Taiheiyo Cement Philippines

EIA SUMMARY FOR PUBLICATION

PROJECT NAME	**CEMENT PLANT EXPANSION PROJECT**
PROJECT TYPE	**NON-METALLIC MINERAL PROCESSING**
PROJECT LOCATION	**BARANGAY SOUTH POBLACION, MUNICIPALITY OF SAN FERNANDO, CEBU** **PROJECT EXPANSION WILL BE WITHIN TCPI -SEDC PREMISES IN THE EXISTING CEMENT MANUFACTURING FACILITY**
NAME, ADDRESS and CAPABILITY OF PROPONENT	**TAIHEIYO CEMENT PHILIPPINES, INC.** **9TH FLOOR INSULAR LIFE CEBU BUSINESS CENTER, CEBU BUSINESS PARK, CEBU CITY** **PARENT COMPANY & MAJORITY SHARE HOLDER : TAIHEIYO CEMENT CORPORATION, JAPAN** **SUBSIDIARY: SOLID EARTH DEVELOPMENT CORPORATION**
BACKGROUND ECCs	**ECC 9107-011-105C ISSUED IN 1999 WITH DAILY CEMENT PRODUCTION VOLUME OF 7,350 METRIC TONS ASSIGNED FROM GRAND CEMENT MANUFACTURING CORPORATION. COVERS LIMESTONE QUARRY AND CEMENT MANUFACTURING AND RELINQUISHED TO SEDC IN FAVOR OF QUARRY OPERATIONS. PERMITTED LINE 2 KILN IN ECC 9107-011-105C WAS NOT CONSTRUCTED AND SYSTEM IS PROPOSED TO BE UPGRADED THROUGH THIS APPLICATION.** **ECC 0607-007-3630 ISSUED TO TCPI IN 2007 FOR THE USE OF ALTERNATIVE RAW MATERIALS IN CEMENT MANUFACTURING AND SUPERCEDES ECC 9107-011-105C**
THIS PROJECT	**PROPOSES TO UPGRADE LINE 2 FACILITIES TO PRODUCE 6,000 METRIC TONS CLINKER DAILY, IN ADDITION TO LINE 1 PERMITTED CAPACITY OF 2,440 MT DAILY.** **PROPOSED PRODUCTION CEILING IS 16,350 METRIC TONS PER DAY FROM PRESENT LINE 1 AND LINE 2 PERMITTED CEMENT PRODUCTION CEILING OF 7,350 METRIC TONS**
PROJECT DESCRIPTION	**1. CONSTRUCTION AND OPERATION OF SECOND CEMENT MANUFACTURING LINE (LINE 2) BRINGING TOTAL TCPI PRODUCTION OUTPUT TO 16,350 METRIC TONS CEMENT DAILY OR 5,313,750 METRIC TONS CEMENT ANNUALLY AT 325 DAYS AVERAGE OPERATION;**

	2. PROJECT WILL PRODUCE HIGH QUALITY CEMENT TO SUPPLY THE PHILIPPINE GOVERNMENT CEMENT REQUIREMENT FOR ITS 'BUILD-BUILD-BUILD" PROGRAM; 3. WILL PRODUCE CEMENT UNDER LINE 2 WITH LOWER ENERGY REQUIREMENT OF 720KCAL PER METRIC TON CLINKER COMPARED TO 914 KCAL/MT UNDER LINE 1 4. PROJECT WILL SAVE PHILIPPINE FOREIGN EXCHANGE CURRENCY FROM THE PURCHASE OF IMPORTED CLINKER AND CEMENT WITH UNEVEN PERFORMANCE QUALITY WHILE GENERATING REVENUES FOR LOCAL AND THE NATIONAL GOVERNMENT FROM INCOME TAXES. 5. PROJECT WILL BRING ECONOMIC OPPORTUNITIES FOR DOMESTIC SERVICE CONTRACTORS AND SUPPLIERS, PRIMARILY FROM SAN FERNANDO AND CEBU. 6. QUALIFIED SAN FERNANDO WORKFORCE WILL BE GIVEN PRIORITY IN HIRING. 70% OF OUTSOURCED JOBS FOR UNSKILLED LABOR WILL BE PREFERABLY FROM SAN FERNANDO, CEBU 7. PROJECTED TOTAL COMBINED (LINE 1 AND LINE 2) NORMAL PARTICULATE MATTER EMISSIONS IS 12 mg/NCM. PEAK 1 HR AMBIENT TSP IS 164 μG/NCM 1,709 meters TO 1,907 meters WEST OF THE PLANT. PEAK 24-HR IS 27 μG/NCM, 895 meters WNW TO 1,613 meters W OF THE PLANT, ALL WELL WITHIN THE NATIONAL EMISSIONS AND AMBIENT AIR QUALITY STANDARDS. 8. WILL REDUCE GROUND WATER EXTRACTION FOR CLINKER PRODUCTION FROM 4.7% TO 4.4% OF NWRB-PERMITTED EXTRACTION VOLUME DUE TO INCREASED PROCESS WATER RECYCLING WITH INSTALLATION OF 5,000 M^3 COOLING POND, THUS CONTRIBUTING TO REDUCTION OF FACTORS CAUSING SALINE INTRUSION AND GROUND SUBSIDENCE 9. AN ESTIMATED 810 NEW JOBS DURING PROJECT PRE-CONSTRUCTION AND CONSTRUCTION PHASE WHICH HAS DURATION OF ABOUT 31 MONTHS; 10. AN ESTIMATED TOTAL OF 126 WORKERS WILL BE INVOLVED IN TCPI OPERATIONS AND 392 PERSONS NEEDED FOR MAINTENANCE WORK, FOR A DESIRED PROJECT LIFE OF 50 YEARS. 11. SOCIAL BENEFITS INCLUDE SUPPLEMENTAL SOCIAL DEVELOPMENT PROJECTS TO ASSIST IMPACT COMMUNITIES ATTAIN DEVELOPMENT GOALS IN HEALTH, EDUCATION, LIVELIHOOD AND SAFETY. WILL SUPPORT LOCAL REQUESTS FOR WATER SUPPLY PROJECTS.

