors, may amend, modify, or supplement this plan of merger in such manner as may be agreed upon by them in writing at any time before or after approval thereof by their respective stockholders as and when required by the regulatory agencies; provided, however, that no such amendment, modification or supplement after approval of this plan of merger by the stockholders of both shall substantially change the terms of merger.
- 6.2 Further Assurances. Each of REPUBLIC, FORTUNE, FRCC and LRIC has agreed to, from time to time, execute and deliver such other and further instruments and take all such other action as may be necessary or appropriate to more effectively effectuate the Merger.

Date: 17-10-2008 Time: 4:2:10 PM

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IN WITNESS WHEREOF, the undersigned corporations have caused their respective duly authorized representatives to sign this Plan of Merger on the 30<sup>th</sup> day of May 2007 at Makati City, Philippines.

**REPUBLIC CEMENT CORPORATION**


By:

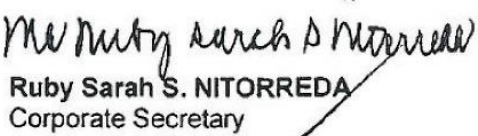
  
**John Reinier H. DIZON**  
President

  
**Ruby Sarah S. NITORREDA**  
Corporate Secretary

**FORTUNE CEMENT CORPORATION**

By:

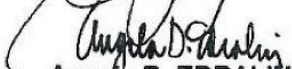
  
**Renato C. SUNICO**  
President

  
**Ruby Sarah S. NITORREDA**  
Corporate Secretary

**FR CEMENT CORPORATION**

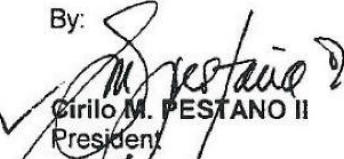
By:

  
**Cirilo M. PESTANO II**  
President

  
**Angela D. EDRALIN**  
Corporate Secretary

**LLOYDS RICHFIELD  
INDUSTRIAL CORPORATION**

By:

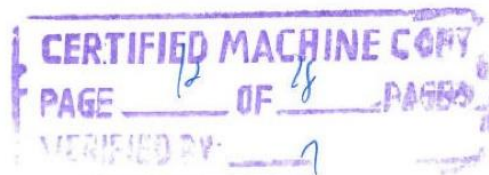
  
**Cirilo M. PESTANO II**  
President

  
**Angela D. EDRALIN**  
Corporate Secretary

Date: 17-10-2009 4:2:11 PM

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User Name: lafargel



SIGNED IN THE PRESENCE OF

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES )  
Makati City ) S.S.

BEFORE ME, a Notary Public for and in Makati City, this MAY 30 2007,  
personally appeared the following:

Name	Community Tax Certificate No.	Date/Place Issued
<b>John Reinier H. Dizon</b> [for and on behalf of Republic Cement Corporation]	<b>15101976</b>	<b>January 5, 2007/Makati</b>
<b>Renato C. Sunico</b> [for and on behalf of Fortune Cement Corporation]	<b>08469402</b>	<b>January 22, 2007/San Juan</b>
<b>Ruby Sarah S. Nitorreda</b> [for and on behalf of Republic Cement Corporation and Fortune Cement Corporation]	<b>17684579</b>	<b>February 7, 2007/Makati</b>
<b>Cirilo M. Pestano II</b> [for and on behalf of FR Cement Corporation and Lloyds Richfield Industrial Corporation]	<b>17684322</b>	<b>February 5, 2007/Makati</b>
<b>Angela D. Edralin</b> [for and on behalf of FR Cement Corporation and Lloyds Richfield Industrial Corporation]	<b>17689330</b>	<b>February 7, 2007/Makati</b>

all known to me and to me known to be the same persons who executed the foregoing instrument and they acknowledged before me that the same is their free and voluntary act and deed and the free and voluntary act and deed of the corporations represented herein.

WITNESS MY HAND AND SEAL at the date and at the place first above written.

Doc. No. 114  
Page No. 24  
Book No. XXVII  
Series of 2007.

