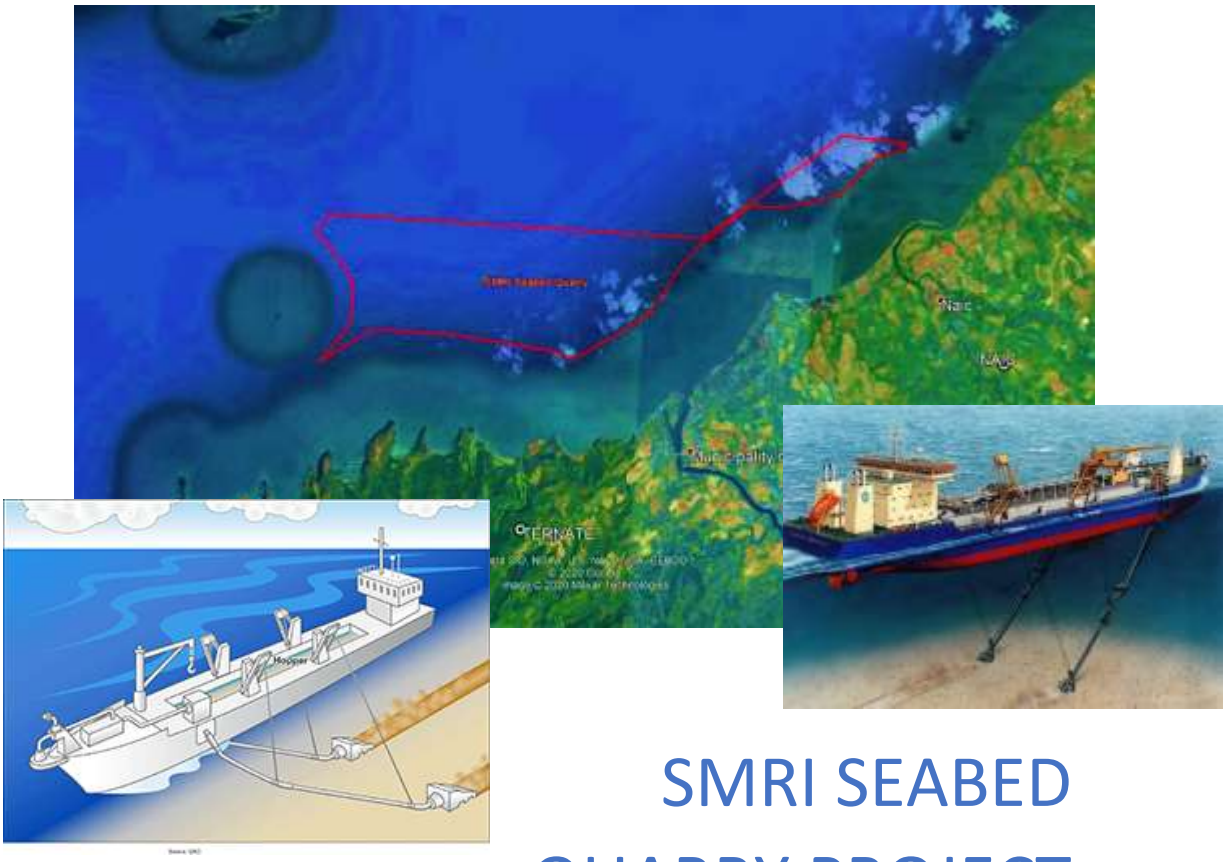
SILVERQUEST MINING RESOURCES, INC



SMRI SEABED QUARRY PROJECT

Environmental Impact Statement

Abstract

The proposed Project of Silverquest Mining Resources, Inc will involve dredging of mud, silts, and other suitable dredge fill materials from the borrow areas offshore within Manila Bay within the jurisdiction of Ternate and Naic, Cavite for use in Manila Waterfront City Reclamation development about 42 kilometers away near the City of Manila

PRISM EXPRESS

ECCA ENVIRONMENT & CLIMATE CHANGE ADVISERS INC.

Unit 11, Kingswood Arcade cor. Pasong Tamo and Vito Cruz Extension, Makati City

EXECUTIVE SUMMARY

E.S. 1.0 BASIC PROJECT INFORMATION and PROJECT DESCRIPTION

Table E.S. 1-1 Basic Project Information

Name of Project:	**SMRI SEABED QUARRY PROJECT**
Project Location	Municipal Waters off the coasts of the municipalities of Ternate and Naic, Province of Cavite
Nature of the Project	Dredge-fill materials/Non-Metallic Minerals Extraction pursuant to DAO 2000-25 guidelines on seabed quarry permitting
Project Duration	Approximately 3 to 4 10 years to operate about 100 million cubic meters of dredge fill materials; may extend depending on weather condition and the number of days the dredge ships are able to operate.
Authority over the Project Area	Government Seabed Quarry Permit from Mines and Geosciences Bureau
Project size	The seabed quarry site has an area of about 2,124.3581 hectares off the coast of Cavite in the Manila Bay; within the municipal waters of Ternate and Naic. Total dredge fill material to be extracted is around 100 million cubic meters over the duration of 3 to 4 years.
Components:	There are two major components of the dredging project • Dredging of silt, sand, aggregates, and other suitable dredge fill materials from the seabed off the Manila Bay within the municipal jurisdiction of Cavite to support the reclamation activity of the Manila Waterfront City Project, which is a separate project of LGU Manila • Transferring the dredged fill materials from the borrow source (project site) and dump it into the reclamation site, also within the same Manila Bay offshore of the City of Manila The activities of reclamation project have been covered by the PEISS; in fact, already secured ECC for Manila Waterfront City Reclamation Project
Project Type:	Environmentally Critical Project (ECP) by EMB Memorandum Circular No. 2014-005 (July 7, 2014) – Guidelines for Coverage Screening and Standardized Requirements under the Philippine EIS System, Amending Relevant Portions of MC 2007-002; Under Sub Heading 2.1.3 – Classified as extraction of non-metallic minerals such as Aggregates (sand, stone, gravel, including dredging with or intended for recovery and use of materials).