PROJECT COMPONENTS	1. Limestone crusher 2. Clay crushing system 3. Pozzolan crushing System 4. Raw mill system 5. Rotary kiln 6. Air conditioning tower 7. Coal mill 8. Clinker cooler 9. Cement mills 10. Packaging machine 11. Air pollution control devices 12. Storage facilities 13. Noise abatement facilities 14. Cooling Pond
PROCESS TECHNOLOGY	**DRY CEMENT MANUFACTURING PROCESS USING PREHEATER/PRECALCINER KILN**
RESOURCE UTILIZATION	**ANNUAL REQUIREMENTS (Metric Tons):**

LIMESTONE	SILICEOUS CLAY	SILICA	Philippine Tuff	FLY ASH
3,948,632	8,002	318,870	476,431	384,605

Daily Water Balance (Cubic Meters)

Process Water Requirement Per Day	Existing in System	Lost to Evaporation	Process Water Recycling	Rainwater Harvesting for Production	Existing Water Extraction Permit Capacity	Average Daily Ground Water Extraction
6,165	2,202	173	5,3814	nil	3,931.2	191.37

Process Energy Design : 720 kCal /ton clinker from fuel, 47.7 kCal from recirculated heat

Project Implementation Schedule

Feasibility Study & Engineering Design	Construction &Commissioning	Start of Commercial Operation
2018	2019	2021

Plant Equipment and Respective Capacity Per Line

	COVERED BY ECC- 0607-007-3630				PROPOSED ECC AMENDMENT		
	WITIHN THE AREA OF 17 HECTARES				TOTAL LAND AREA OF 44 HECTARES		
#	Line 1	Capacity	Line 2- Existing	Capacity	Line 2- Amendment	Capacity	Remarks
1	Limestone Crusher	450 t/hr	------	------	Limestone Crusher	1,000 t/hr	Currently TCPI is importing clinker material to cope up demand in cement.
2	Raw Milling System				Raw Milling System		
	Hammer Mill	270 t/hr	------	------	Hammer Mill	450 t/hr	
3	Rotary Kiln	2,800 t/day	------	------	Rotary Kiln	6,000 t/day	
4	Coal Mill	25.6 t/hr	------	------	Coal Mill	36 t/hour	
5	Cement Mills		Cement Mills		Cement Mills		
	1k- Roller Press	75 t/hr	7k	70 t/hr	9k	125 t/hr	
	2k		8k	125 t/hr	10k	125 t/hr	
	3k		------	------	11k	125 t/hr	
	4k		------	------	------	------	

	5k		------	------	------	------	
	6k	34 t/hr	------	------	------	------	
6	Packing Machine		Packing Machine		Packing Machine		
	(#1 - #6)		(#7 – #14)		(#15 - # 22)		
	Cement produced per day	4,350 MT	With the existing Mills and Packing machine	7,350 MT	With the additional equipment	16,350 MT	

Project Process and Criteria for Selection, including how the public stakeholders influenced the selection

The cement manufacturing system (Line 1) operated by TCPI was installed in 1993 and no longer produce the permitted clinker volume due to aging clinker production facilities. At present, TCPI imports a large volume of clinker to cope with existing demand. The Line 1 equipment currently produces an average of 2,267 metric tons clinker per day, only 87% of its rated capacity of 2,800 mtpd while consuming the same energy to operate a 2,800 mtpd kiln.

The Line 2 kiln permitted under ECC 9107-011-105C is being updated to utilize modern equipment and apply heat recirculation systems for energy efficiency. In the process of ECC amendment, TCPI proposes to increase production output from 2440 mtpd clinker under Line 1 to 6,000 mt daily under Line 2. TCPI will continue to apply the dry process cement manufacturing method and overall will produce 16,350 mtpd cement at a clinker to cement ratio of 1:1.282 and with the use of 3,474 mt imported clinker.

Cement kilns are the heart of cement manufacturing systems, producing clinker through pyro-processing, a very energy intensive process requiring raising of kiln temperature to the range of 1,200 - 1,450 °C to sinter calcium carbonate with silica-bearing minerals to form a mixture of calcium silicates. The global average energy consumption for precalciner kiln is 840 kCal./ ton clinker. TCPI design heat for Line 2 is 720 kCal per metric ton clinker, also using recirculated waste heat of 43.3688 kCal per mt clinker.

TCPI under its proposed Line 2 production expansion plan, will :

1. Opt to use more fuel-efficient equipment and system design
2. Co-process fly ash to substitute a fraction of natural quarry materials to reduce negative quarry impacts in the process of increasing cement production to supply the growing cement demand in the Philippines;
3. Co-process waste copper slag in lieu of iron slag raw material and in the process reduce a small fraction of greenhouse gas formation during clinkering;
4. Utilize a denitification unit to apply urea or sodium nitrate with waste steam to reduce the formation of nitrogen oxides during clinkering;
5. Continue to co-process waste derive fuels approved under ECC 0607-007-3630;
6. Increase daily cement production ceiling from 7,370 metric tons to 16,350 mtpd.

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The Project is proposed to be located within the TCPI-SEDC property in San Fernando, Cebu due to the following reasons:

1. Availability of existing auxiliary and ancillary support facilities under TCPI Line 1 which will reduce the cost of establishing the second cement manufacturing Line (Line 2) which will reduce the pre-operation period
2. Proximity of raw material sources;
3. Suitability of climate which has more dry than rainy days and a generally warm temperature conducive to natural drying of raw materials;
4. The land needed for physical expansion is already available and currently within possession;.
5. The SEDC Port which is important input and as market outlet is already existing;

Forecast Source Emissions from Clinker Production (Result from AERMOD-assisted Dispersion Model)

		Stack	Stack	Stack Ht.	VEL	Concentration (mg/Ncm)			
		Diam (m)	Area (m^2)	(m)	(m/s)	PM	CO	NOx	SOx
KILN LINE 1		4	12.57	43.00	9.00	6	326.21	256.47	ND
KILN LINE 2		4	12.57	100.00	14.92	6	326	256	ND
			Stack Temp	Stack	VFR	Emission Rate/Strength (g/s)			
	UTM		deg C	Temp. (K)	(Ncm/Min)	PM	CO	NOx	SOx
KILN LINE 1	576582	1123476	93.75	366.75	4,578.00	5.27	24.89	19.57	0.00
KILN LINE 2	576326	1123629	93.75	366.75	11,252.77	12.96	61.18	48.10	0
AFR Metals Concentration (mg/Ncm)									
AS	Cd	Cu	Pb	Hg	Ni	Zn	Cr	Sb	Total DF
0.02197	4.43	0.017	0.0299	0.0069	0.0309	0.04204	0.0273	0.002	0.00034
0.02197	4.43000	0.01700	0.02990	0.00690	0.03090	0.04204	0.0273	0.002	0.00034
AFR Metals Emission Rate/Strength (g/s)									
AS	Cd	Cu	Pb	Hg	Ni	Zn	Cr	Sb	Total DF
0.00168	0.33801	0.00130	0.00228	0.00053	0.00236	0.00321	0.00208	0.000153	2.594E-05
0.00412	0.83083	0.00319	0.00561	0.00129	0.00580	0.00788	0.00512	0.000375	6.377E-05