Date: 17-10-2008 Time: 4:2:12 PM

**ATTY. GERVACIO B. ORTIZ JR.**  
NOTARY PUBLIC  
UNTIL DECEMBER 31/2007  
PTE NO. 0017551  
APPL. M-64/2007 TO 2008  
IBP NO. 85655 - LIFETIME MEMBER  
REL NO 40097

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SECRETS AND EXCHANGE COMMISSION

TIFICATION

g first duly sworn, deposes and states that

REPUBLIC CEMENT CORPORATION ("RCC") and FR CEMENT CORPORATION ("FRC") are referred to as the "Constituent Companies" of the laws of the Republic of the Philippines. The Salcedo Tower, 169 H.V. I

She is the duly elected Treasurer of **REPUBLIC CEMENT CORPORATION ("RCC")**, **FORTUNE CEMENT CORPORATION ("FCC")** and **FR CEMENT CORPORATION ("FRCC")** (hereinafter, collectively referred to as the "Constituent Companies") duly organized and existing under and by virtue of the laws of the Republic of the Philippines, with mailing address at the 25<sup>th</sup> Floor, The Salcedo Tower, 169 H.V. Dela Costa St., Salcedo Village, Makati City, Metro Manila;

The parties to the merger have also caused the publication on May 28, 2007 of the Notice of Merger in The Manila Times. Attached as Annex "A" is a copy of the Affidavit of Publication issued by Ms. Alice Pacis, the Accounting Supervisor of The Manila Times attesting to the foregoing.

This Certification is being issued in support of the application with the Securities and Exchange Commission for approval of the merger among RCC, FCC, FRCC and LRIC.

  
MARY MARGARET SAN PEDRO  
Treasurer

SUBSCRIBED AND SWORN to before me this JUN 08 2007 affiant exhibited to me her Community Tax Certificate No. 12626840 issued at the City of Makati, Metro Manila on January 15, 2007.

www.segacorp.ph

User Name: lafarge1  
ATTY: JEFFREY LOZADA

**PTR. NO.** 007 **SRAM CITY**

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PAGE 48 OF 48 PAGES  
VERIFIED BY: 7

**CERTIFICATION**

**JOCELYN B. SARMIENTO**, being first duly sworn, deposes and states that:

She is the duly elected Treasurer of **LLOYDS RICHFIELD INDUSTRIAL CORPORATION ("LRIC")**, a corporation duly organized and existing under and by virtue of the laws of the Republic of the Philippines, with mailing address at the 25<sup>th</sup> Floor, The Salcedo Tower, 169 H.V. Dela Costa St., Salcedo Village, Makati City, Metro Manila;

In connection with the application for the approval of the merger among Republic Cement Corporation ("RCC"), Fortune Cement Corporation ("FCC"), FR Cement Corporation ("FRCC") and LRIC, LRIC has sent notices by facsimile, courier or by registered mail to its trade suppliers and creditors as of January 31, 2007 at their addresses as appearing in our records, where available, advising them of the proposed merger between RCC, FCC, FRCC and LRIC.

The parties to the merger have also caused the publication on May 28, 2007 of the Notice of Merger in The Manila Times. Attached as Annex "A" is a copy of the Affidavit of Publication issued by Ms. Alice Pacis, the Accounting Supervisor of The Manila Times attesting to the foregoing.

In any event, said creditors are adequately protected inasmuch as under the terms of the Plan of Merger, any and all obligations falling due from FCC, FRCC and LRIC as of January 31, 2007 shall be assigned, transferred to and assumed by RCC as the surviving corporation. RCC shall be liable for all liabilities and obligations of FCC, FRCC and LRIC in the same manner as if RCC had itself incurred such liabilities and obligations, and any pending claim, action or proceeding brought by or against FCC, FRCC and LRIC may be prosecuted by or against RCC.

This Certification is being issued in support of the application with the Securities and Exchange Commission for approval of the merger among RCC, FCC, FRCC and LRIC.

IN WITNESS WHEREOF he has hereunto affixed her signature at the City of Makati, Metro Manila, this July 16, 2007.

*Ms. Sarmiento*  
**JOCELYN B. SARMIENTO**  
Treasurer

REPUBLIC OF THE PHILIPPINES)  
MAKATI CITY, METRO MANILA ) S.S.

SUBSCRIBED AND SWORN to before me this JUN 08 2007, affiant exhibited to me her Community Tax Certificate No. 12626841 issued at the City of Makati, Metro Manila on January 15, 2007.

Doc. No. 188 :  
Page No. 18 :  
Book No. XVI :  
Series of 2007.

