In cooperation with

CTI Engineering International Co., Ltd. (CTII)
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EIS Summary for the Public (ESP) - English

Paranaque Spillway Project

Cities of Muntinlupa, Parañaque, Las Piñas and Bacoor

SUBMITTED TO:

Project Fact Sheet

<table>
<tr><td>Project Name</td><td colspan="2">PARAÑAQUE SPILLWAY PROJECT</td></tr>
<tr><td rowspan="5">Project Location</td><td>City</td><td>Barangay</td></tr>
<tr><td>Muntinlupa City</td><td>Buli
Sucat</td></tr>
<tr><td>Parañaque City</td><td>B.F. Homes
San Isidro</td></tr>
<tr><td>Las Piñas City</td><td>B.F. International Village
Pulang Lupa Dos
Pulang Lupa Uno
Zapote</td></tr>
<tr><td>Bacoor City</td><td>Zapote V</td></tr>
<tr><td>Project Components</td><td colspan="2">
<table>
<tr><th>Project Component</th><th>Main Facilities and Equipment</th></tr>
<tr><td>Intake Facility (Inlet)</td><td>• Intake, Intake open channel, Sand sedimentation pond, Inlet vertical shaft, Control Center Building
• Boom (Floating weed trap), Screen (Trash rack), Dust remover
• Suspended water drainage pump, Operation system
• Ventilation fan
• Elevator, Stairs, Gondola, Hoist crane
• Generator, Transformer, Fuel tank
• Water level gauge, Remote monitoring device, Siren
• Inlet control gate, Stop-log, machine building, gate building</td></tr>
<tr><td>Drainage Facility (Outlet)</td><td>• Outlet vertical shaft, outlet, outlet channel, Control center building
• Main drainage pump, Suspended water drainage pump, Transformer, Generator, Operation system
• Ventilation fan
• Elevator, Stair, Gondola, Hoist crane, Pressure door
• Generator, Transformer, Fuel tank
• Water level gauge, Remote monitoring device, Siren
• Outlet gate, Stop-log, operation center building, machine building, gate building</td></tr>
<tr><td>Spillway (Underground Tunnel Type)</td><td>• Underground tunnel
• Manual cleaning machine, High-pressure cleaning car, Wheel-loader, Vacuum car
• Ventilation fan</td></tr>
</table>
</td></tr>
<tr><td>Type of Project (Based on DENR MC 2014-05)</td><td colspan="2">Flood Control Project</td></tr>
<tr><td>Project Size</td><td colspan="2">9.7 kilometers underground spillway</td></tr>
</table>

Project Proponent	**Department of Public Works and Highways** Flood Control Management Cluster (FCMC) Unified Project Management Office Authorized Representative: Ramon A. Arriola III Project Director UPMO – Flood Control Management Cluster
EIA Preparer	**LCI ENVI CORPORATION** **Engr. JOSE MARIE U. LIM** EIA Team Leader Unit 8L-M Future Point Plaza 3 111 Panay Avenue, South Triangle Quezon City, Metro Manila, Philippines Tel. No.: (+632) 442-2830 / Fax No.: (+632) 961-9226

Project Location and Area

1 The proposed project will be constructed within the cities of Muntinlupa, Parañaque , Las Piñas and Bacoor. The intake facility consisting of the jetty, open channel, inlet gate and vertical shaft will be constructed in Brgy. Buli, Muntinlupa City. The jetty will be installed within the Laguna Lake.

2 The spillway connecting Laguna Lake to Manila Bay will be constructed underground and will pass through the private roads in barangays B.F. Homes and San Isidro in Paranaque City, barangays B.F. International Village, Pulang Lupa Uno Dos, Zapote and Pulang Lupa Uno in Las Pinas City and in Barangay Zapote V, Bacoor City. The spillway will be constructed 50 to 77 meters below the ground.

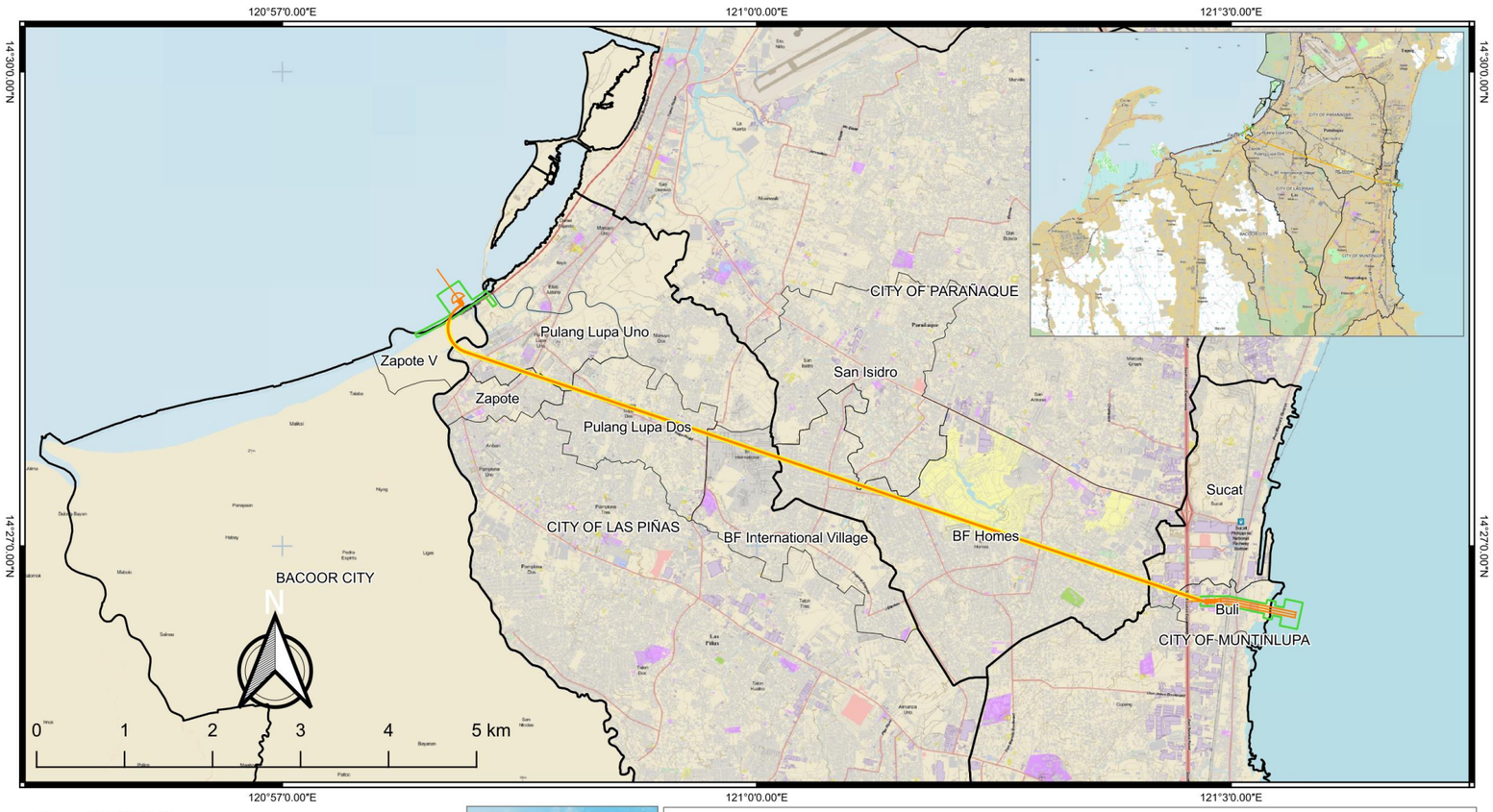
3 The drainage facility will be installed within the coastal water of Manila Bay in Brgy. Zapote V, Bacoor City. A vertical shaft will also be installed in the outlet of the spillway.