Total Project Cost:	P15 Billion
Total Manpower:	20 personnel per dredging ship or a total of 80 on 4 dredging ships; plus 20 more personnel onshore or a combined total of 100 personnel

Table E.S. 1-2 Proponent's Profile

Proponent Name and Profile	**SILVERQUEST MINING RESOURCES, INC. (SMRI)**
Proponent's Address	Unit 103A ZEN Bldg., 8352 Mayapis St., San Antonio Village, Makati City.
Authorized Representative	Ms. Ellen T. Balunsat
Designation	President
Contact Number	02-8529-4741
Contact Email	ednonog07@gmail.com silverquestmining@yahoo.com
EIS Consultant	PRISM EXPRESS CONSULTANTS, INC
Consultant's Address	Unit 11, Kingswood Arcade cor. Pasong Tamo Chino Roces and Vito Cruz Extension, Makati City
Consultant's Authorized Representative	Allan Plete Vice President and Project Manager
Contact Numbers	(+632) 88651223
E-mail Address	allanplete@yahoo.com

E.S. 2.0 Brief Summary of the Project EIA Process

The Silverquest Seabed Quarry Project falls under Category A: Environmental Critical Project (ECP) per EMB Memorandum Circular 2014-005. The content of the EIS is based on the checklist based on the results of the conduct of online Technical Review and Scoping held last January 18, 2021 per EMB-DENR Revised Procedural Manual (RPM). This checklist is provided as ANNEX 1.

E.S 2.1. EIA TEAM

The members of the multi-disciplinary team of researchers that conducted the Environmental Impact Assessment (EIA) study and their corresponding fields of expertise are shown in Table ES-3.1.

Table E.S. - 2-1 EIA Team

Consultant	Module
Engr. Allan Plete	Project Manager
Mr. Reynar Rollan	Geotechnical Engineering
Engr. Aldwin A. Camance	Risk Assessment/General Ecology
Dr. Merlyn Rivera	Socio Economics
Mr. Manuel Potrido	IEC
Mr. Roy Aurelio Metin	General Geology
Mr. Delio Cimatu	Public Participation and Consultation
Mr. Rogerio Espiritu	Bathymetry Survey
Dr. Katherine Sanchez Escalona	Coastal Marine Ecology and Water Quality
Engr. Oliver Barbosa	Bathymetry and Survey and GIS mapping
Mr Rommel Peneyra	Climate Change and Disaster Risk Management
Mr. Jones Melendres	Terrestrial Ecology

E.S 2.2. EIA Study Schedule and Methodology

The EIA team started the environmental works on October 2020 to February 2021 including the preparation and holding of consultation meetings onsite in Ternate and Naic. It would be good to note that the Environmental Work Program for Offshore Exploration was done in 2017 and made to form part of the exploration works for issuance of the Government Seabed Quarry Permit.

Table E.S. 2-2 the EIA Study Period

ACTIVITY	DATE	AREAS COVERED
Environmental Work Program for Offshore Exploration	October 2016-July 2017	Landform
Exploration Work Program	October 2020 to January 2021	Literature Search: geophysical data, lithological data Geophysical survey
Application for a Government Seabed Quarry permit	November 2020 to January 2021	
Hydrography and Bathymetry	December 2020	Project Site and Immediate Vicinity
Secondary Data Researches	November 2020 to January 2021	Naic and Ternate, offshore areas, Manila Bay
Marine Study	December 2020	Proposed Project site and immediate vicinity
Water Sampling and Laboratory Tests	December 2017	Proposed Project site
Consultation with LGUs and stakeholders	November to December 2020	
Drafting of EIS Report	December 2020 to January 2021	
Final Review and Submission of Report	February 2021	

The direct and indirect impact areas are defined by DAO 2017-15 are provided below. EIA Approach and Methodology is also presented in Table ES 2-3.

E.S. 2.2.1. Direct Impact Area for Air Quality

Direct Impact areas for Air Quality are areas where ground level concentrations of emissions are higher than the ambient standards based on air modelling. Modelling is done based on the emissions of ships to

be used in dredging; the resulting data is not expected to exacerbate ground level ambient pollutant concentrations in Ternate and Naic neither affect the local air quality along the coasts.

E.S. 2.2.2. Direct Impact Area for Water Quality and Quantity Impacts

Direct Impact Areas for Water Quality is where water quality is projected to exceed the ambient standards. This likewise are areas where existing users of the natural resources will be impacted. There will be considerable turbidity where dredging operations would take place but these may be fleeting considering the high currents in the vicinity of the borrow area. Studies have shown that turbidity values usually go back to background from 300-400 meters from the source of dredging; however, the effects of continuous dredging activities must take into account the effects of calm waters; i.e. locations up to 2.5 kilometers from the dredging point or source must be taken into account, as shown below.

E.S. 2.2.3. Direct Impact Areas for Impacts on Land

Direct impact areas on Land are those directly vulnerable to the potential effects of flooding or which may cause changes in the deposition of sand in the shores particularly along beach fronts area. Erosion on the shoreline will be studied as part of the possible impacts of changes in the bathymetry due to dredging.

E.S. 2.2.4. Direct Impact Areas for Impacts on People

Direct Impact on the People Sector includes the local populations in the barangays and municipality that will benefit from taxes, royalties, social development fund provisions, and permit fees to be generated from quarry operations over the span or duration of the project. Since the seabed quarry area is in the municipal waters off Ternate and Naic, then the two municipalities will also benefit from the project.