*Atty. Levon*  
**ATTY. LEVON LOPEZ LOZADA**

User Name: lafargel  
UNTIL: JUN 08 2007

**PTR. NO. 026792417 (MAKATI CITY)**  
**TIN NO. 166-810-224**

**CERTIFIED MACHINE COPY**  
PAGE 18 OF 18  
VERIFIED BY: 1



## SECRETARY'S CERTIFICATE

**RUBY SARAH S. NITORREDA**, being first duly sworn, deposes and states that:

She is the duly elected Corporate Secretary of **FORTUNE CEMENT CORPORATION** (the "Corporation") duly organized and existing under and by virtue of the laws of the Republic of the Philippines and domiciled in the City of Makati, and as such Corporate Secretary, she has custody of the corporate records of said Corporation;

That the Corporation has an authorized capital stock of Four Billion Two Hundred Thirty Two Million Pesos (P4,232,000,000.00), divided into Four Billion Two Hundred Million (4,200,000,000) common shares, with a par value of One Peso (P1.00) per share and Thirty Two Million (32,000,000) preferred shares, with a par value of One Peso (P1.00) per share.

Based on the records in her custody, as of date hereof, the Corporation has a total issued and outstanding capital of Three Billion Seven Hundred Eighty Three Million Five Hundred Twelve Thousand Seventy Seven Pesos (PhP3,783,512,077.00), consisting of Three Billion Seven Hundred Fifty Two Million Three Hundred Fifty Three Thousand Five Hundred Seventy Seven (3,752,353,577) common shares and Thirty One Million One Hundred Fifty Eight Thousand Five Hundred (31,158,500) preferred shares, both classes of shares having a par value of One Peso (PhP1.00) per share.

As of June 30, 2007, the stockholders of the Corporation are as follows:

Stockholder	Nationality	Class	No. of Shares	%age
Republic Cement Corporation	Filipino	Common	3,723,921,936	
		Preferred	31,158,500	99.24%
Minority Shareholders	Filipino	Common	21,983,809	0.59%
	Foreign	Common	6,447,832	0.17%
Total Issued and Outstanding Shares		Common	3,752,353,577	
		Preferred	31,158,500	

28,431,641

This Certification is being issued in support of the Corporation's application with the Securities and Exchange Commission for the merger of Republic Cement Corporation, Fortune Cement Corporation, FR Cement Corporation and Lloyds Richfield Industrial Corporation.

IN WITNESS WHEREOF she has hereunto affixed her signature at the City of Makati, Metro Manila, this 18 JUL 2007.

*Ruby Sarah S. Nitorreda*  
**RUBY SARAH S. NITORREDA**  
Corporate Secretary

REPUBLIC OF THE PHILIPPINES)  
METRO MANILA (MANILA) S.S.

SUBSCRIBED AND SWORN to before me, this 18 JUL 2007 Time 4:10 PM, affiant exhibited to me her Community Tax Certificate No. 17684579 issued in the City of Makati, Metro Manila on February 7, 2007.

Doc. No. 146  
Page No. 20  
Book No. 117  
Series of 2007.

www.sec.gov.ph

**JOSE E. GORDOLA**  
NOTARY PUBLIC  
COMMISSION NO. 130 (2006-2007) UNTIL DEC. 31, 2007  
ROLL OF ATTORNEY NO. 25103  
S.P. NO. 645194 (LY 2006-2007) B. 1 CHAPT  
OF NO. 3480422, JAN. 08, 2007 BUEZON OF

**CERTIFIED MACHINE COPY**  
PAGE 16 OF 18 PAGES  
VERIFIED BY 1

# SECRETARY'S CERTIFICATE

ANGELA D. EDRALIN, being first duly sworn, deposes and states that:

She is the duly elected Corporate Secretary of **FR CEMENT CORPORATION** (the "Corporation") duly organized and existing under and by virtue of the laws of the Republic of the Philippines and domiciled in Brgy. Dulumbayan, Teresa, Rizal, and as such Corporate Secretary, she has custody of the corporate records of said Corporation;

That the Corporation has an authorized capital stock of Two Billion Seven Hundred Fifteen Million Pesos (PhP2,715,000,000.00), divided into Twenty Million (20,000,000) common shares and Seven Million One Hundred Fifty Thousand (7,150,000) redeemable preferred shares, both classes of shares having a par value of One Hundred Pesos (PhP100.00) per share.

Based on the records in her custody, as of date hereof, the Corporation has a total issued and outstanding capital of Two Billion Seven Hundred Fourteen Million Three Hundred Thirty Three Thousand Three Hundred (PhP2,714,333,300.00), consisting of Twenty Million (20,000,000) common shares and Seven Million One Hundred Forty Three Thousand Three Hundred Thirty Three (7,143,333) redeemable preferred shares, both classes of shares having a par value of One Hundred Pesos (PhP100.00) per share.