4 The locations of the components of the Parañaque Spillway project are summarized in Table 1. The general location map of the proposed project site is shown in Figure 1.

Table 1: Project Location of the Proposed Project

Project Component	City	Barangay
Open Channel and Inlet Facility	Muntinlupa	Buli
Underground Spillway Alignment	Muntinlupa	Buli Sucat
	Parañaque	B.F. Homes San Isidro
	Las Piñas	B.F. International Village Pulang Lupa Dos Pulang Lupa Uno Zapote
	Bacoor City	Zapote V
Drainage Facility	Bacoor City	Zapote V

Figure 1: General Location Map of the Proposed Project



MAP SOURCE/S:
NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY

MAP INFORMATION:
Map Scale : 1 : 5 0 , 0 0 0
Administrative Boundaries: UN OCHA
Base Map: Philippine Geoportal
Geographic Coordinate System : EPSG 4326 WGS 1984
Datum: WGS 1984
Mapping Software: QGIS 3.16
Prepared by: LCI Envi Corporation

NOTE: This map has been prepared for the Environmental Impact Assessment (EIA) of the proposed Parañaque Spillway Project of the Department of Public Works and Highways. The boundaries reflected herewith are not authoritative.

Map Legend

Project Alignment
- Spillway Alignment
- Tunnel Section
- Outlet Facility
- Inlet Facility

LGUs
- Muntinlupa City
- Brgy. Buli
- Brgy. Sucat
- Parañaque City
- Brgy. B.F. Homes
- Brgy. San Isidro
- Las Piñas City
- Brgy. B.F. International Village
- Brgy. Pulang Lupa Dos
- Brgy. Pulang Lupa Uno
- Brgy. Zapote
- Bacoor City
- Brgy. Zapote V

FIGURE TITLE:

General Location Map of the Proposed Project

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
Department of Public Works and Highways Flood Control Management Cluster (FCMC) Unified Project Management Office	**PARAÑAQUE SPILLWAY PROJECT** Cities of Muntinlupa, Parañaque, Las Piñas and Bacoor	LCI ENVI CORPORATION

Figure 2: Vicinity Map of the Proposed Intake Facility

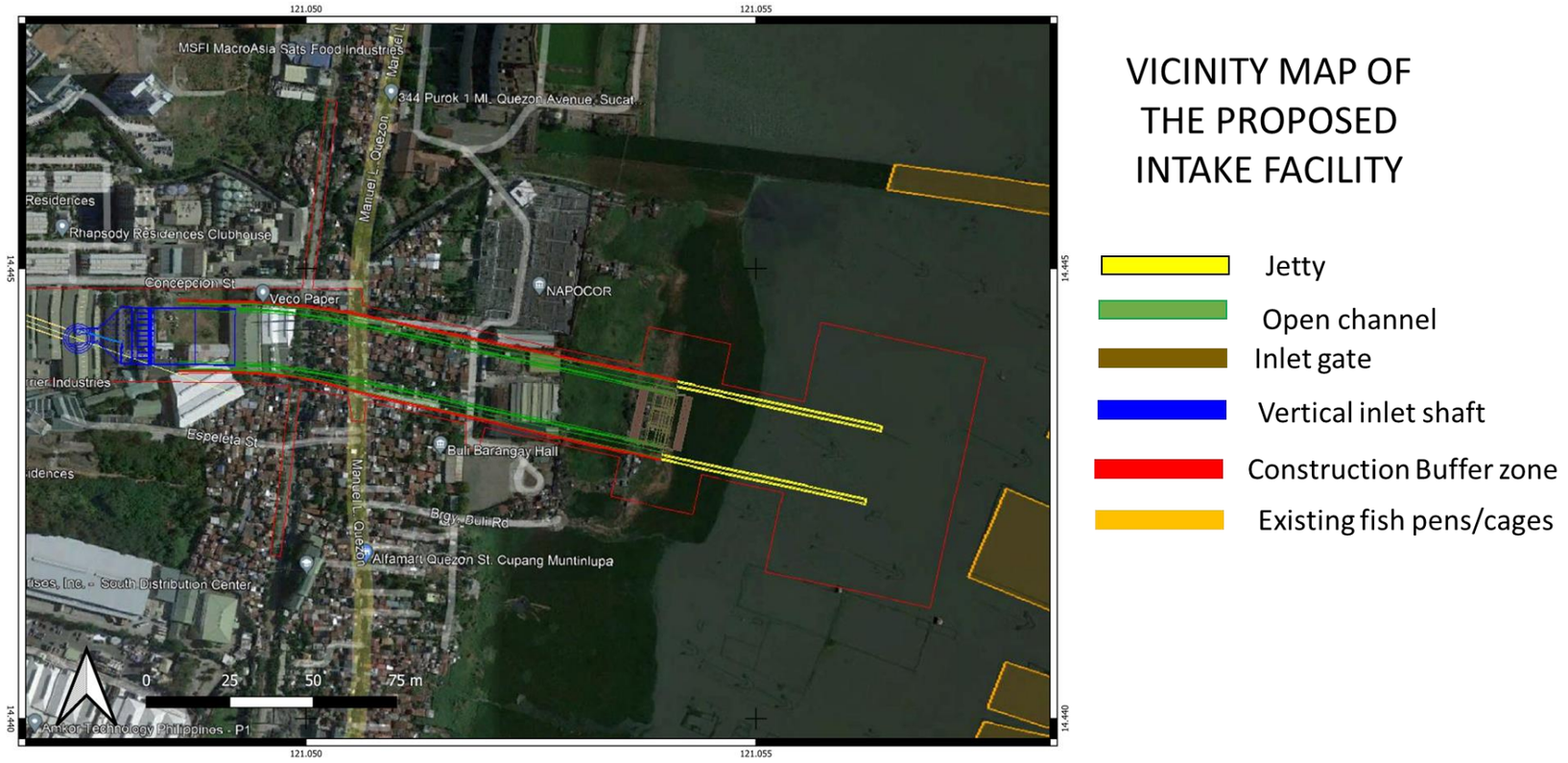


FIGURE TITLE:

Vicinity Map of the Proposed Intake Facility

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
Department of Public Works and Highways Flood Control Management Cluster (FCMC) Unified Project Management Office	**PARAÑAQUE SPILLWAY PROJECT** Cities of Muntinlupa, Parañaque, Las Piñas and Bacoor	LCI ENVI CORPORATION

Figure 3: Vicinity Map of the Proposed Drainage Facility

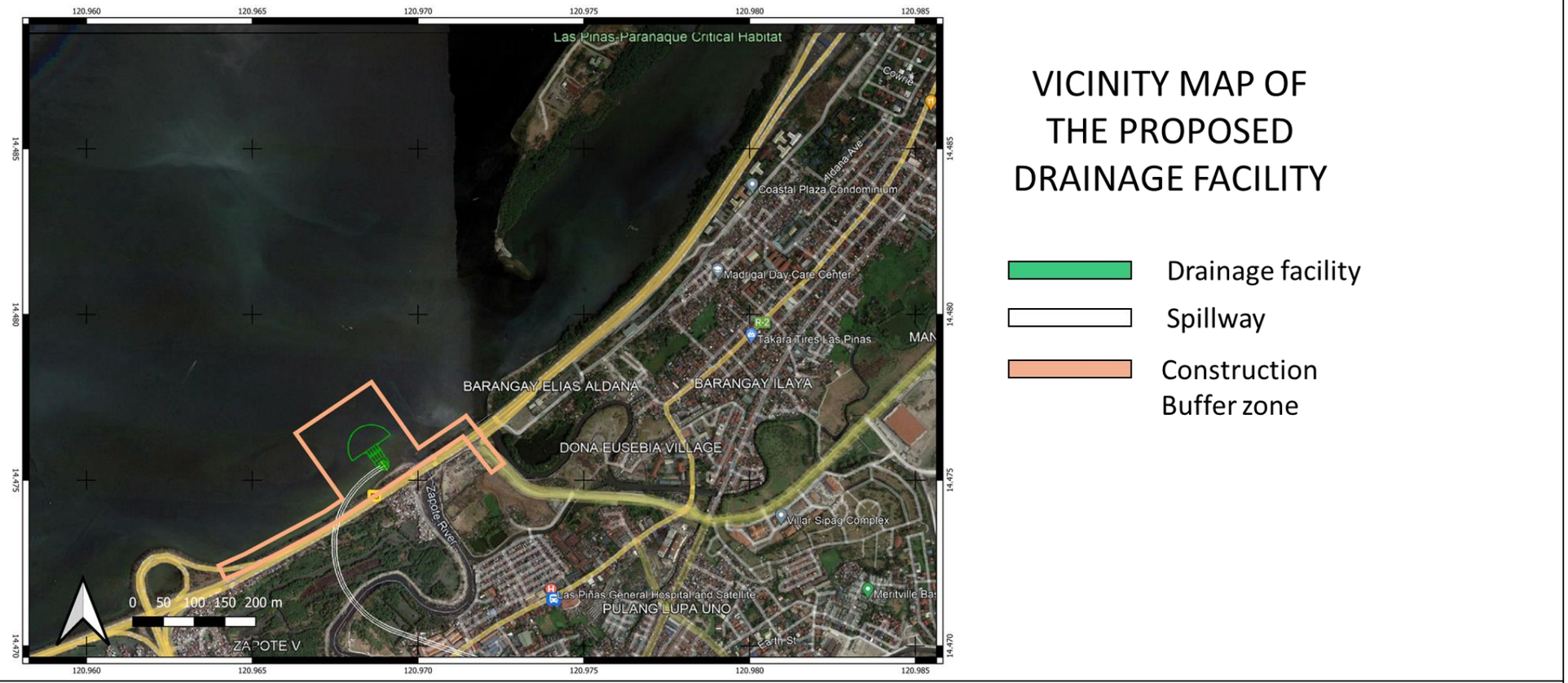


FIGURE TITLE:

Vicinity Map of the Proposed Intake Facility

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
Department of Public Works and Highways Flood Control Management Cluster (FCMC)	**PARAÑAQUE SPILLWAY PROJECT** Cities of Muntinlupa, Parañaque, Las Piñas and Bacoor	LCI ENVI CORPORATION

Unified Project Management Office		

Project Alternatives

Site Selection

5 There were five route plans studied for the Parañaque Spillway project as summarized in Table 2. The alternative route plans considered are presented in Figure 4. Each alignment was evaluated considering the environmental, social and economic impacts and benefits. Based on the assessment, Route X was the chosen alignment of the Paranaque Spillway Project.

Table 2: Route Plans Considered for the Paranaque Spillway Project

Item	Route 1	Route 2A	Route 2B	Route 3	Route X
Route	Lower Bicutan to South Parañaque River	Sucat to San Dionisio River	Sucat to Zapote River	Sucat to Zapote River	Buli to Manila Bay
Summary of Spillway Alignment	Straight line between Lower Bicutan and South Parañaque River to minimize the water head loss.	A tunnel is planned under Dr. A. Santos Avenue that connects Laguna de Bay and Manila Bay efficiently from the Sucat inlet shaft and is a straight line that connects to the outlet shaft of San Dionisio River.	A tunnel is planned under Dr. A. Santos Avenue that connects Laguna de Bay and Manila Bay efficiently from the Sucat inlet shaft, and is a straight line that connects to the outlet shaft of Zapote River	Straight line between Sucat and Zapote River to minimize water head loss.	Straight line from the inlet site on land in Buli to the outlet site on coastal area of Manila Bay
Location of Inlet	Lower Bicutan	Sucat	Sucat	Sucat	Buli
Location of Outlet	South Parañaque River	San Dionisio River	Zapote River	Zapote River	Manila Bay
Length of Intake Open Channel (km)	1.2	0.7	0.7	0.6	0.8
Spillway length	6	7.2	8.7	8.8	9.7
Inlet Vertical Shaft Height (m)	75	-	-	75	78.6
Outlet Vertical Shaft Height (m)	75	32	32	75	74.7
Depth of Underground Tunnel	Deeper than ~50m	Deeper than 15~30m	Deeper than 15~50m	Deeper than ~50m	Deeper than ~50 to 77 m
Source: JICA Study Team					

Technology Selection/Resources

6 Considering the hydrological and flood characteristics of Laguna Lake, the regional differences in land use, and differences in damage characteristics, the flood management plan shall include measures to control the rise in water level of Lake Laguna to mitigate the inundation damage.