Peak Values 98 percentile (Rank 8th – 1-hour and 176th – 24-hour) Combined/Simultaneous Line 1 and 2 Kiln Restarting. This will reduce when Line 1 and Line 2 start-up is not simultaneous

Parameters	Averaging Time	Distance	Direction	Concentration (µg/Ncm)	Standard / GV (µg/Ncm)
TSP	1 Hour	1,000	West	164	300
	24 Hour	1,200	West	27	230
CO	1 Hour	1,000	West	665	35 mg/Ncm
	8 Hour	1,200	West	115	10 mg/Ncm
NO_2	1 Hour	1,000	West	53	260
	24 Hour	1,200	West	9	150
As	1 Hour	1,000	West	0.044	0.02 µg/Ncm*
	24 Hour	1,200	West	0.007	--
Cd	1 Hour	1,000	West	9.03	0.01 µg/Ncm*
	24 Hour	1,200	West	1.57	--
Cu	1 Hour	1,000	West	0.014	--
	24 Hour	1,200	West	0.006	--
Hg	1 Hour	1,000	West	0.005	--
	24 Hour	1,200	West	0.0024	--
Ni	1 Hour	1,000	West	0.026	--
	8 Hour	1,200	West	0.022	--
Pb	1 Hour	1,000	West	0.025	20 µg/Ncm*
	24 Hour	1,200	West	0.0106	--
Sb	1 Hour	1, 000	West	0.022	0.20 µg/Ncm*
	24 Hour	1,200	West	0.009	--
Zn	1 Hour	1,000	West	0.035	--
	24 Hour	1,200	West	0.014	--
Cr	1 Hour	1,000	West	0.023	--
	24 Hour	1,200	West	0.009	--
TDDFF	1 Hour	1,000	West	0.00038	--
	24 Hour	1,200	West	0.00016	--

Notes: * For 30-minute averaging time; -- No applicable guideline value or standard limit.

After the first 24 hours of kiln start-up (after each periodic and preventive maintenance works which occur once every quarter for Line 1 and once every two (2) quarters for Line 2), the particulate emissions significantly reduce.

Concise integrated summary of the major impacts and residual effects after mitigation is given in the following Table :

Main Impacts	Raised in Scoping?	How Issue is addressed by the Project /Mitigating Measures	Residual Effects
Air Quality – Particulate matter	✓	Convert Air Pollution Control Facility from Electrostatic Precipitator which has 92% efficiency to Bag house filters with 99. 7% control efficiency Separate maintenance schedule for Line 1 and Line 2 to minimize emissions of incompletely burnt fuel at one time	Maximum / highest ground level concentration of ambient particulate matter assuming Line 1 and Line 2 kiln are fired at the same time is 164 µg/Ncm. Standard is 300 µg/Ncm. Less than 100 µg/Ncm will be experienced at peak emission load during kiln firing.
Air Quality – Nitrogen Dioxide emissions	✓	Line 1 will use waste gas recirculation, gas conditioning tower (water scrubber and temperature management) to keep temperature to about 1,450 °C, sufficient for calcining but insufficient for NOx proliferation. Line 2 will have more efficient system with denitrification unit spraying urea or sodium chloride with waste steam to inhibit further NOx formation.	Maximum ground level concentration under existing condition forecasted with Line 2 given its new system, is 57 µg/Ncm. The National Guideline Value is 230 ug/Ncm. (3rd party stack emission analysis report was used in forecasting).
Air quality – road dust during transportation of coal and materials to plant	✓	Transportation of coal, fly ash and out-going cement will be through enclosed conveyor belt from port to plant, water sprinkling on dusty days	Minimal ambient dust. Material transport from quarry to plant shall be covered with tarpaulin and controlled with a “no tarpaulin, no acceptance policy” by TCPI.
Water Resource Competition	✓	100% Process water recycling and rainwater harvesting. Ground water extraction within NWRB permitted volume.	173 m^3 daily extraction for make up water (lost to evaporation), only 4.4% of the 3,931 m^3 daily extraction permitted by NWRB.
Social Development Program contribution to San Fernando	✓	Formal and informal training support and priority employment is accorded to San Fernando residents.	Enhanced social capital Improved livelihood opportunities to those giving effort to learn and do productive work

Main Impacts	Raised in Scoping?	How Issue is addressed by the Project /Mitigating Measures	Residual Effects
		TCPI provides and will continue to provide training to fishermen and farmers to improve their knowledge, skills and income	

IDENTIFIED STAKEHOLDERS

The identified stakeholders are the residents in Barangays Tonggo, Panadtaran, South Poblacion, North Poblacion, and Tinubdan who are expected to notice minute increase in ambient particulate matter particularly during kiln firing, the peak pollution load of which persist for one hour and reduces in the next 24 hours.

The particulate matter contribution of TCPI combined Line 1 and Line 2 operations even during cold kiln start up will be within National Emission Standard for Source Specific Pollutants (NESSAP). The particulate emissions will be further reduced by conducting maintenance works one kiln at a time.

The residents in Tonggo and Tinubdan are likewise stakeholders as they may experience water resource competition from the Project in case of sustained daily ground water extraction beyond the volume permitted by the National Water Resources Board.