As of the date of this Certification, the stockholders of the Corporation are as follows:

Stockholder	Nationality	Class	No. of Shares	%age
Republic Cement Corporation	Filipino	Common	19,690,996	
		Preferred	7,143,333	98.86
FRC Holdings, Inc.	Filipino	Common	309,000	1.14
Paul Benedict M. Abastillas	Filipino	Common	1	
John Reinier H. Dizon	Filipino	Common	1	
Cirilo M. Pestano II	Filipino	Common	1	
Renato C. Sunico	Filipino	Common	1	

This Certification is being issued in support of the Corporation's application with the Securities and Exchange Commission for the merger of Republic Cement Corporation, Fortune Cement Corporation, FR Cement Corporation and Lloyds Richfield Industrial Corporation.

IN WITNESS WHEREOF she has hereunto affixed her signature at the City of Makati, Metro Manila, this 16 JUL 2007

*Angela D. Edralin*  
ANGELA D. EDRALIN  
Corporate Secretary

REPUBLIC OF THE PHILIPPINES)  
**QUEZON CITY** METRO MANILA ) S.S.

**16 JUL 2007**

SUBSCRIBED AND SWORN to before me this 17-10-2008 Time: 4:10:28 PM, affiant exhibited to me her Community Tax Certificate No. 17689330 issued in the City of Makati, Metro Manila on February 7, 2007.

Doc. No. 64  
Page No. 18  
Book No. 147  
Series of 2007 ph

**JOEL G. GORDOLA**  
NOTARY PUBLIC  
COMMISSION NO. 030 (2006-2007) UNTIL DEC. 31, 2006  
ROLL OF ATTORNEY NO. 25103  
I.B. P. NO. 645124 (2005-2007) I.B. P. NO. 645124 (2005-2007) I.B. P. NO. 645124 (2005-2007)

**CERTIFIED MACHINE COPY**  
PAGE 18 OF 18 PAGES  
VERIFIED BY 1



## SECRETARY'S CERTIFICATE

**ANGELA D. EDRALIN**, being first duly sworn, deposes and states that:

She is the duly elected Corporate Secretary of **LLOYDS RICHFIELD INDUSTRIAL CORPORATION** (the "Corporation") duly organized and existing under and by virtue of the laws of the Republic of the Philippines and domiciled in Bo. Dunga-an, Danao City, Cebu, and as such Corporate Secretary, she has custody of the corporate records of said Corporation;

That the Corporation has an authorized capital stock of Three Billion Pesos (PhP3,000,000,000.00), divided into Thirty Million (30,000,000) common shares, with a par value of One Hundred Pesos (PhP100.00) per share.

Based on the records in her custody, as of date hereof, the Corporation has a total issued and outstanding capital of One Billion Pesos (PhP1,000,000,000.00), consisting of Ten Million (10,000,000) common shares, with a par value of One Hundred Pesos (PhP100.00) per share.

As of the date of this Certification, the stockholders of the Corporation are as follows:

Stockholder	Nationality	Class	No. of Shares	%age
Republic Cement Corporation	Filipino	Common	9,999,995	99.99
Paul Benedict M. Abastillas	Filipino	Common	1	
John Reinier H. Dizon	Filipino	Common	1	
Ma. Ruby Sarah S. Nitorreda	Filipino	Common	1	
Cirilo M. Pestano II	Filipino	Common	1	
Renato C. Sunico	Filipino	Common	1	

This Certification is being issued in support of the Corporation's application with the Securities and Exchange Commission for the merger of Republic Cement Corporation, Fortune Cement Corporation, FR Cement Corporation and Lloyds Richfield Industrial Corporation.

IN WITNESS WHEREOF she has hereunto affixed her signature at the City of Makati, Metro Manila, this 16 JUL 2007.

*Angela D. Edralin*  
**ANGELA D. EDRALIN**  
Corporate Secretary

REPUBLIC OF THE PHILIPPINES)  
MAKATI CITY, METRO MANILA ) S.S.

**QUEZON CITY**

SUBSCRIBED AND SWORN to before me this 16 JUL 2007, affiant exhibited to me her Community Tax Certificate No. 17689330 issued in the City of Makati, Metro Manila on February 7, 2007.