7 From the listed potential structural measures to control the water level rise in Laguna Lake, there were two options that were found to be feasible namely, the widening of the Napindan Channel and the construction of the Parañaque Spillway. However, since the surrounding of the Napindan Channel is

already densely packed with houses, this will require wide scale of relocation of the residents thus, it will be more difficult to implement this measure.

8 The Department of Public Works and Highways (DPWH) has selected the Parañaque Spillway Project as a priority project in the draft plan, as it has a short construction period and is expected to have an early impact. DPWH is currently in the process of approving the Parañaque Spillway Project as an Infrastructure Flagship Project (IFP) in the Philippines.

Without Project Option

9 If the project will not be pursued, the potential reduction of inundation damages and affected population, as listed in Table 3, will not be realized. In terms of social impact, if the proposed project will not be pursued, relocation of the households and establishments in the proposed intake facility will not be required.

Table 3: Effect of Parañaque Spillway against Probable Flood

Index	100-year Probability		10-year Probability		5-year Probability	
	Base year (2021)	Target value (2036)	Base year (2021)	Target value (2036)	Base year (2021)	Target value (2036)
Maximum Lake Water Level (m)	14.5	13.8	13.4	13.0	13.1	12.8
Inundation Area (km^2)	100	67.4	46.7	25.5	30.2	15.5
Inundation Damage Population (person)	687,000	431,000	289,000	147,000	182,000	82,000
Inundation Period (month)	4.8	2.5	3.1	0.8	2.4	0.6
Source: JICA Study Team						

Figure 4: Route Plan Options for the Paranaque Spillway Project

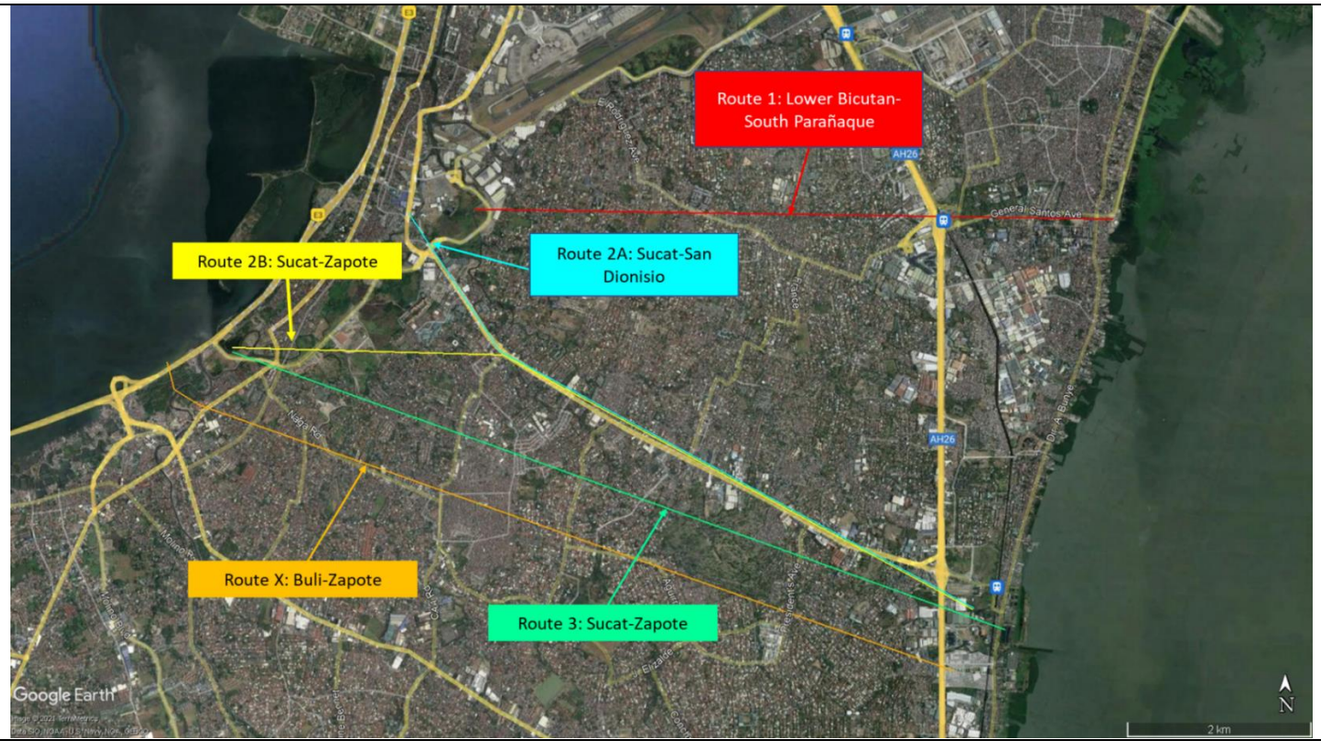


FIGURE TITLE:

Route Plan Options for Parañaque Spillway Project

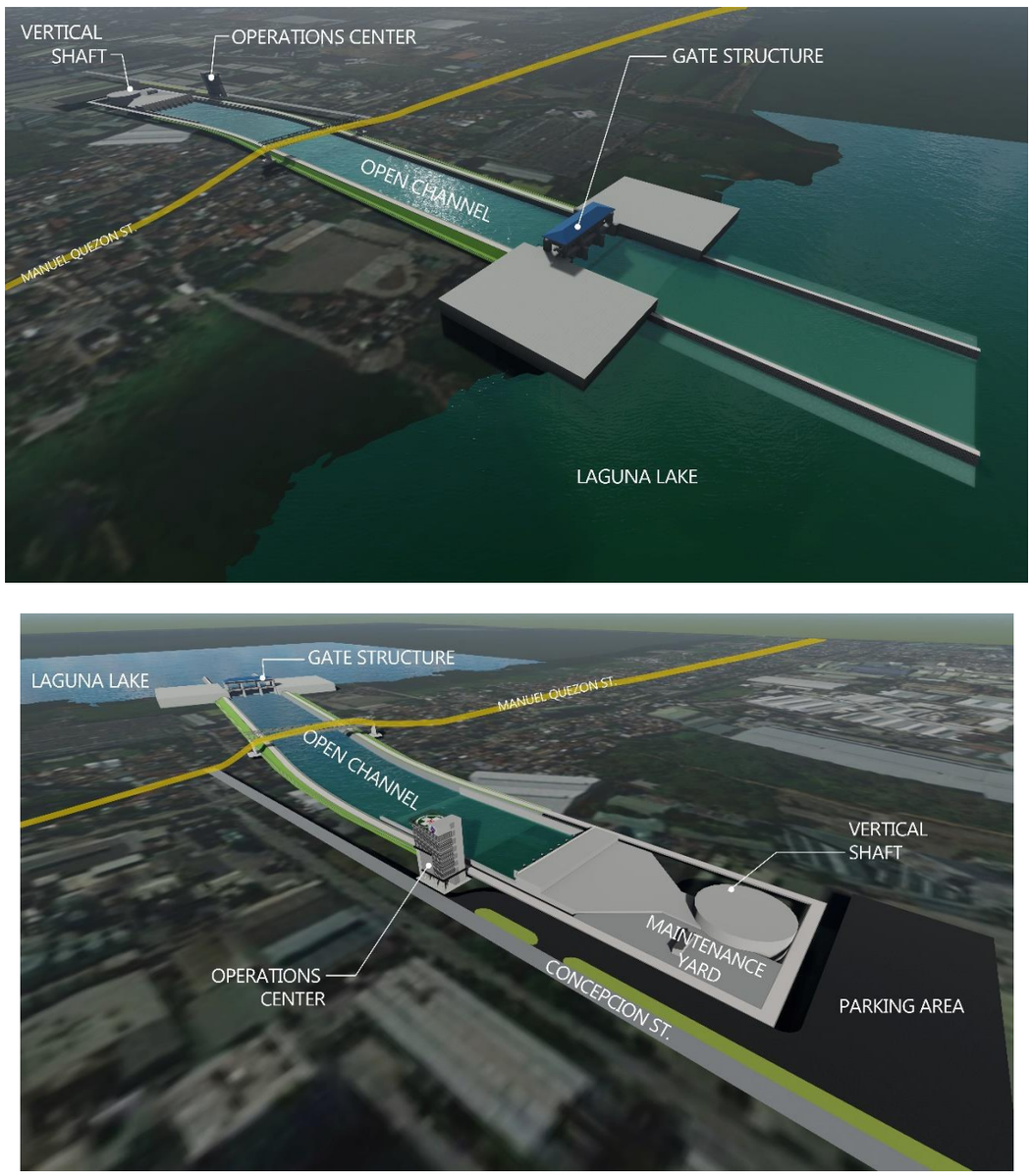
PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
Department of Public Works and Highways Flood Control Management Cluster (FCMC) Unified Project Management Office	**PARAÑAQUE SPILLWAY PROJECT** Cities of Muntinlupa, Parañaque, Las Piñas and Bacoor	LCI ENVI CORPORATION

Project Components

Intake Facility

10 The conceptual layout plan of the proposed intake facility is presented in Figure 5.

Figure 5: Conceptual Layout Plan of the Intake Facility



Note: Since the design in conceptual, the details are still subject to change.

FIGURE TITLE:

Conceptual Layout Plan of Intake Facility

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
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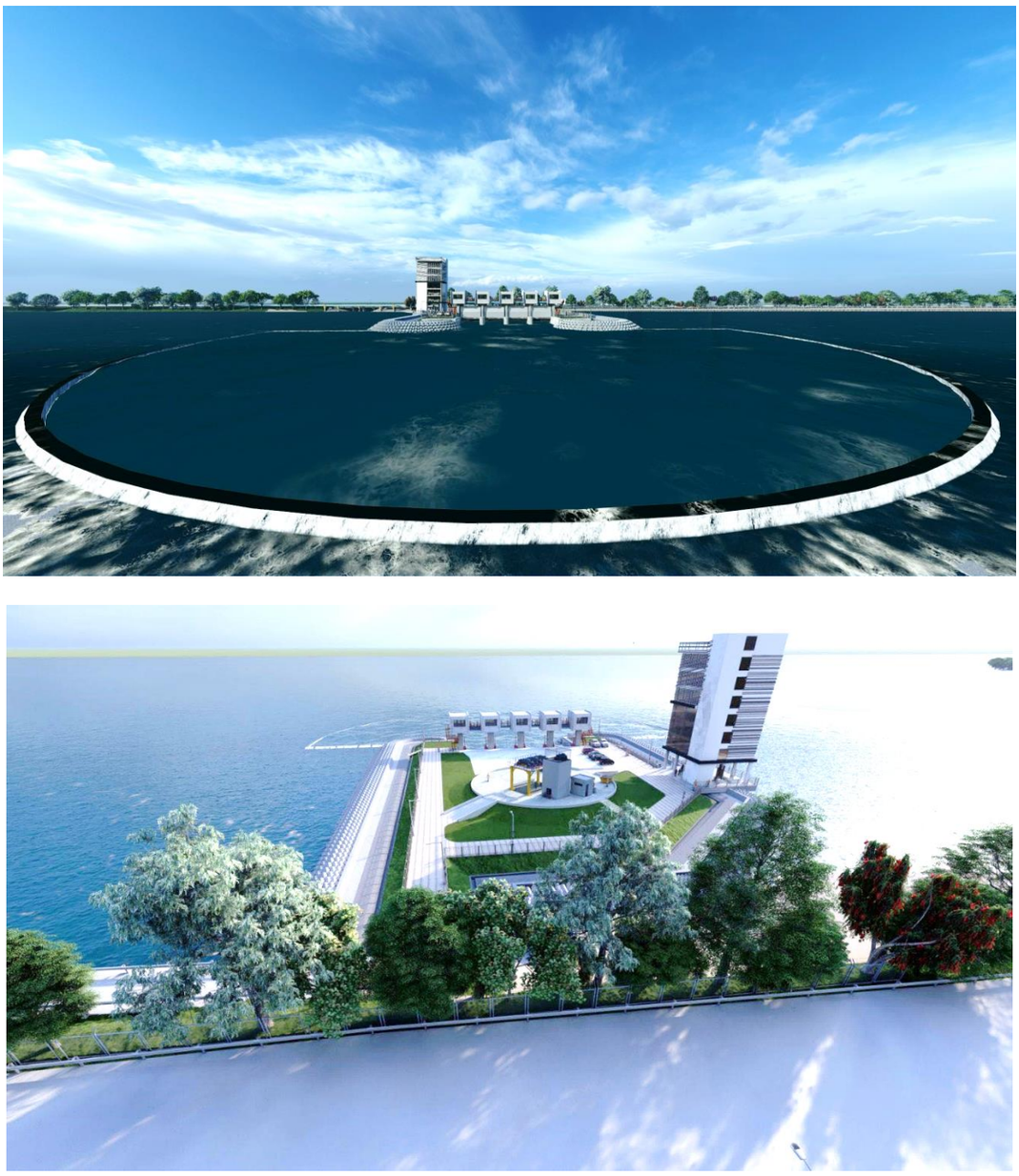
Underground Spillway

11 The proposed spillway will be an underground pressure tunnel type and will have a total length of about 9.7 kilometers and an inner diameter of 13 meters. The depth is estimated to be 50 to 77 meters below ground level, depending on the subsurface condition.