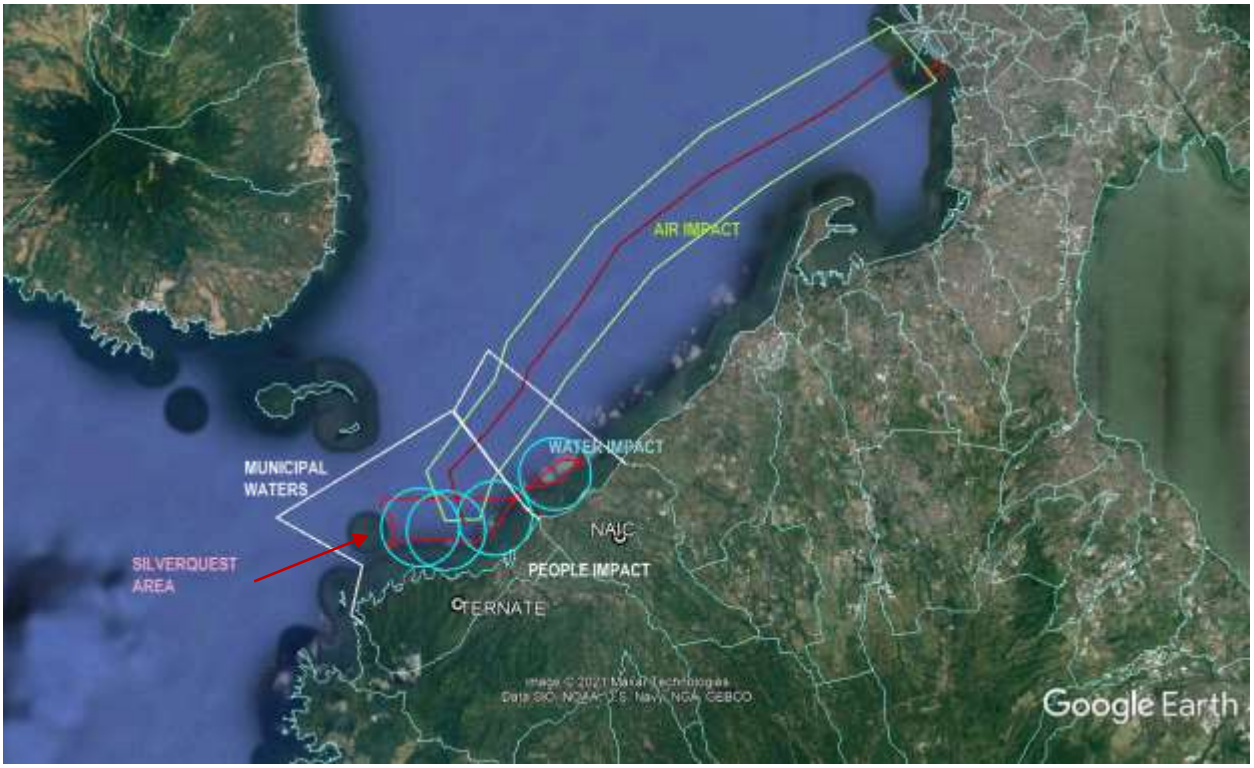


Figure 2-1 Conglomeration of Impact Areas

Table ES-2.3 presents the methodologies used for the gathering of primary and secondary data for the different components.

Table E.S.2-3 Methodologies for each component

Module / Section	Baseline	Methodology
LAND		
Land Use Classification	**Secondary data:** The Comprehensive Land Use Plan (CLUP) of Naic and Ternate	Assessment of the land uses in the coastal areas that may be affected by the dredging activities
Geology	**Secondary data:** Geologic, seismic, hazard maps and evaluation based on government data and maps.	Identify and assess project impact in terms of the changed in topography including existing hazard as maybe aggravated
Pedology	**Primary data:** Geotechnical Studies	Describe the physical properties and erodibility potential of the soil, ongoing erosion processes in the shoreline
WATER		
Hydrology / Hydrogeology	**Secondary data:** Existing drainage system. Historical flooding occurrences onshore	Identify and assess project impact on the change in drainage morphology, local drainage and resulting effects of flooding

Module / Section	Baseline	Methodology
Marine Water Quality	**Secondary Data:** Standard Methods for Water Quality Sampling and Monitoring. **Water Body Classification:** DENR Class SB for Manila Bay **Parameters Considered:** pH, BOD5, COD, DO, Oil and Grease, TSS, Heavy Metals, Fecal / Total Coliform, Nitrates / Phosphates	Assess impacts on siltation of surface and coastal marine waters
Sediment Transport	Secondary Data: Assessment of effect of Tides and wind on the transport of sediments	Use of a Sediment Transport Model
Oceanography	Topographic map covering the Manila Bay from NAMRIA. Depth surveys available in the project area. Post-processing of the interpolated bathymetry of the areas covering Manila Bay	To determine the topographic configurations of the seabed (referred to as "bathymetry"), available topographic map covering the Manila Bay from NAMRIA were digitized and merged with the depth surveys available in the project area.
Marine	**Primary data:** Abundance / density / distribution of ecologically and economically important species, mangroves, benthism plantons, coral reefs, algae, seaweeds, sea grasses	Transect, manta tow and spot dives surveys, marine resource characterization (e.g. city/municipal and commercial fisheries data), Key informant interview.
AIR		
Air Quality	No primary data since the operations are all off shore and far from populated areas. Secondary data using some air modelling to determine extent of plumes from ships	**Methodology:** use of a Gaussian Plume assessment model for SOx and Nox
Contribution in terms of GHG	Data in Greenhouse gasses	Estimate of projected greenhouse gasses (GHG) from Ship ping
PEOPLE		
Demographic Profile / Baseline	**Primary data:** Conduct of Public Perception Survey, Public Scoping **Secondary data:** Comprehensive Land Use Plan of Naic and Ternate	