Doc. No. 4  
Page No. 18  
Book No. 143  
Series of 2007.

www.sec.gov.ph

**JOEL B. GORDOLA**  
NOTARY PUBLIC  
COMMISSION NO. 020 (2006-2007) UNTIL DEC. 31, 2006.  
ROLL OF ATTORNEY NO. 25103  
I.B.P. NO. 645154 (2006-2007) B.C. CHAPTER  
NO. 3480482; JAN. 22, 2007

**CERTIFIED MACHINE COPY**  
PAGE 18 OF 18 PAGES  
VERIFIED BY: 1

Republic of the Philippines  
SECURITIES AND EXCHANGE COMMISSION  
Edsa, Mandaluyong, Metro Manila

10/17, 19 88

I HEREBY CERTIFY that the foregoing is a true  
and correct machine reproduction of the Official file (s)  
thereof in the custody of this Commission consisting  
of eight ( 8 ) page (s).

Verified by: Orville Fees P. 100- paid under  
C. R. No.                      dated 10/17; 19 88

ISMA C. GONZALES  
ASSISTANT DIRECTOR  
CENTRAL RECEIVING AND RECORDS DIVISION



# ***Annex B***

---

Copy of ECC Change of  
Name



Republic of the Philippines  
Department of Environment and Natural Resources  
**ENVIRONMENTAL MANAGEMENT BUREAU**  
DENR Compound, Visayas Avenue, Diliman Quezon City 1116  
Telephone Nos. (632) 927-15-17, 928-37-25, Fax No. (632) 920-22-58  
Website: <http://www.emb.gov.ph> / Email: [mail@emb.gov.ph](mailto:mail@emb.gov.ph)

JUL 07 2017

**MR. RENATO C. SUNICO**  
President and CEO  
**REPUBLIC CEMENT & BUILDING MATERIALS, INC.**  
The Salcedo Tower, 169 H.V. dela Costa,  
Makati City

**SUBJECT: REQUEST TO CHANGE THE NAME OF THE HOLDER OF ENVIRONMENTAL COMPLIANCE CERTIFICATES FROM REPUBLIC CEMENT CORP. (RCC) TO REPUBLIC CEMENT & BUILDING MATERIALS, INC. (RCBMI)**

Dear Mr. Sunico:

This refers to your request for change of name of the holder of Environmental Compliance Certificates (ECCs) for the following projects from Republic Cement Corporation (RCC) to Republic Cement & Building Materials, Inc.:

1. Waste Co-Processing Facility Project located at Brgy. Mapulo, Taysan, Batangas (ECC Ref. No. 0508-009-105C issued dated 11 August 2006);
2. 3300 MTPD Kiln Line "D" Expansion Project located at Brgy. Dulumbayan, Teresa, Rizal (ECC Ref. No. 9508-008-105C issued on 08 May 1996);
3. Cement Plant Expansion & 12 MW Power Plant Project located at Brgy. Mapulo, Taysan, Batangas (ECC Ref. No. 9605-002-105C) issued on 06 June 1997);
4. Quarry Expansion Project located at Barangays Dulumbayan and Prenza, Teresa, Rizal (ECC Ref. No. 9906-013-302 issued on 05 January 2000); and
5. 2.5 MMTPY Cement Manufacturing Complex, Quarrying, Power Plant, Wharf & Other Facilities Project located at Danao City and Carmen Municipality, Cebu Province (ECC Ref. No. 9906-014-105) issued on 26 September 2002)

Based on the evaluation of the submitted documents, the above subject request is hereby granted.

However, please be informed that per records of this Office, the project with Environmental Compliance Certificate (ECC Ref. No. 1309-0031) relative to the Cement Manufacturing and Waste Co-Processing Plant to Include Both Hazardous and Non-Hazardous Alternative Fuels and Raw Materials Project located at Barangay Bigte, Norzagaray, Bulacan

Page | 1

Department of Environment and  
Natural Resources  
ENVIRONMENTAL MANAGEMENT BUREAU  
Office of the Director



Protect the environment... Protect life...

CERTIFIED TRUE COPY  
TULAN, MARK ANTHONY C.  
RECORDS, EIAM DIVISION

CERTIFIED TRUE COPY  
Tulan, Mark Anthony C.  
Records, EIAM Division




issued on 13 October 2015 has pending case before this Office, hence, transfer of ownership cannot be fully granted until such the said case be resolved.

Please be advised that the change of name shall carry the environmental liability and obligations of the former proponent of each of the above projects. Further, all other conditions stipulated in the above-cited ECC shall remain in force unless otherwise revised in writing. Any expansion and/or modification of approved operations shall be subjected to a new Environmental Impact Assessment (EIA) requirement.