Primary and Secondary Impact Barangays, TCPI Production Expansion Project

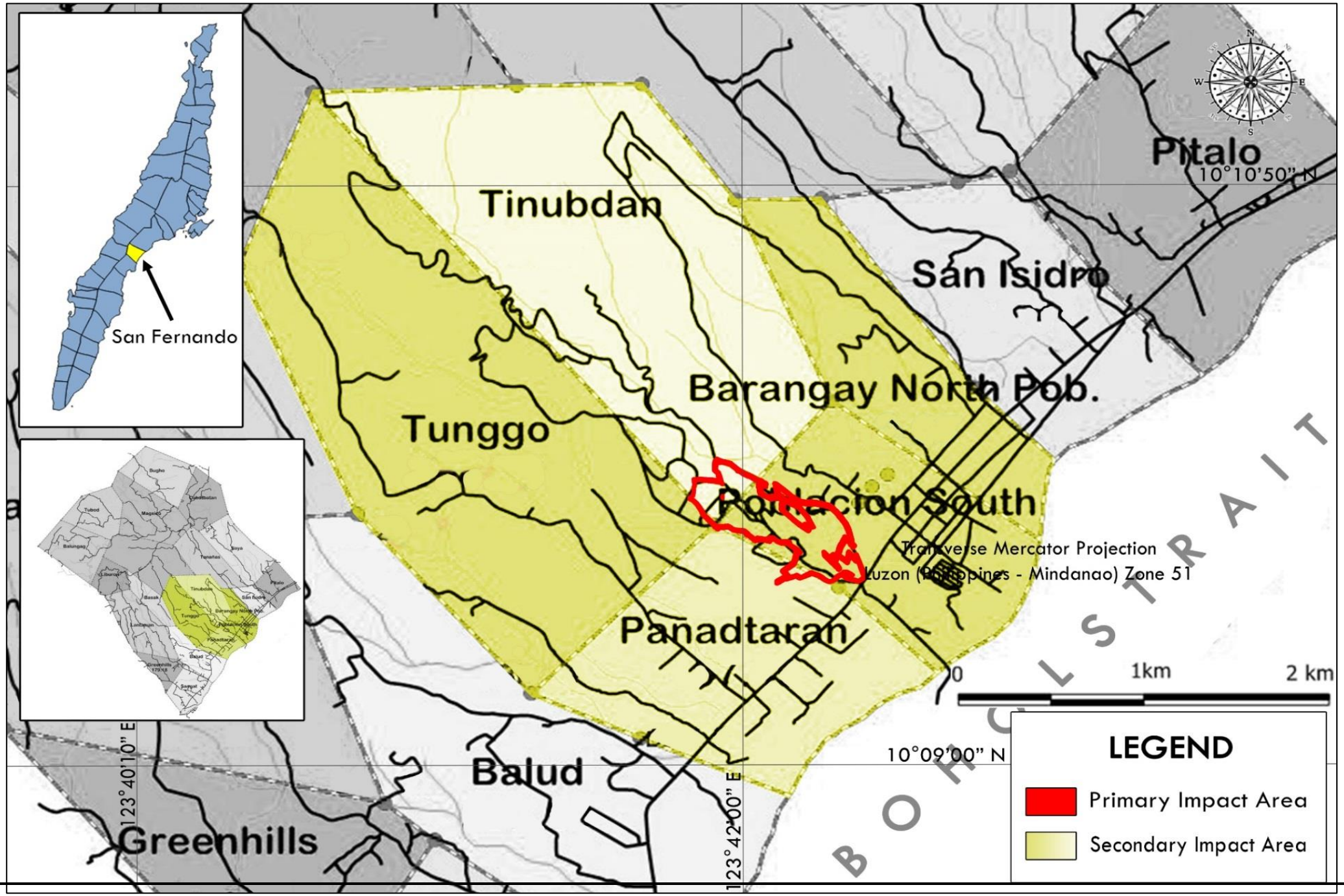
Primary Impact Barangays	Description of Location	Nature of Impact
1. Poblacion South	Host community	Location of Sensitive AQ Receptor Area
2. Panadtaran	South west of the existing TCPI cement production plant	Location of Sensitive AQ Receptor Area
3. Poblacion North		Location of Sensitive AQ Receptor Area
Secondary Impact Barangays		
4. Tonggo	South east of cement plant	Headwaters of Luknay Creek, May experience resource use competition
5. Tinubdan	`North east of cement plant	Location of a portion of plant expansion area. Location of large portion of Sabang River micro watershed. May experience resource use competition

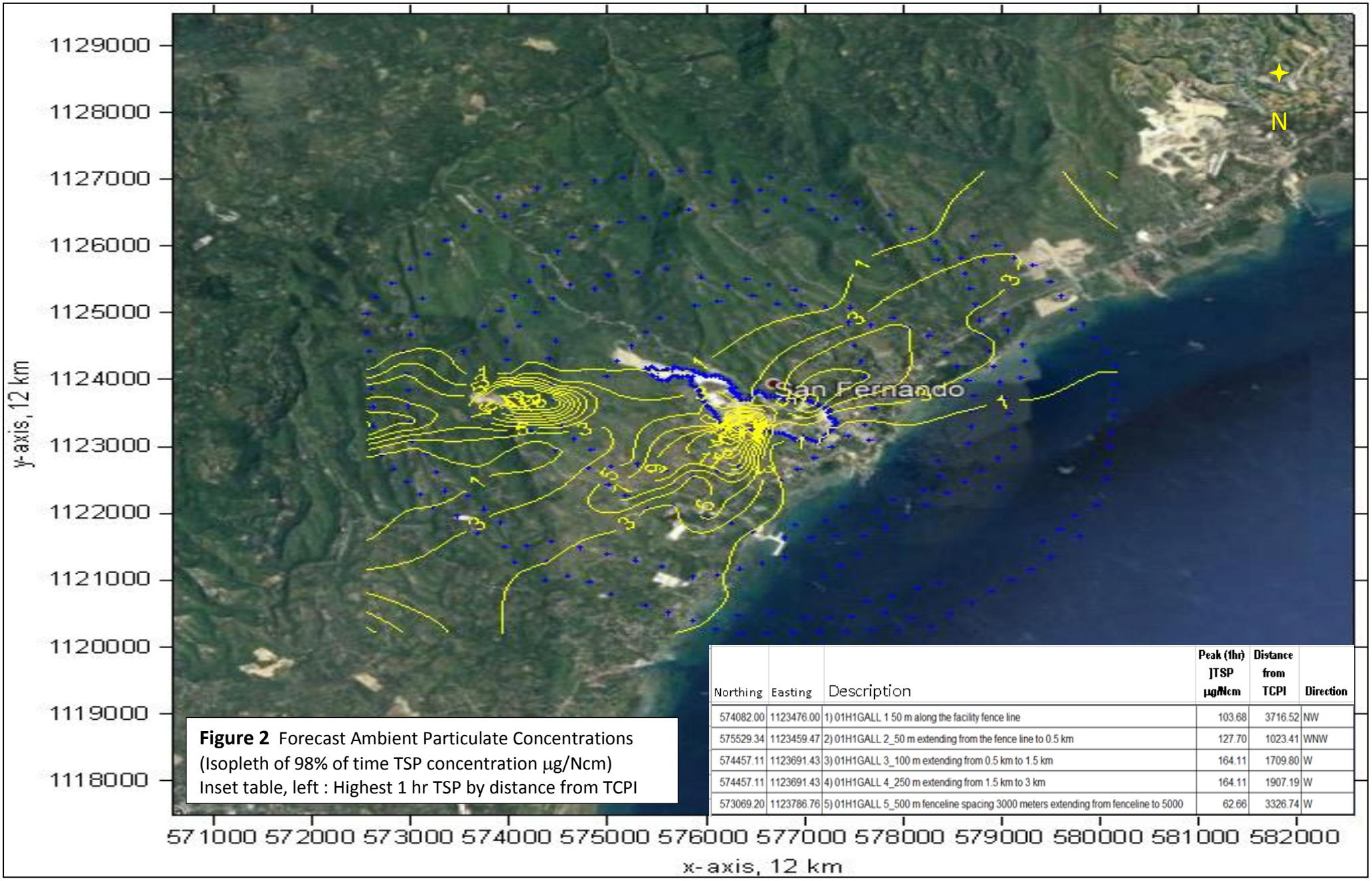
PAID UP CAPITAL : PhP 2,183 million, Total Assets as of 12/31/2017 : 4,759 million

The Proponent is committed, is technically and financially capable implement necessary measures to prevent adverse negative impacts.