E.S. 3.0 SUMMARY OF BASELINE CHARACTERIZATION

E.S 3.1. LAND SECTOR

Table E.S. 3-1 Summary of Land Sector Baseline Information

Environmental Component	Description
LAND	
Land Use and Classification	The project site will be situated off the shore and project activities would not touch on any landmass except to berth and maintain the dredge ships and to provide residential areas for the crew. This section of the baseline will focus on portions of the land that are closest to the activities and most likely may affect or get affected by the same. It covers the municipalities of Naic and Ternate, in the province of Cavite.
Municipal Coverage	Naic is a first-class municipality and located at the western part of the Province of Cavite. It has a total land area of 8,600 ha which is about 6.03% of Cavite's total provincial land area. It is politically subdivided into 30 barangays wherein 10 barangays are located along the coastal areas facing the Manila Bay.
	On the other hand, the Municipality of Ternate is a 4th class municipality and a total land area of 4,350 or 3.05% of the land area of Cavite. It has 10 barangays in which three are urban barangays while seven are rural areas. Both the municipalities of Naic and Ternate are classified as coastal municipality
Existing Water Use	In terms of coastal area, the province has a total coastal water area of 93,679.38 ha in which 6.75% (6,324.62 ha) is in Naic while 11.02% (10,331.23 ha) is in Ternate. Furthermore, the Province of Cavite has a total coastal line length of 122.57 kilometers. The coastal line in Naic is 9.12 kilometers long while in Ternate is 23.63 kilometers
Environmentally Critical and Sensitive Areas	The borrow or dredge area will not overlap with existing protected areas in Ternate; relatively close to the 3kilometer buffer zones of two municipal fish sanctuaries in Cavite.
	The nearest ECA is the Mt. Palay-palay protected landscape, which is onshore in the province of Cavite. Mt. Palay-Palay protected landscape is proclaimed a game refuge and bird sanctuary. It is home to a diverse bird species such as the Philippine eagle-owl, Philippine falconet, Philippine hawk-cuckoo, Philippine drongo-cuckoo, Philippine hawk-owl, ashy thrush, brahminy kite, crested serpent eagle, Philippine fairy-bluebird, Philippine trogon, black-chinned fruit dove, island swiftlet, Philippine bulbul, Pacific swallow, Luzon hornbill and Philippine pygmy woodpecker.
Geology/Geomorphology	The burrow or dredging area corresponds to a portion of Manila Bay known as the San Nicolas Shoal (SNS). It is located 4 to 6 kilometers north of the coast of Maragondon and Ternate in Cavite. Regionally, it occupies the south-eastern edge of Manila Bay. The SMRI dredging area occupies approximately 2,135 hectares.
Slope and Bathymetry	Spatially, the burrow area corresponds to 1.26% of the total expanse of Manila Bay. The narrow northern section has a depth range of 3 to 5 meters and has an average slope of 0.5%. The elongated and wide southern section varies in depth from 5 to 35 meters and also has an average slope of 0.5%.

Environmental Component	Description
LAND	
Techtonic Settng	The burrow site is located on the western shore of the Manila Bay along the chain of Quaternary volcanoes which extends from Pinatubo southwards to Natib, Mariveles, Corregidor, Taal, Palay-Palay and on the northeastern portion of Mindoro Island. In particular, the project site forms a part of the volcanic front related to the active subduction of the adjacent Manila Trench with resultant faulting, volcanism and rifting.
Lithology	The Holocene sediments found along the coastal section of Cavite, Bataan, Bulacan and Pampanga extend seaward into Manila Bay. Using NAMRIA data, Siringan and Ringor (1998) generated a sediment distribution map of Manila Bay and show sandy deposits are dominant along the coastal section of the project area. Available borehole data at the San Nicolas Shoal revealed interlayers of sand, silt and clay within the drilled depth of 20 meters
Sesimicity	The major earthquake generators and structures which can potentially affect the area include the Manila Trench, Lubang Fault, West Marikina Valley Fault, Philippine Fault, Philippine Trench and Macolod Corridor.
	The nearest fault line in the project area is the West Valley Fault and located more than 30 kilometers away.
	The strongest recorded quake within the vicinity of the area corresponds to a Magnitude 7.8 event, which was recorded on July 16, 1990. The epicenter of this quake is in Digdig, Nueva Ecija which is about 159 kilometers northeast of the Project Area.
Ground Rupture	The municipalities of Naic and Ternate are not susceptible to ground rupture. The significant distance of the area from major faults will make it not be susceptible to ground rupture.
Ground Shaking	Ground shaking due to earthquakes will affect the project the entire Manila Bay and its coastal rim including the project area. This phenomenon could stir up the partially consolidated sediments or soft soils. The regional peak ground acceleration map of the Philippines prepared by Thenhaus, Hanson and Algermissen of the United States Geological Survey and the Philippine Institute of Volcanology and Seismology (1995) indicate that a value of 0.60 g for the unconsolidated sediments of Manila Bay and the coastal areas . This g value has a 10% probability of being exceeded in 50 years
Earthquake induced landslide	Both the municipalities of Naic and Ternate are not susceptible to earthquake-induced landslide
Liquefaction	In Naic, 16 barangays are susceptible to liquefaction; 9 barangays are highly susceptible while 7 barangays are moderately susceptible. For Ternate, only 1 barangay is not susceptible to liquefaction; 4 barangays are highly susceptible, 4 are moderately susceptible and 1 has low susceptibility
Volcanic Eruptions	Based on previous eruption records, ash spewed from Taal Volcano and even Mt. Pinatubo in the north could reach the Manila Bay Area. Although these airborne deposits could locally and temporarily reduce visibility and safe movement of vehicles, ships and airplanes in the Bay area, these will have no significant impact on the Project Area.
Tsunami	Tsunamis generated by major seismic events could potentially damage the coastal areas depending on the wave height and the presence of coastal protection measures. The passage of the tsunamis through the project area can potentially affect the seabed by stirring up the underlying sediments.

Environmental Component	Description
LAND	
Storm Surge	The coast-lying barangays are susceptible to this kind of hazard. The municipalities of Naic and Ternate are both moderately susceptible to storm surge. Storm surges could affect the Coastal Plain but no effect on the submerged part of the area.
Soil Type	The lowland area of Cavite, including Naic, is generally made of Guadalupe clay and clay loam. It is characterized as coarse and granular when dry, but sticky and plastic when wet. Its substratum is solid volcanic tuff. The shoreline of Naic is composed of Guadalupe sand.
	In Ternate, is made of Tagaytay sandy loam with mountain soil undifferentiated. Tagaytay sandy loam is friable and granular. It has a considerable amount of volcanic sand and is underlain by adobe clay. Patungan sand, characterized as pale gray to almost white sand with a substratum of marine conglomerates, is seen along the coastlines of Ternate
Soil Erodibility	Both the municipalities of Naic and Ternate, being located along the coastal area of Manila Bay, are susceptible to coastal erosion due to flood and storm surge.