Furthermore, as to submission of reports, please be informed of the Memorandum Circular No. 2016-001 "*Requiring online submission of Compliance Monitoring Report (CMR)*". Please visit our website at [www.emb.gov.ph](http://www.emb.gov.ph), register at CMR Online and submit your report within the prescribed period.

Thank you.


Very truly yours,

  
**JACQUELINE A. CAANCAN**  
In-charge, Office of the Director  
and concurrent Assistant Director

O.R. No. 8081863  
Date 8/11/2017  
Processing Fee Php 6,000.00

 Department of Environment and  
Natural Resources  
ENVIRONMENTAL MANAGEMENT BUREAU  
Office of the Director



 8-16-18  
**CERTIFIED TRUE COPY**  
Tuliao, Mark Anthony C.  
Records, EIAM Division

# ***Annex C***

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## **Existing Environmental Compliance Certificate**



Republic of the Philippines  
Department of Environment and Natural Resources  
**ENVIRONMENTAL MANAGEMENT BUREAU**  
DENR Compound, Visayas Avenue, Diliman, Quezon City 1116  
Telephone Nos.: 927-15-17, 928-20-96  
Email : emb@emb.gov.ph  
Visit us at <http://www.emb.gov.ph>

04 JAN 2018  
**ECC-CO-1601-0002**

**Mr. Rolando Ong**  
*Vice President for Operations*  
**Republic Cement & Building Materials, Inc.**  
Barangay Dulumbayan, Teresa, Rizal

Subject : **ENVIRONMENTAL COMPLIANCE CERTIFICATE**

Dear Mr. Ong:

This refers to your application for amendment of Environmental Compliance Certificate (ECC) for the **Cement Manufacturing Plant Project** of Republic Cement and Building Materials, Inc. located in Barangay Dulumbayan, Municipality of Teresa, Province of Rizal.

After satisfying the requirements of the Presidential Decree No. 1586 and its implementing rules and regulations and upon recommendation of the Environmental Impact Assessment Review Committee (EIARC), the Department through EMB, has decided to grant an ECC for the above-mentioned project, which supersedes the previously issued ECC.

With the issuance of the ECC, you are expected to fully implement the measures presented in the Environmental Performance Report and Management Plan (EPRMP) intended to protect and mitigate the project's adverse impacts on community health, welfare and the environment. Likewise, environmental considerations shall be incorporated in all phases and aspects of the project.

This Certificate does not create any right nor shall be used as an authorization to implement the project, you may proceed with the implementation only after securing all the necessary and relevant permits from other pertinent Government Agencies. This Office shall be monitoring the project periodically to ensure strict compliance with the stipulations cited in the attached ECC.

Please be guided accordingly.

Very truly yours,

Approved by the authority of the Secretary

**ENGR. METODIO U. TUBELLA**  
Director



cc: EMB Region IVA  
MGB Central Office  
MGB Region IVA  
BMB  
FMB  
DENR Region IVA  
NCIP

LLDA  
DOLE-BWC Region IVA  
DOH Region IVA  
LGU - Province of Rizal  
LGU - Municipality of Teresa  
LGU - Barangay Dulumbayan, Teresa, Rizal

*Protect the environment... Protect life...*





Republic of the Philippines  
Department of Environment and Natural Resources  
**ENVIRONMENTAL MANAGEMENT BUREAU**  
DENR Compound, Visayas Avenue, Diliman, Quezon City 1116  
Telephone Nos.: 927-15-17, 928-20-96  
Email : emb@emb.gov.ph  
Visit us at <http://www.emb.gov.ph>

**ENVIRONMENTAL COMPLIANCE CERTIFICATE**  
(Issued under Presidential Decree No. 1586)

**ECC-CO-1602-0002**

THIS IS TO CERTIFY THAT THE PROPONENT, **Republic Cement & Building Materials, Inc. (RCBMI)**, as represented by its Vice President for Operations, **Mr. Rolando Ong**, is granted this Environmental Compliance Certificate (ECC) for the existing and proposed expansion of cement manufacturing plant located in **Barangay Dulumbayan, Municipality of Teresa, Province of Rizal** by the Department of Environment and Natural Resources (DENR) through the Environmental Management Bureau (EMB).

SUBJECT to the conditions and restrictions set out herein labeled as Annexes A and B, this Certificate supersedes ECC with Reference No. 9508-008-105C issued on 08 May 1996.