Drainage Facility

12 The conceptual layout plan of the proposed drainage facility is in Figure 6.

Figure 6: Conceptual Layout Plan of the Drainage Facility



Note: Since the design is conceptual, the details are still subject to change.

FIGURE TITLE:

Conceptual Design of the Drainage Facility

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
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Process and Technology

13 The proposed Parañaque Spillway project will only be operated during rainy season. It is assumed that the spillway will be non-operational from January to May since these are dry season. From June to July, it will operate once the lake water level reaches 11.5 meters while in August to December, the spillway will start when the water level in Laguna Lake is 12.0 meters.

Operation from June to December

(1) Preparation for flood discharge

14 The lake level will be monitored, and advance preparations will be made so that all facilities can operate smoothly when the planned discharge level (EL.11.4m from June to July, EL.12.0m from August to December) is reached. Here, the lake level is defined as the water level in front of the intake facility.

15 Confirm the safety of the Laguna Lake inflow area, the open channel area, and the water intake, and contact the surrounding municipalities and related organizations.

(2) Start of flood discharge operation

16 When the lake level reaches the planned discharge level, the intake gate will be opened, and the tunnel will be filled with water. The outlet gates will be closed to prevent the inflow of seawater. When the water level in the drainage shaft rises and the seawater level is balanced with the water level in the shaft, the discharge gate will be opened, and discharge will begin.

17 Prior to discharge, safety in the vicinity of the discharge outlet will be confirmed and the surrounding municipalities and relevant organizations will be notified. Furthermore, an alarm device (siren) will be used to signal the start of the discharge to the surrounding area. Monitor the discharge status from the drainage facilities.

18 During the discharge operation, monitor the inflow status of the water intake visually and with remote monitoring equipment, and confirm that there is no blockage of the intake due to suspended solids and that smooth inflow from Laguna Lake to the intake facility is ensured.

19 Remove debris from the front of the intake with a dust extractor in a timely manner.

(3) Suspension of discharge

20 After the lake level drops below the planned discharge level, all intake and discharge gates will be closed to stop the discharge. After confirming the safety of the discharge, the end of discharge will be notified to the surrounding municipalities and related organizations.

Operation from January to May

21 If the water level is at the planned discharge level as of January 1, the operational rules for June to December will be followed until the water level is below the planned discharge level. Draining of water in the spillway will begin after confirming that the water level in Laguna Lake is below the planned discharge level (WL.12.0m) and that flooding is not expected to recur for the time being, based on weather information.

22 The water in the underground tunnel will be drained, then cleaning and inspection in the tunnel is conducted as preparation for the operation of the next wet season. It is estimated that the draining of water from the underground tunnel will take about 5 days.

Resource Utilization

Power Supply

23 The estimated power requirement during construction is 48,628 MWh.

24 As for main drainage pumps and ventilation fan in the outlet facility, electricity supply to the equipment shall be designed to enable supply by in-house power generator instead of the electric power company. Since the equipment is estimated to operate for a short period annually, it is possible to reduce the fixed charges generally imposed for power received from the electric power company. On the other hand, lighting and air-conditioning of office building and auxiliary equipment will be operated by power received from the electric power company.

Water Supply

25 The estimated water requirement during the construction is 1,500 cubic meters per day. Water supply during construction and operation phase will be sourced from Maynilad.

Project Timeframe

26 Table 4 shows the indicative project timeline. As shown in the table, the conduct of feasibility study and ECC application started during the 1st quarter of 2021 while detailed engineering design will start by 2nd quarter of 2023. Construction of the proposed spillway and support facilities will start in 2026 and will end by 2036. Start of operation is expected to start in 2036.

Table 4: Indicative Project Timeline

Item	2021				2022				2023				2024				2025				2026				2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4										
1. ECC Application																																		
2. Feasibility Study																																		
3. Detailed Design																																		
4. Land acquisition and resettlement																																		
5. Construction																																		
6. Operation																																		

Summary of Impacts and Mitigating Measures

27 The following table summarizes the project impacts and the residual effects after application of mitigating measures.

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
Pre-construction Phase			
Acquisition of applicable permits and licenses	Disclosure of project components and activities	• Submission of complete requirements for processing of all permits	100% compliance to all applicable required permits and clearances.
Local sourcing of labor	Employment opportunities	• Priority hiring within the project affected barangays • Local labor requirement to be announced and posted in the barangay halls and public areas.	100% compliance with local policy on hiring of workers.
Land acquisition for the proposed intake facility	Involuntary resettlement of households and structures	• Preparation and implementation of Right-of-way Acquisition Plan (RAP) • Provision of compensation to affected households based on RA No. 10752 and DPWH DO No. 124 series of 2017 • Coordinate with the host City and barangay LGUs	100% implementation of RAP
Clearing and demolition activities in the proposed intake facility	Improper management of construction wastes and other solid wastes which may lead to soil contamination, contamination of nearby water bodies, potential health risks and may induce flooding due to clogging of drainage	• Implementation of the solid waste management program by the contractor • Regular transport of construction debris and other solid waste in the approved designated area by the DENR. • Provision of waste storage area within the site • Reuse and recycle demolished structures or facilities, whenever applicable.	100% compliance to RA 9003
	Generation of ground vibration	• Apply non-vibration techniques during construction, if possible	Ground vibration will not be a nuisance to nearby residents.