Information on where to get a copy of the EIS for further information:

A copy of the Project Environmental Performance Report and Management Plan will be available at the Environmental Impact Assessment and Management Division of the Bureau of Environment and Natural Resources Office in Visayas Avenue, Diliman, Quezon City from December 10, 2018 onwards and at the Environmental Management Bureau Region VII Office and the Municipal Development Coordinating Office at the San Fernando Municipal Government from December 14, 2018 onward.


San Fernando
Tinubdan
San Isidro
Barangay North Pob.
Tunggo
Poblacion South
Panadtaran
Balud
Greenhills
Pitalo
10°10'50" N
10°09'00" N
123°40'10" E
123°42'00" E
Transverse Mercator Projection
Luzon (Philippines - Mindanao) Zone 51
0
1km
2 km
LEGEND
Primary Impact Area
Secondary Impact Area



Northing	Easting	Description	Peak (1hr) TSP µg/Ncm	Distance from TCPI	Direction
574082.00	1123476.00	1) 01H1GALL 1 50 m along the facility fence line	103.68	3716.52	NW
575529.34	1123459.47	2) 01H1GALL 2_50 m extending from the fence line to 0.5 km	127.70	1023.41	WNW
574457.11	1123691.43	3) 01H1GALL 3_100 m extending from 0.5 km to 1.5 km	164.11	1709.80	W
574457.11	1123691.43	4) 01H1GALL 4_250 m extending from 1.5 km to 3 km	164.11	1907.19	W
573069.20	1123786.76	5) 01H1GALL 5_500 m fenceline spacing 3000 meters extending from fenceline to 5000	62.66	3326.74	W

Figure 2 Forecast Ambient Particulate Concentrations (Isopleth of 98% of time TSP concentration µg/Ncm)
Inset table, left : Highest 1 hr TSP by distance from TCPI