This Certificate is issued with the following details:

PROJECT DESCRIPTION	
This Certificate shall cover the operation of the 1.7 million MT/yr cement manufacturing plant project within an area located in Barangay Dulumbayan, Teresa, Rizal bounded by the coordinates as stipulated in the EPRMP. The said project shall have the following components:	
The said project shall have the following components:	
Major components	crushing area, raw mix section, homogenization silo, kiln/preheater, pyro processing, coal processing, finish mills (Mill C and D) and packhouse
Support facilities	coal plant, 5x4 MW diesel power plant, waste heat recovery facility, refuse derived-fuel facility, rice husk facility, petcoke facility, and flyash facility
Pollution control devices	jet pulse bag type dust collector and electrostatic precipitator

This Certificate is issued in compliance with the requirements of Presidential Decree No. 1586, and its Implementing Rules and Regulations. Non-compliance with any of the provisions of this Certificate shall be a sufficient cause for its cancellation and/or imposition of a fine in an amount not to exceed Fifty Thousand Pesos (P50,000.00) for every violation thereof without prejudice to

Environmental Compliance Certificate  
Cement Manufacturing Project  
Republic Cement & Building Materials, Inc.

*Protect the environment...*



imposition of fines and penalties under other environmental laws. The EMB, however, is not precluded from reevaluating and correcting any deficiencies or errors that may be found after issuance hereof.

Issued at DENR, Quezon City, Philippines, this \_\_\_\_\_.

Recommending Approval:

Approved by the Authority of the Secretary:


  
**ATTY. MICHAEL DRAKE P. MATIAS**  
Chief, EIAM Division

  
**ENGR. METODIOS U. TURRELLA**  
Director



### STATEMENT OF ACCOUNTABILITY

I, **ROLANDO ONG**, **Vice President for Operations**, representing **Republic Cement & Building Materials, Inc. – Teresa Plant** with office address located in **Barangay Dulumbayan, Teresa, Rizal**, take full responsibility in complying with all conditions in this Environmental Compliance Certificate (ECC).

  
Signature

TIN 193-314-039

Subscribed and sworn to before me this JAN 25 2018, the above-named affiant taking oath presenting \_\_\_\_\_ issued on \_\_\_\_\_ at \_\_\_\_\_.

  
Notary Public

Until Dec. 31, 2018

Commission No. PNC-51-MB-2016

PTR No. 966500/01-03-16/IsL Bul.

Barangay Roll No. 0267/Agawan Del Norte  
Roll No. 17690

Doc. No. 216  
Page No. 45  
Book No. XV  
Series of 2018

**I. CONDITIONS****ENVIRONMENTAL MANAGEMENT**

All commitments, appropriate mitigating/enhancement measures and monitoring requirements contained in the approved Environmental Performance Report and Management Plan (EPRMP), particularly in the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP), shall be instituted to minimize any adverse impact of the Project to the environment throughout its implementation, including the following:

1. Conduct an effective Information, Education and Communication (IEC) Program to inform and educate all stakeholders, especially its contractors, workers, and local residents about the following:
  - a. Mitigating measures embodied in its EPRMP, the conditions stipulated in this Certificate and the environmental and human safety features of the project for greater awareness, understanding and sustained acceptance; and
  - b. Disaster risk reduction management measures and climate change related issues/concerns.

Submit a report of IEC implementation to the EMB Central Office and EMB Region IVA as part of the semi-annual Compliance Monitoring Report (CMR);

2. Implement a Social Development Program (SDP) and submit a report thereof together with the CMR to the EMB Central Office copy furnished EMB Region IV-A on a semi-annual basis;
3. Maintain at least ten (10) meters buffer zones along the entire periphery of the project site with appropriate species/dense vegetation cover to enhance the condition of the ecosystem and to serve as noise, vibration and dust buffers;
4. Undertake risk assessment prior to the start of project operation covering all facilities in relation to occupational health and safety to be updated at least every five (5) years, to ensure that hazards and risks are kept at a minimum;
5. Maintain a reforestation and carbon sink program using endemic/indigenous species to offset greenhouse gas (GHG) emissions of the project in line with the DENR's thrust for GHG emissions reduction programs and National Greening Program. The same shall be submitted to EMB Central Office and EMB Region IV-A within thirty (30) days upon receipt of this Certificate;
6. The Continuous Emissions Monitoring System (CEMS)/Continuous Opacity Monitoring System (COMS) shall be maintained and conform to the guidelines in DENR Administrative Order (DAO) 2007-22. The hourly average air quality data acquired from CEMS and hourly real time images captured from closed-circuit television (CCTV) shall be transmitted to EMB in accordance with the DAO 2017-14;

**GENERAL CONDITIONS**

Environmental Compliance Certificate  
Cement Manufacturing Project  
Republic Cement & Building Materials, Inc.