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
		• Notify nearby residents about use of heavy equipment • For hauling trucks, comply with road weight limit standards to avoid ground vibration • Regular monitoring of ground vibration within the project sites	No complaints from nearby community
	Clearing of vegetation in the proposed site for the inlet facility	• Apply for a tree cutting permit • Limit clearing to the proposed footprint of facilities to avoid unnecessary vegetation and habitat removal	100% compliance to TCP conditions
	Generation of dust which may pose health hazards	• Regular watering of construction site • Proper PPEs to workers	Results of ambient air monitoring are within DAO 2000-81
	Generation of air emissions and noise which may result to air and noise pollution	• Regular maintenance of heavy equipment • Perform noisy activities during daytime	Results of ambient noise monitoring is within the applicable standards
	Traffic congestion	• Provide early warning devices/road signs • Implement Traffic Management Plan • Coordinate with the barangay LGUs	100% implementation of traffic management plan.
Construction Phase			
Construction of open channel, jetty and outlet facility	Improper management of construction wastes and other solid wastes which may lead to soil contamination, contamination of nearby water bodies, potential health risks and may induce flooding due to clogging of drainage	• Implementation of the solid waste management program by the contractor • Regular transport of construction debris and other solid waste in the approved designated area by the DENR.	100% compliance to RA 9003
	Improper management of hazardous wastes and other solid wastes which may lead to soil contamination, contamination of nearby water bodies and potential health risks	• Collect, store and dispose hazardous wastes in accordance with RA 6969 • Treatment and dispose of hazardous wastes through DENR-accredited waste treaters	100% compliance to RA 6969

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
	Deposition or accumulation pf sediments in mangrove roots (i.e., pneumatophores) due to soil erosion	• Establishment of sediment traps, erosion barriers, and silt curtains • Regular removal of silt and sediments	Results of water quality monitoring in Manila Bay is within DAO AO 2016-08 and 2021-19
	Wildlife displacement due to dust and noise pollution	• Operation of high noise-emitting tunneling equipment must be scheduled to prevent unnecessary noise and dust accumulation. • Regular water sprinkling to minimize dust resuspension • Schedule drilling activities, especially in the Manila Bay side of the project, in accordance with the migration and breeding schedule of birds. Activities that will generate high level noise should not coincide with the breeding season of birds.	Results of ambient noise monitoring is within the applicable standards Results of ambient air monitoring are within DAO 2000-81
	Possible siltation of nearby bodies of water and clogging of drainage due to surface run-off from the construction sites	• Establishment of sediment traps, erosion barriers, and silt curtains • Regular removal of silt and sediments	Results of water quality monitoring in Manila Bay and Laguna Lake are within DAO AO 2016-08 and 2021-19
	Erosion of sediment and silt can increase water turbidity and significantly decrease light penetration, thereby reducing the quantity of light available for phytoplankton and overall primary productivity, further leading to decrease in zooplankton abundance in Laguna Lake	• Stockpiles should be bunded or covered especially during heavy rains which can potentially erode and carry sediments to the marine environment and lakeshore areas. • If possible, construction activities should be scheduled during the dry or summer months to avoid downpour of heavy rain which can potentially erode and deposit sediment and silt to the immediate marine and freshwater environment.	Results of water quality monitoring in Laguna Lake are within DAO AO 2016-08 and 2021-19

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
		• Establishment of sediment traps, erosion barriers, and silt curtains • Regular removal of silt and sediments	
	Pollution from solid wastes may generally decrease the frequency and abundances of phytoplankton, zooplankton and soft-bottom animals in Laguna Lake	• Implement proper segregation, re-use, recycle and disposal. • Adequate number of garbage bins and containers should be strategically located at all construction sites. • Prompt and regular collection of wastes as well as removal of non-recyclable wastes from the site • Natural organic debris should be gathered and disposed of in a designated area away from the Bay and river.	100% compliance to RA 9003
	Erosion of sediment and silt can increase water turbidity and significantly decrease light penetration, thereby reducing the quantity of light available for phytoplankton and overall primary productivity, further leading to decrease in zooplankton abundance in Manila Bay	• Stockpiles should be bunded or covered especially during heavy rains which can potentially erode and carry sediments to the marine environment and lakeshore areas. • If possible, construction activities should be scheduled during the dry or summer months to avoid downpour of heavy rain which can potentially erode and deposit sediment and silt to the immediate marine and freshwater environment. • Establishment of sediment traps, erosion barriers, and silt curtains • Regular removal of silt and sediments	Results of water quality monitoring in Manila Bay are within DAO AO 2016-08 and 2021-19
	Pollution from solid wastes may generally decrease the frequency and abundances of	• Implement proper segregation, re-use, recycle and disposal.	100% compliance to RA 9003

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
	phytoplankton, zooplankton and soft-bottom animals in Manila Bay	• Adequate number of garbage bins and containers should be strategically located at all construction sites. • Prompt and regular collection of wastes as well as removal of non-recyclable wastes from the site • Natural organic debris should be gathered and disposed of in a designated area away from the Bay and river.	
	Generation of dust which may pose health hazards to the workers and nearby communities	• Minimization of unnecessary earth-movement • Regularly water construction sites that will generate dust • Avoid long exposure of excavated soil piles to strong winds by applying canvass covers • Proper PPEs to workers	Results of ambient air monitoring are within DAO 2000-81
	Conflict in ROW	• Construct bridges along affected areas in Manuel L. Quezon Avenue, PNR railway and NAPOCOR road. • Provide alternative routes or temporary access during construction	-
	Disruption of water supply service due to relocation of water pipes within the intake facility	• Coordinate with the water service provider for the realigning of the water supply pipes prior the start of construction • Inform the public on schedule • The realignment or reconnection of the affected water supply pipes shall be completed first before the construction activities in the open channel will start.	-

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
Earthwork activities (tunneling, excavation)	Possible slope failure, ground subsidence or landslide during tunneling activities	• Application of excavating techniques giving few or no impacts on landslide and surface conditions • Application of proper reinforcement of excavation and tunneling sections • Implementation of construction management plan and best engineering practices	Ground vibration will not be a nuisance to nearby residents. No complaints from nearby community
	Generation of excavated soil	• Provision of temporary storage on-site • Regularly hauling of excavated soil • Reuse excavated soil as backfill.	-
	Potential impact on groundwater level and groundwater quality due to excavation activities	• Implementation of best engineering practices during construction • Installation of two to three monitoring wells	-
	Possible siltation of nearby bodies of water and clogging of drainage due to surface run-off from the construction sites	• Establishment of sediment traps, erosion barriers, and silt curtains • Regular removal of silt and sediments	Results of water quality monitoring in Manila Bay and Laguna Lake are within DAO AO 2016-08 and 2021-19
	Generation of Air Emissions and Noise	• Regular maintenance of heavy equipment • Perform noisy activities during daytime • Maintain buffer zone (existing vegetation surrounding the project site) to serve as natural noise barrier and/or install a purpose-built barrier around the construction site	Results of ambient noise monitoring is within the applicable standards
	Generation of dust which may pose health hazards to the workers and nearby communities	• Minimization of unnecessary earth-movement • Regularly water construction sites that will generate dust	