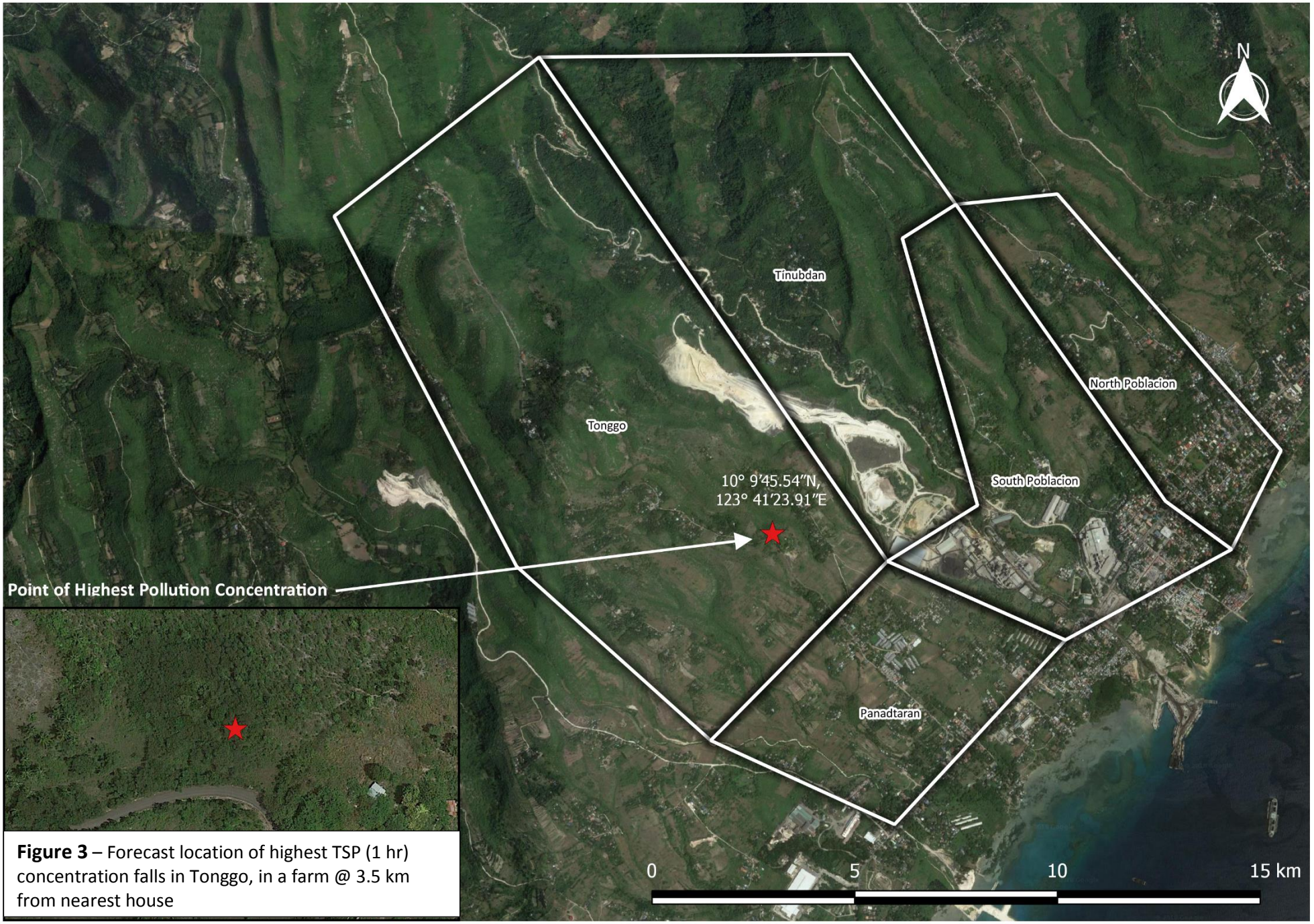
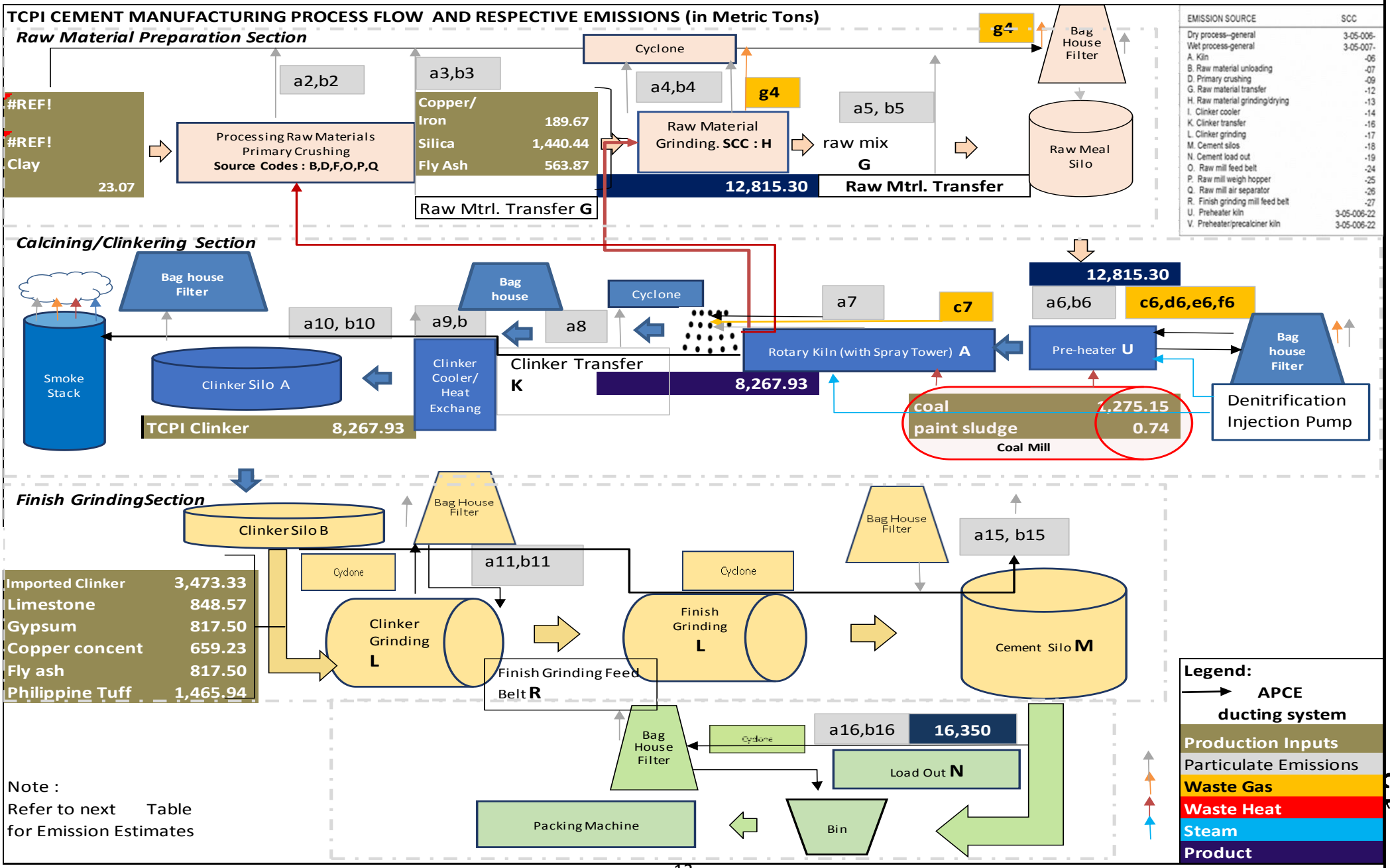


Figure 3 – Forecast location of highest TSP (1 hr) concentration falls in Tonggo, in a farm @ 3.5 km from nearest house