E.S 3.2. WATER SECTOR

Table E.S. 3-2 Summary of Water Sector Baseline Information

Environmental Component	Description
WATER	
Hydrology	The general direction of the flow is from the highlands of Tagaytay going to Manila Bay and stretching from the Municipality of Bacoor up to Ternate. Cavite has six major rivers; Maragondon River, Labac River, San Juan River, Bacoor River and Imus River. The Municipality of Ternate is within the Maragondon River Basin while Naic is within the Maragondon River Basin and Labac River Basin. The Maragondon River and Labac River are discharging near the proposed project site.
Water Quality	Based on DENR Data, all the stations in NCR have dissolved oxygen below the limit in 2017 and were observed to have low dissolved oxygen since 2011. Stations in Region 3 and Region 4A have DO levels of 6-7 mg/L from 2011 to 2017. Only stations in NCR have available data on nutrients. Measured nitrate in NCR stations were below the standard limit for Class SB. This is also true for the measured phosphate concentrations in the stations. All the coastal beach monitoring stations contain high level of fecal and total coliform exceeding the standard limit. The stations in NCR were observed to have the highest measured coliforms. This indicates that the bathing beaches are not safe for human contact
	Based on recent water quality sampling results, coastal waters of Cavite that are onshore of the proposed dredge area generally pass Class SB water quality standards except for high TSS levels and fecal coliform levels

Environmental Component	Description
WATER	
Sediments	The sediments which underlie the project area and the rest of the Manila Bay were transported by river systems which drain 26 catchments. These catchments are bounded on the east by the Sierra Madre Mountains, to the north by the Caraballo Mountains, to the northwest by the Zambales Mountain Range and to the west by the Bataan Peninsula. The biggest river systems correspond to the Pampanga River to the north and the Pasig River to the west. At the Maragondon – Ternate area, the drainage systems which discharge into Manila Bay and in the vicinity of the Project Area correspond to the Maragondon River and small streams which drain the Volcanic Mountainous Area. These waterways form their respective deltas at the southeastern edge of Manila Bay
	De Las Alas in 1990 (as cited in Siringan and Ringor, 1998) predicted the sedimentation rates in various parts of Manila Bay. The predicted rate at the Project Area is less than 1 cm per year. The movement of the sediments within the bay is due to the combined effects of tidal, fluvial and wind patterns.
Marine Ecology	The project area is on the eastern coast of Manila Bay adjacent to Nasugbu Bay. The dredging area is estimated to be at 4 kilometers from Ternate coast. There is no known reef in the area but hard substrates or volcanic origins are known to occur. The proposed dredging area is about 10 to 30 meters in depth
Fish	Underwater visibility within the project area runs only for about a meter in which camera tows did not show any features that indicate biological activity within the project site. Interviews with fishermen, however, indicate pelagic fish species are being sourced from the area. Species caught mostly include species from the Scrombidae and Carangidae like Shortfin scad or "galunggong" (Decapterus macrosoma), Frigate tuna or "tulingan" (Auxis thazard), and Chub mackerel or "lumahan" (Scomber sp.).
Benthos	At Ternate River, the area has gravel-sand substrate with thick shells layer overlying the bottom. The site is known locally to be commercially exploited for *halaan*. At least two (2) species of clams were documented to be harvested from the site: *Katelysia hianta* (Family Veneridae) and *Anadara* sp. (Family Arcidae). *Tahong* (*Mytilus* sp.) also forms part of the benthic harvest but are usually discarded. Interviews with gleaners indicate a catch-per-unit effort of 10 liters for four (4) hours that is being sold at PhP 500.
	Spot diving in the area indicated recruitment of sponges, oyster spats, and hard corals. There were no observed large colonies of either sponges or hard corals observed, however. The site is visited by angler-hobbyists which reportedly can haul various fish species such as *lapulapu* (Serranidae), *mais-mais* (Luthjanidae and Lethrinidae), *tulingan* (Scrombidae) and *talakitok* (Carangidae).
Seagrass	There was no seagrass community observed in the area. Within Manila Bay, seagrasses are known to occur in Bataan at the northern coast of the bay

E.S 3.3. AIR SECTOR

Table E.S. 3-3 Summary of Air Sector Baseline Information

Environmental Component	Description
AIR	
Climatology and Meteorology	The climate in the site and in the municipalities of Naic and Ternate is classified as Type I under the Modified Corona's Classification System used by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). Areas under this climate type experiences two pronounced seasons: dry from the months of November to April and wet for the rest of the year.
Temperature	April and May are the hottest month of the year with a recorded mean temperature of 31 degrees Celsius (˚C) while January is the coldest month with average temperature of 26 ˚C.
Wind Direction	Based on the meteorological observations from 1974 to 2012, the prevailing wind in the area is east-southeast during the northeast monsoon ("Amihan") from October to March and west during the southwest monsoon ("Habagat") from June to September. The average speed of winds is 3.0 meters per second.
Rainfall	Based on the climatological normals in Sangley Point, Cavite the annual amount of rainfall in the area is about 2,078.4 mm with 127 days of rainfall. The highest rainfall was observed in August with amount of 457.2 mm and lowest in March with 9 mm. The greatest daily rainfall recorded was on August 7, 2012 with amount of 354.2 mm
Tropical Cyclones	Tropical cyclone paths from 1948-2017 show only about 18-20 typhoons and tropical cyclones pass near the area with only one hitting the project area directly
Air Quality	Air quality in the land area of Naic and Ternate is generally very good as the surroundings are mostly devoid of industries and is in a mostly agricultural and residential area. Air quality in the coastal area where the ships will be deployed has not been measured but is expected to be very good considering the effects of land and sea breezes.