7. The proponent shall set-up the following:

- 7.1 A readily available and replenishable Environmental Guarantee Fund (EGF) to cover the following expenses:
- a) for further environmental assessment, compensation/indemnification for whatever damages to life and property that may be caused by the project;
  - b) rehabilitation and/or restoration of areas affected by the project's implementation; and
  - c) abandonment/decommissioning of the project facilities related to the prevention of possible negative impacts and as a source of fund for contingency and clean-up activities;
- 7.2 A reconstituted Multipartite Monitoring Team (MMT) composed of representative(s) from concerned stakeholders as provided in DENR Administrative Order (DAO) 2017-15 shall be established. The MMT shall primarily oversee the compliance of the proponent with the Environmental Management Plan/Environmental Monitoring Plan (EMP/EMoP) and the conditions of this ECC;
- 7.3 A replenishable Environmental Monitoring Fund (EMF) in accordance with DAO 2017-15.

8. Maintain Environmental Unit (EU) that shall competently handle the environment-related aspects of the project. In addition to the monitoring requirements as specified in the Environmental Management Plan/Environmental Monitoring Plan, the EU shall have the following responsibilities:
- a. Monitor actual project impacts vis-à-vis the predicted impacts and management measures in the EPRMP;
  - b. Recommend revisions to the EMP/EMoP, whenever necessary subject to the approval of EMB Central Office. Revisions shall also consider the result of the validation of air dispersion and thermal plume modeling;
  - c. Ensure that data gathered during monitoring activities are properly documented, assessed, evaluated and reported to EMB (Central Office and Region IVA) in accordance with the standard formats; and
  - d. Ensure that monitoring and submission of reports to EMB (Central Office and Region IVA) are carried out as required;
9. The proponent shall ensure that its contractors and sub-contractors strictly comply with the relevant conditions of this Certificate;

**II. RESTRICTIONS**

10. No activities shall be undertaken other than what were stipulated in the final EPRMP. Should there be any expansion of the project beyond the project description or any change in the activity or transfer of location shall be subject to a new Environmental Impact Assessment; and
11. In case of transfer of ownership of this project, these same conditions and restrictions shall apply and the transferee shall be required to secure an amendment of this ECC with the EMB Central Office within fifteen (15) days from transfer.

**PROJECT ASSESSMENT PLANNING TOOL**

For the assistance of the Proponent and the Government agencies concerned in the management of the Project and for better coordination in mitigation of the impacts of the Project on its surrounding areas and the environment, the following have been recommended by the this Office to the parties and authorities concerned for appropriate action.

<b>RECOMMENDATIONS TO CONCERNED GOVERNMENT AGENCIES</b>	<b>RESPONSIBLE AGENCY</b>
1. Compliance by the proponent with the following: a. Sanitation Code of the Philippines b. Building Code of the Philippines c. Ecological Solid Waste Management Act	LGUs concerned
2. Labor Code of the Philippines and occupational health and safety standards.	Department of Labor and Employment (DOLE)- Bureau of Working Conditions
3. Secure Laguna Lake Development Authority (LLDA) Clearance	LLDA
4. Secure Certificate of Non-Overlap (CNO)	National Commission on Indigenous Peoples (NCIP)
<b>ENVIRONMENTAL PLANNING RECOMMENDATIONS</b>	
5. Preference of employment shall be given to qualified local residents. Adequate public information on jobs available for local residents in the affected areas shall be provided;	
6. An independent third party shall be commissioned to undertake an environmental audit and submit a report every three (3) years. The result of third party environmental audit, including auditing of risks and hazards of the Project, shall be submitted to EMB Central Office; and	
7. A continuing study of the effects of the Project on health of workers and affected residents shall be conducted every five (5) years. The results of the study shall be submitted to the Department of Health (DOH) Region IVA.	

For dissemination and proper action of the agencies concerned.

**ATTY. MICHAEL DRAKE P. MATIAS**  
Chief, EIAM Division

**ENGR. METODIO U. TURBELLA**  
Director

# ***Annex D***

---

## Recent Aerial Photos of the Project Site





Figure PD-9. Aerial Photo of RCBM Cement Plant, Teresa