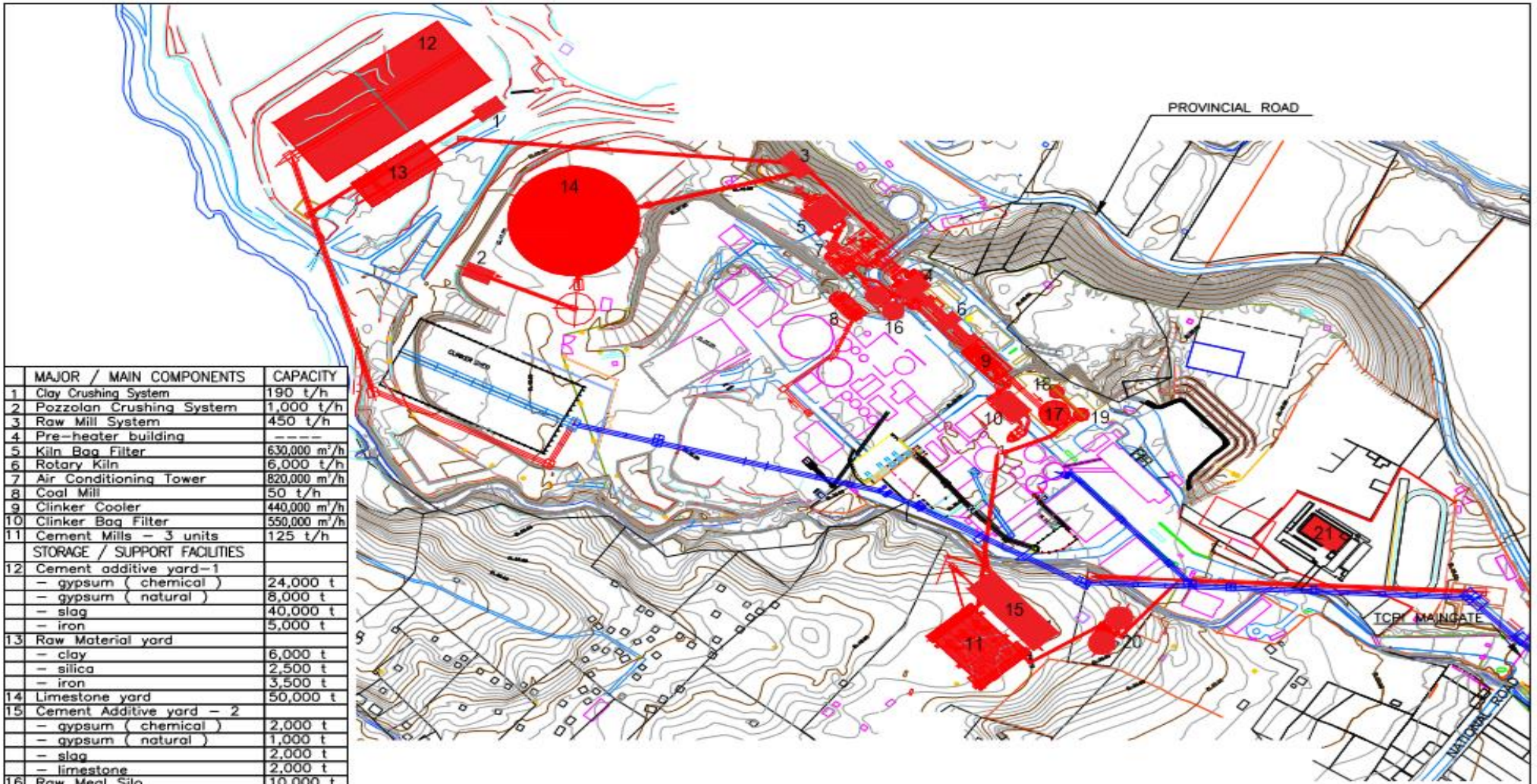
Figure 4


TCPI CEMENT MANUFACTURING PROCESS FLOW AND RESPECTIVE EMISSIONS (in Metric Tons)
Raw Material Preparation Section
#REF!
#REF!
Clay 23.07
a2,b2
Processing Raw Materials Primary Crushing
Source Codes : B,D,F,O,P,Q
a3,b3
Copper/ Iron 189.67
Silica 1,440.44
Fly Ash 563.87
Raw Mtrl. Transfer G
Cyclone
a4,b4
g4
Raw Material Grinding. SCC : H
12,815.30
a5, b5
raw mix G
Raw Mtrl. Transfer
g4
Bag House Filter
Raw Meal Silo
EMISSION SOURCE SCC
Dry process--general 3-05-006-
Wet process-general 3-05-007-
A. Kiln -06
B. Raw material unloading -07
D. Primary crushing -09
G. Raw material transfer -12
H. Raw material grinding/drying -13
I. Clinker cooler -14
K. Clinker transfer -16
L. Clinker grinding -17
M. Cement silos -18
N. Cement load out -19
O. Raw mill feed belt -24
P. Raw mill weigh hopper -25
Q. Raw mill air separator -26
R. Finish grinding mill feed belt -27
U. Preheater kiln 3-05-006-22
V. Preheater/precalciner kiln 3-05-006-22
Calcining/Clinkering Section
12,815.30
a6,b6
c6,d6,e6,f6
a7
c7
Rotary Kiln (with Spray Tower) A
Pre-heater U
Bag house Filter
Denitrification Injection Pump
coal 1,275.15
paint sludge 0.74
Coal Mill
Bag house Filter
a10, b10
a9,b
a8
Cyclone
Clinker Cooler/ Heat Exchang
Clinker Transfer K
8,267.93
Clinker Silo A
Smoke Stack
TCPI Clinker 8,267.93
Finish GrindingSection
Clinker Silo B
Bag House Filter
Cyclone
a11,b11
Cyclone
Bag House Filter
a15, b15
Imported Clinker 3,473.33
Limestone 848.57
Gypsum 817.50
Copper concent 659.23
Fly ash 817.50
Philippine Tuff 1,465.94
Clinker Grinding L
Finish Grinding L
Cement Silo M
Finish Grinding Feed Belt R
Bag House Filter
Cyclone
a16,b16
16,350
Load Out N
Packing Machine
Bin
Note :
Refer to next Table for Emission Estimates
Legend:
APCE ducting system
Production Inputs
Particulate Emissions
Waste Gas
Waste Heat
Steam
Product

Summary of Emission Inventory (emissions per day in kg/Ncm)

PROCESSES	PM30	PM10	SO2	NO2	CO	CO2	TOC	Moisture
1. Raw Material Preparation								
Raw material Unloading	0.0000	0.0002						
Hammer Crusher	0.0000	0.0005						
Raw Material Grinding	0.0000	0.0027	0.2330				0.2330	
Raw Meal transfer & Conveyor	0.0051	0.0000						
SUB-TOTAL	0.0052	0.0035	0.2330	0.0000	0.0000	0.0000	0.2330	0.00
2. Calcining/ Clinkering								
PreHeater with cooling tower	0.00	0.00	2.91	0.00	0.00	0.00		467.30
Coal Rotary Kiln	0.20		6.41	12.64	8.74			
Clinker Transfer	0.00	0.00						
Clinker Cooler	0.01	0.00						
Clinker Storage	0.00	0.00						
SUB-TOTAL	0.22	0.00	9.32	12.72	8.74	4791.83	0.00	467.30
3. Finish Grinding								
Finish Grinding mill separator	0.00	0.00						
Clinker Grinding	0.20	0.18						
Finish Grinding Feed Belt	0.00	0.00						
Finish Grinding Mill	0.00	0.00						
TOTAL	0.20	0.18	0.00	0.00	0.00	0.00	0.00	0.00
4. Packing and Load Out								
Cement Silo	0.07	0.06						
Cement Load out	0.00	0.00						
SUB-TOTAL	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00
	PM30	PM10	SO2	NO2	CO	CO2	TOC	Moisture
Project Emission	**0.50**	**0.24**	**9.55**	**12.72**	**8.74**	**4,791.83**	**0.23**	**467.30**