E.S 3.4. PEOPLE SECTOR

Table E.S. 3-4 Summary of People Sector Baseline Information

Environmental Component	Description
PEOPLE	
Demography	Based on the 2015 Census of the Philippine Statistic Authority, the Province of Cavite had a total population of 3,678,301 of which 3.03% (11,454) is from Naic and only 0.63% (23,157) is from Ternate.
	In terms of population density, Naic is inhabited by 1,470 people while Ternate by 386 people. The total number of households is Naic is 26,131 with average household size of 4.2 while Ternate has 5,673 with average household size of 4.1

Environmental Component	Description
PEOPLE	
Literacy Rate and Education Attainment	In 2015, the literacy rate of Naic in terms of its household population of 10 years old and above is 99.4%. The percentage of people who are in schooling age (5 to 24 years old) that was attending school in 2015 was 68.49%. In terms of highest educational attainment, majority (30%) of the population were able to graduate in high school and about 11% were academic degree holder
	For Ternate, the literacy rate is 99.7% and about 67.3% of the population were attending school in 2015. The highest education attainment of the Municipality was high school graduate with 30% of the population followed by high school undergraduate with 15%. Only 8% were academic degree holder
Income	According to the 2015 Family Income and Expenditure Survey (FIES), the average annual family income in Region 4A at current (2015) prices was at 312,000. For all income class, majority (60%) reported wage/salaries as their main source of income. Only 15.7% reported entrepreneurial activities while 24.3% cited other sources of income.
	In Naic, there are a total of 42,795 gainful workers who are 15 years old and above. Of the major occupation groups covered in the 2015 Census of Population, the largest number of gainful workers 15 years were found to be engaged as Service and Sales Workers. For Ternate, the total gainful workers who are 15 years old and above is 8,810 in which majority were also engaged as Service and Sales Workers
Indigenous People	There is no known Ancestral Domain Claim (CADC) covering the project area nor Ancestral Domain Title (CADT) applied or issued within the project area
Industry	About 46% of the land area in Naic is used as agricultural area. As of 2018, there are 8,529 farmers in Naic and Ternate and about 14,938 MT of crops were harvested. These crops include rice, corn, vegetables and mango. Of all the crops harvested, majority (78%) is rice
	In Ternate, only 12% of the land area is used for agriculture and only 312 farmers were recorded in 2018. About 4,420.82 MT of crops were produced which consists of rice, vegetables, root crops, coffee, banana, mango and papaya. More than half of the crop produced was rice.
Aquaculture	Aquaculture fisheries is also observed in Naic. It has 3,791 registered municipal fisher folks and 178 registered commercial fisherfolks.
	Aquaculture fisheries in the municipality were mostly in brackish water fishpond. There are also 3,000 municipal fisher folks registered in the municipality.
Power Supply	The electric power supply in both municipalities is serviced by the Manila Electric Company (MERALCO). In 2017, there were 27,858 and 3,577 customers of MERALCO in Naic and Ternate, respectively. About 90% of the households in Naic and Ternate are served by MERALCO.
Water Supply	The water supply in Municipality of Naic is served by the Naic Water Supply Corporation. In 2018, there are 8,495 households and 348 commercial establishments connected to Naic Water Supply Corp. The minimum residential water rate is Php 120 for first 10 m3
	For the Municipality of Ternate, water is supplied by Western Cavite Water Supply and Service Corporation. There were 1,545 residential service connections in 2018 with minimum residential rate of Php 144 for first 10 m3

Environmental Component	Description
PEOPLE	
Tourism	In terms of tourism, Ternate is included in Metro Tagaytay which is famous for natural tourist attractions and conducive for meditation, sight-seeing, picnicking and other activities. Another tourism point in the province is the Tente-Corregidor-Naic-Maragondon area which is known for the presence of world-class beach resorts. There are also two major historical attractions in Naic, the Battle of Naik Site and the Recollect State House. For natural attractions, Ternate has the Mts. Palay Palay and Mataas na Gulod National Park.
Peace and Order	The Municipality of Naic has a police to population ratio of 1:2,055 while in Ternate, the police to population ration is 1:714.
Public Health Services	There are two private hospitals and one government-owned hospital in Naic with a total bed capacity of 90 however, there are no hospitals in Ternate. Furthermore, there are 1 RHU, 34 barangay health stations in Naic and 1 RHU and 2 barangay health stations in Ternate.
Perception Survey	The respondents mentioned of several serious problems in their respective barangays. Foremost of these is the occurrence of trash/garbage. According to them, garbage is normally observed as being disposed in the river and shorelines. Furthermore, there seems to be a shortage of garbage trucks which results to the irregular and untimely collection of garbage from the communities. It was also alleged that there is no designated disposal facility which results to improper waste disposal. In addition, a seemingly disregard for the environment was observed because domestic/human waste without treatment is directly discharged to the river and bay.
	Another problem experienced is the occurrence of flood waters coming from the Maragondon River. The rushing flood waters during strong rains and typhoon carry not only garbage but also silt, gravel and sand. This contributes to the siltation and shallowing of the river mouth which eventually caused the closure of one of the channels of the said river. The obstruction has resulted to barangay Bucana's being susceptible to flooding.
	According to the respondents, the strong waters of Maragondon River during typhoons and heavy rains, has now eroded almost 50% of the original area of Balut Island
	Fishing is the main source of income by majority of the respondents and harsh weather conditions extremely affect their source of income since there are no fishes to sell by the vendors. The source of food for those directly dependent on the sea is likewise drastically affected. Illegal fishing, which utilizes harmful chemicals/dynamite and trolling (gears destroy the corals) add to the burden of the fishermen from the barangays.
	The lack of job opportunities has been the predicament of seventeen (17) or 6% of the respondents. Also, shallow wells have allegedly disappeared, damaged and eroded. There is an acute problem as to where to source water for domestic use in the area. Water is fetched from distant sources since all the wells nearby were all reported to have been damaged by big waves.
	Furthermore, the insufficient annual barangay budget was forwarded by two (2) of the respondents from Sapang I. The inadequacy poses as a problem because it results to the lack or insufficiency of important resources during emergencies. These resources identified as rescue boats and vehicles which are badly needed during emergency evacuations

Environmental Component	Description
PEOPLE	
Community Concerns about Dredging	When asked about their opinion on dredging, there was a different trend observed on a per barangay basis. Majority of the respondents in barangays Bucana (75%), San Juan I (71.4%) and Sapang I (70.4%) had a negative outlook about dredging. While a smaller percentage of the respondents in the given barangays indicated a positive perception on dredging, there was a majority of the respondents in Poblacion III who was not sure of their perspective towards dredging. On the whole, there was 64.0% of the total respondents who had a thumbs down for dredging while 26.1% had a positive outlook on dredging. Over-all, there was only 10% of the interviewed residents who was not sure about dredging activities implying that they need more information to make a conclusive response.
	The respondents who replied in the negative, gave reasons such as the destruction of fish sanctuaries including the coral reefs which consequently will drive fishes away. Given this situation, a negative impact will be experienced on their source of livelihood. Furthermore, dredging according to them cause erosion which will make shoreline communities "disappear". In addition, erosion cause blockage of the waterways exacerbating flooding in the area. The respondents stated a negative perception of dredging because they are oblivious of any positive effect or benefit of the said activity.
	The proposed dredging project was seen by forty-two (42) or 20% of the total respondents as a catalyst for a cleaner Manila Bay. It was also perceived to control floods and a means to prevent destructive erosion. Flood control and erosion prevention infrastructures are perceived to be a component of the proposed project. There was 10% of the respondents who perceived to be provided with more job opportunities while 9% foresee that there will be additional revenues to the local government as a result of the proposed project.

E.S. 5.0 SUMMARY OF IMPACT ASSESSMENT and ENVIRONMENTAL MANAGEMENT PLAN

Table E.S. 5-1 Environmental Management Plan Summary

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
PRE CONSTRUCTION PHASE						
Marine Ecology Survey for EIS, Bathymetric Survey	Limited and non-destructive activities			SILVERQUEST and EIS	P10million	Part of the Feasibility and EIA for Government Seabed Quarry Permit
CONSTRUCTION /OPERATION PHASE						
Extraction of sediments from the borrow area using trailing suction hopper dredgers	Dredging site/area	Possible Archaeological site / shipwrecks and other marine historical artifacts	Consult maps of possible historical wrecks / do inspection prior to extraction and deposition	Initial works made during the EIS and Bathymetric surveys	Included in pre-construction activities	ECC/ Contract between Silverquest and Dredging / environmental management plan
	Dredging site/ Seabed	Local terrain modification; generation of sediment plumes	Planning of dredging operations in consideration of the results from bathymetric surveys, current measurements and plume modeling	Dredging /Silverquest	Part of dredging cost estimated at P15 Billion	ECC/ Contract between Silverquest and Dredging

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
			Monitoring of dredging operations and volume of extracted materials	Dredging /Silverquest		
			Proper ship handling of dredged materials and eventual transport to the reclamation site in Manila	Dredging /Silverquest		
	Sea Water at Dredging Site	Wastewater generation aboard ships	Proper disposal of ship wastewaters	Dredging /Silverquest	Included in dredging cost	ECC / Requirement under current laws and regulations
		Sea Water turbidity and Silt dispersion	Use of silt curtain enclosure during dredging especially when activity is near coast	Dredging /Silverquest		ECC/ Contract between Silverquest and Dredging
			Periodic Water quality monitoring			
		Increased possibility of Spills from dredging vessels particularly	Proper maintenance of ship engines	Dredging /Silverquest	Maintenance cost on the part of the dredging operator	ECC/ Contract between Silverquest and Dredging

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
		lubricants due to heavy use of machineries	Audits of ship processes to ensure proper storage of oil and ballast		P150,000 per third party auditor	ECC/ Contract between Silverquest and Dredging
	AIR	Ship Emission, Particulate Matter, CO and Nox	Proper Maintenance of ship engines and pumps	Dredging /Silverquest	Maintenance cost on the part of the dredging operator	ECC/ Contract between Silverquest and Dredging
		Noise Generation	Dredging operation is far from coastal community areas; thus, minimal noise.	Dredging /Silverquest	Included part of dredging operations	ECC/ Contract between Silverquest and Dredging
	PEOPLE: workers	Health and Safety Risk: Physical Hazards	Proper procedures followed by crews and staff onboard ships	Dredging /Silverquest	Included as part of dredging operations	ECC/ Contract between Silverquest and Dredging
			Mandatory use of Personal Protective Equipment (PPE)	Dredging /Silverquest	P500,000 for the ship personnel / part of contractual obligations	ECC/ Contract between Silverquest and Dredging
			Implement policy for periodic health checks	Dredging /Silverquest	P500,000 for the ship personnel / part of contractual obligations	ECC/ Contract between Silverquest and Dredging

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
		Risk of Dredging During Extreme Weather conditions	Implement proper procedure for dredging during weather events; No dredging during typhoon signals	Dredging /Silverquest	Included part of dredging operations	ECC/ Contract between Silverquest and Dredging
	PEOPLE: Fishermen	Risk of Collision between dredging and fishing vessels	Ensure communication between vessels, Promote public awareness of activities in Ternate and Naic	Dredging /Silverquest	P50,000 to provide proper communication channel between FARMC and dredge ships	ECC/ Contract between Silverquest and Dredging
		Impact of Turbidity on Fish Catches	Implement Social Development Plan; provide alternative livelihood for fishermen;	Silverquest	P250,000 to offer livelihood opportunities to fishermen	ECC
			Smaller-capacity TSHD will be deployed in area near the coast, while larger-capacity TSHD will be assigned far offshore	Dredging /Silverques	Included as part of dredging operations	ECC/ Contract between Silverquest and Dredging