Figure 3



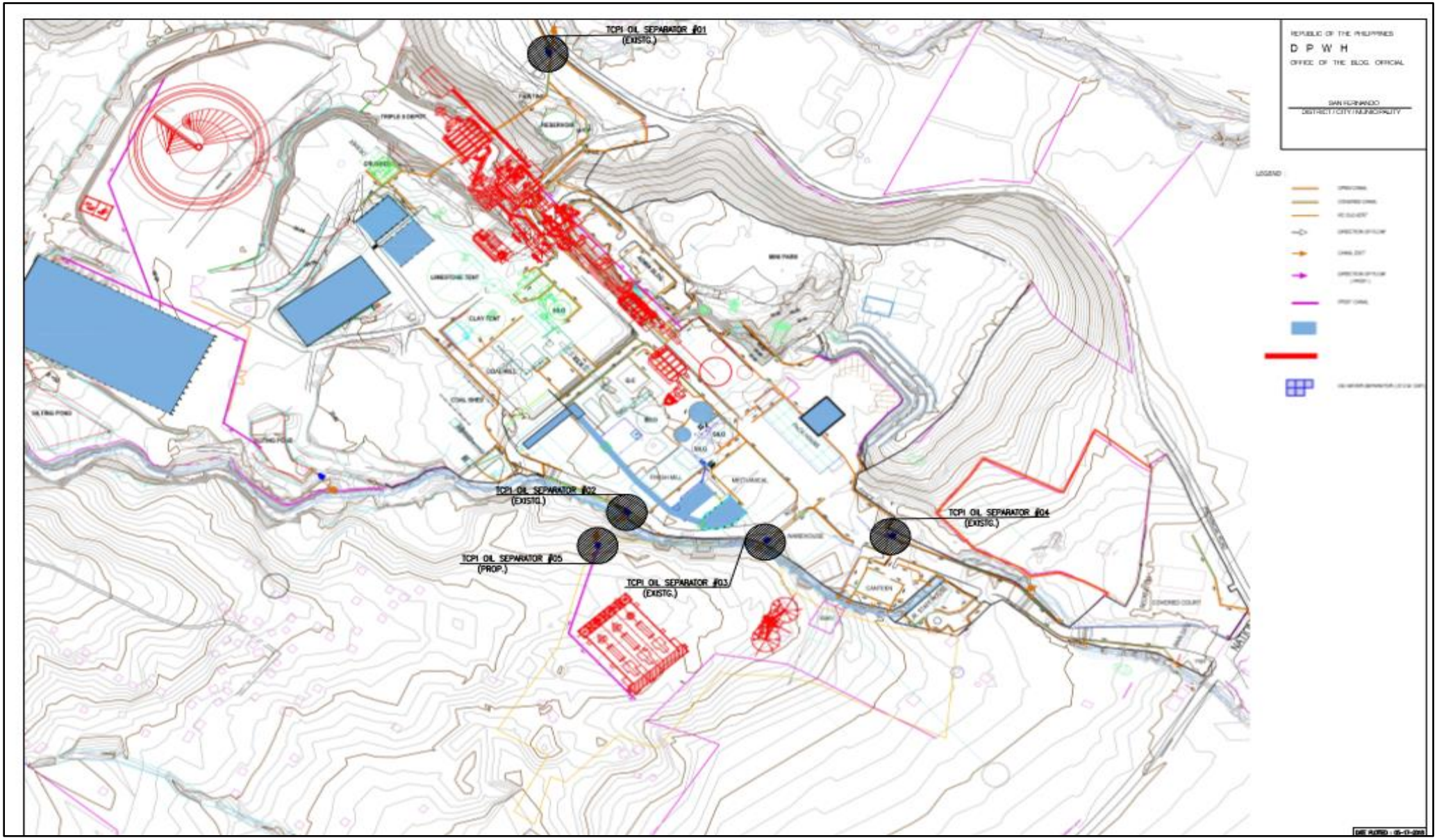
	MAJOR / MAIN COMPONENTS	CAPACITY
1	Clay Crushing System	190 t/h
2	Pozzolan Crushing System	1,000 t/h
3	Raw Mill System	450 t/h
4	Pre-heater building	----
5	Kiln Bag Filter	630,000 m³/h
6	Rotary Kiln	6,000 t/h
7	Air Conditioning Tower	820,000 m³/h
8	Coal Mill	50 t/h
9	Clinker Cooler	440,000 m³/h
10	Clinker Bag Filter	550,000 m³/h
11	Cement Mills - 3 units	125 t/h
	STORAGE / SUPPORT FACILITIES	
12	Cement additive yard-1	
	- gypsum (chemical)	24,000 t
	- gypsum (natural)	8,000 t
	- slag	40,000 t
	- iron	5,000 t
13	Raw Material yard	
	- clay	6,000 t
	- silica	2,500 t
	- iron	3,500 t
14	Limestone yard	50,000 t
15	Cement Additive yard - 2	
	- gypsum (chemical)	2,000 t
	- gypsum (natural)	1,000 t
	- slag	2,000 t
	- limestone	2,000 t
16	Raw Meal Silo	10,000 t
17	Clinker Silo	20,000 t
18	Under Burnt Clinker Silo	2,000 t
19	Pozzolan Silo	3,000 t
20	Cement Silo - 2 units	15,000 t
21	New Administration building	2,518 m²

TCPI KEY PLAN

Taiheiyo Cement Philippines

Proposed Components - Additional Line 2 Expansion

: 2ND LINE Project



Location of Oil and Water Separator Facilities

RISKS and UNCERTAINTIES :

Assumptions :

1. All Project information provided by the Proponent for the EIA will be maintained for implementation, particularly the components, equipment, process, feed composition, fuel type, facility construction and implementation procedure, institutional arrangements, manpower sourcing, safety and emergency response policies and procedures;
2. The Proponent will apply or implement the recommendations in the Geotechnical Investigation Report pertaining to depth of foundation for load bearing structures;
3. Steady state condition of wind patterns, i.e., the PAGASA information in wind rose in the area will remain the same. Future wind patterns due to climate change have not been included in the pollutants' dispersion model for lack of sufficient reference on wind pattern or current behavior.

The Risks and Uncertainties in the environmental aspects of Project implementation include the following:

1. Possible change in area / location that will receive the maximum one-hour Ground Level Concentration of air pollutants, which is experienced during kiln firing. As observed in the result of Air Dispersion modelling, the resulting pollutants that will be experienced at ground level will be much lower than the upper limit set by the DENR.
2. Risks to the public due to failure of Air Pollution Control Facility (APCF) is nil, because there will be a total of twenty two (22) APCF. The system has auto-shut-off which will shut operations when more than one APFC fails to perform properly.
3. Risks to health due to the plant pollution will be nil, due to 99.97% efficiency of bag house filters that will be used.
4. Risks to safety and integrity of the Line 2 structures will be safeguarded by a) the Quality Control of TCPI because the loss will primarily be theirs and being a company with operations in several countries, Taiheiyo engineers will not accept substandard design or construction of important facilities which have high potential to generate damage to its environment in the event of failure.
5. Risks of failure of waste water treatment facility (WWTF) will bring minimal repercussions a) because waste water volume is minimal b) each WWTF has five (5) chambers and there are five (5) WWTFs.
6. Risks of sudden unemployment due to sudden unintended closure will be addressed by Company compliance to policies of the Department of Labor and Employment.
7. Risks of the Project not bringing the desired Social Development impact will be managed by the recipient community. The Proponent is willing and ready to assist but require that the Recipients help themselves to reach their dreams and aspirations.