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
			Limit the dredging activities in areas the shore especially during periods of calm wind or during low tides	Dredging /Silverquest	Included as part of dredging operations	ECC/ Contract between Silverquest and Dredging
	ECONOMY and PEOLE: LGUs	Generation of Employment	Priority will be given to the residents of Naic and Ternate for qualified residents	Silverquest	Included part of operations	ECC / SDMP
		Additional Revenue for the LGU	Pay the exact taxes and Quarry fees as required by law	Silverquest	Php50 M (estimate only)	National
			Participate in LGU activities	Silverquest	Php 100k/year	ECC/SDP
		Employment Opportunities	Priority for qualified barangay residents	Silverquest	Included as part of dredging operations	ECC/SDP
		Health/Safety	Security in the dredging site to prevent collisions and other activities	Silverquest	NA	ECC
			Advance information on dredging sites to warn fishing boats	Silverquest	Part of SDP	ECC/SDP

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
			Provision of communication equipment to prevent disasters	Silverquest	P100,000 for communication equipment for Ternate and Naic fishing boats	ECC/SDP
ABANDONMENT PHASE						
Completion of Dredging	PEOPLE	Reduction in available jobs and eventual termination of employment	Promote alternative livelihood at early stage of project	Silverquest	P100,00 per quarter for livelihood	ECC/SDP

Project Activities	Environmental Component likely to be affected	Potential Impact	Option for Prevention or Mitigation or Enhancement	Responsible Entity	Cost (Indicative)/ year	Guarantee/ Financial Arrangement
	Seabed	Stirred-up sediments during dredging will eventually settle at rates dependent on particle size and the prevailing currents. The irregularity of the dredged slope to be created will favor deposition of the sediments coming from the northeast and southwest. The passage of currents will cause the subsequent adjustment of the slope of the seabed over time and in accordance with the natural angle of repose of the sediment deposit	Allow for natural attenuation of the seabed			

E.S. 6.0 SUMMARY OF ENVIRONMENTAL MONITORING PLAN

Table E.S. 6-1 Summary of Environmental Monitoring Plan

Key Environmental Aspects per Project Phase Activities	Potential Impacts Per Environmental Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Annual Estimated Cost	EQPL MANAGEMENT SCHEME					
								EQPL RANGE			MANAGEMENT MEASURE		
			Method	Frequency	Location Note 1			ALERT	ACTION	LIMIT	ALERT	ACTION	LIMIT
I. PRE-CONSTRUCTION PHASE													
Potential disturbance of corals and marine ecology during the conduct of geotechnical survey of the seabed; mitigation is by avoidance through appropriate selection of test sites. Deemed not applicable inasmuch as the pre-construction phase activities are essentially completed.													
II. CONSTRUCTION / OPERATION PHASE													
Dredging	A. Land	Solid Waste	Visual	Weekly	Onboard	Project Manager (PM)	Monitoring will be through weekly visual count of the number of garbage cans/containers picked up from the vessels Solid Waste Management Office.						
	B. Water	Total Suspended Solids (TSS)	Gravimetric (Dried at 103- 105◦ C) (USEPA method 3010)	Quarterly During Dredging works	Downstream portion of dredging activities	Project Manager (PM)	Php2000	>50 mg/L < 55 mg/L	>55 mg/L < 60 mg/L	>60 mg/L	Inspection of dredging & filling for corrective action e.g. slow down dredging rate	Increase Silt traps, silt curtains, move closer to dredging	Temporary stoppage until issues are resolved
		O & G	Std Method		At strategic points	PM	Php1000	>2 mg/L < 2.5	>2.5 mg/L <2.5 mg/L	>2.5 mg/L			
		Arsenic	SDDC, Spectrophotometric		Dredging area	PM	Php 50,000 annual	>0.01 mg/L <0.015	>0.015 mg /L <0.02	>0.02 mg/L	Tighten performance of	Zero discharge to sea	Same Same

Key Environmental Aspects per Project Phase Activities	Potential Impacts Per Environmental Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Annual Estimated Cost	EQPL MANAGEMENT SCHEME					
								EQPL RANGE			MANAGEMENT MEASURE		
			Method	Frequency	Location Note 1			ALERT	ACTION	LIMIT	ALERT	ACTION	LIMIT
		Chromium	Flame AAS			PM	budget for heavy metals tests	>0.05 mg/L <0.06	>0.06 mg/L <0.075	>0.075 mg/L	onboard OWS Slow down dredging/ & filling rates	of bilge water Increase surcharge volume	
		Lead	Flame AAS			PM		>0.01 mg/L <0.015	>0.015 mg/L <0.02	>0.025 mg/L			
		Mercury	Manual Cold Vapor AAS			PM		>0.001 mg/L <0.0015	>0.0015 mg/L <0.002	>0.002 mg/L			
		Marine species	Underwater survey			PM	Php 200,000	10% decrease of significant Marine Species	15% decrease of significant Marine Species	20% decrease of significant Marine Species			
		Fecal Coliform	Coliform Count	Quarterly	Same as above	Project Manager	Php 10,000	>100 MPN/100 mL <200	>200 MPN/100 ML <500	.>500 MPN/ 100 mL	Tighten operation of onboard wastewater treatment	No discharge of bilge water to sea	Temporary stoppage until corrections are made
		Quantity of fish resource	Ocular inspection Audit of incident	Accident-Worst case scenario only	scene of accident	Dredging Operator	Part of dredging contract	1-Recorded Potential Accident /potential damage to fish lifts			PCG action and recommendations to be complied with in the absence of quantitative parameters		

Key Environmental Aspects per Project Phase Activities	Potential Impacts Per Environmental Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Annual Estimated Cost	EQPL MANAGEMENT SCHEME					
								EQPL RANGE			MANAGEMENT MEASURE		
			Method	Frequency	Location Note 1			ALERT	ACTION	LIMIT	ALERT	ACTION	LIMIT
	Safety	Implement safety guidelines	observation	Daily	Dredging and Reclamation Site	PM	Part of dredging contract	No injuries or deaths No regulatory framework for quantitative evaluation			Progressive restrictions as imposed by the PCG and other concerned agencies		Temporary stoppage of work until corrective actions are complied