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
		• Avoid long exposure of excavated soil piles to strong winds by applying canvass covers • Proper PPEs to workers	
	Traffic congestion	• Provide early warning devices/road signs • Implementation of traffic management plan • Provide parking spaces within project site • Coordinate with barangay LGU	100% implementation of traffic management plan.
	Possible damage of nearby properties due to ground vibration during tunneling activities	• Apply non-vibration and/or vibration-avoiding techniques during construction, if possible • Notify nearby residents about use of heavy equipment • Regularly monitor vibrations • For hauling trucks, comply with road weight limit standards to avoid ground vibration	Ground vibration will not be a nuisance to nearby residents. No complaints from nearby community
Use of heavy equipment, during construction works	Generation of ground vibration	• Apply non-vibration and/or vibration-avoiding techniques during construction, if possible • Notify nearby residents about use of heavy equipment • Regularly monitor vibrations • For hauling trucks, comply with road weight limit standards to avoid ground vibration	Ground vibration will not be a nuisance to nearby residents. No complaints from nearby community
	Accidental oil spills/leaks which may cause soil contamination and contamination of nearby water bodies	• Use sawdust, rice hulls, or coir dusts to absorb the oil spills • Implement oil spill management plan	Results of water quality monitoring in Manila Bay and Laguna Lake are within DAO AO 2016-08 and 2021-19

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
		• Maintain canal in the maintenance and repair area of vehicles and equipment	
	Generation of Air Emissions and Noise	• Regular maintenance of heavy equipment • Perform noisy activities during daytime • Maintain buffer zone (existing vegetation surrounding the project site) to serve as natural noise barrier and/or install a purpose-built barrier around the construction site	Ambient noise is within the applicable standards.
	Traffic congestion	• Provide early warning devices/road signs • Implement traffic management plan • Provide parking spaces within project site	100% implementation of traffic management plan.
Influx of workers	Improper management of solid wastes which may lead to soil contamination, contamination of nearby water bodies and potential health risks	• Implement solid waste management plan • Hauling of discarded items by accredited haulers	100% compliance to RA 9003
	Ground and coastal water contamination from improper disposal of domestic wastewater	• Provision of sanitation facilities for workers (e.g. toilets, showers, etc.) • Follow basic housekeeping policies	1 toilet for every 25 male workers and 1 toilet for every 20 female workers
	Occupational Health and Safety	• Proper training on construction safety • Provision of PPE • Proper supervision by trained professionals during construction activities • Implementation of Occupational Health and Safety Policy	-
	Employment opportunities	• Priority in hiring should be given to qualified residents of host communities	-

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
	Competition in the basic services	• Priority in hiring should be given to qualified residents of host communities	-
Operation Phase			
Discharge of floodwater to Manila Bay	Increased influx of sediments from water discharge which results to water turbidity and deposition/accumulation in mangrove roots (pneumatophores) blocking air and sunlight	• Construction of facilities to control sediment in water such as siltation ponds • Regular removal of trapped silts in the inlet gate • Regular monitoring of TSS in Manila Bay	Results of water quality monitoring in Manila Bay are within DAO AO 2016-08 and 2021-19
	Increased transport of solid waste that may suffocate mangrove aerial roots and prevent mangrove establishment and regeneration	• Install screens in the intake facility • Construction of pool structure in the outlet facility • Conduct of conservation programs such as regular coastal cleanup activities	
	Influx of nutrients and coliform which may lead to algal blooms affecting mangrove species	• Regular monitoring of water quality in Laguna de Bay and in the Manila Bay area (outlet)	Results of water quality monitoring in Manila Bay and Laguna Lake are within DAO AO 2016-08 and 2021-19
	Influx of freshwater that may result in temporary displacement of fishes	Monitor fish communities in vicinity of discharge	-
	Transport of non-native taxa during discharge may lead to introduction in Manila Bay	Monitor fish communities in vicinity of discharge Physical removal of adult and juveniles via filtering or exclusion system	-
Operation of intake facility	Generation of ground vibration during opening of the inlet gate	• The operation of the inlet gate will only be during daytime • Monitor the ground vibration during operation	-

ENVT'L ASPECT	POTENTIAL IMPACT	OPTIONS FOR PREVENTION OR MITIGATION OR ENHANCEMENT	TARGET PERFORMANCE/ EFFICIENCY
Influx of workers	Improper management of solid wastes which may lead to soil contamination, contamination of nearby water bodies and potential health risks	• Implement solid waste management plan • Provision of interim solid waste storage area in the intake and drainage facility	100% compliance to RA 9003
	Contamination of Laguna Lake and Manila Bay due to discharge of untreated domestic wastewater	• The operation buildings will be connected to the existing sewer lines in the proposed sites for the proper treatment and disposal of domestic wastewater • Provision of sanitary toilet facilities within the project sites	-
Maintenance activities	Improper management of solid wastes which may lead to soil contamination, contamination of nearby water bodies and potential health risks	• Implement solid waste management plan • Provision of interim solid waste storage area in the intake and drainage facility	100% compliance to RA 9003
	Generation of wastewater from cleaning/draining of the tunnel which may affect the water quality in the Manila Bay and Laguna Lake if discharged without treatment	• Provision of sedimentation ponds in the intake and drainage facility • Regular desilting of sedimentation ponds. • Collected sediments must be disposed in the designated disposal site.	Results of water quality monitoring in Manila Bay and Laguna Lake are within DAO AO 2016-08 and 2021-19
	Occupational Health and Safety	• Proper training on operation of the project • Provision of PPE • Proper supervision by trained professionals during construction activities • Implementation of Occupational Health and Safety Policy	-

Identified Key Stakeholders

28 The following project stakeholders have been identified based on the stakeholder groups indicated in Section 5 of DAO 2017-15:

- **LGUs in areas where all project facilities are proposed to be constructed/situated and where all operations are proposed to be undertaken**
  i. City LGU of Muntinlupa (host city)
  ii. City LGU of Parañaque (host city)
  iii. City LGU of Las Piñas (host city)
  iv. City LGU of Bacoor, Cavite (host city)
  v. Barangay LGUs of Buli & Sucat, Muntinlupa (host barangays)
  vi. Barangay LGUs of B.F. Homes & San Isidro, Parañaque (host barangays)
  vii. Barangay LGUs of B.F. International Village, Pulang Lupa Uno, Pulang Lupa Dos & Zapote, Las Piñas (host barangays)
  viii. Barangay LGU of Zapote V, Bacoor, Cavite (host barangay)
- **Government agencies with related mandate on the type of project and its impacts**
  i. DENR National Capital Region
  ii. DENR Region 4A
  iii. DENR EMB NCR
  iv. DENR EMB Region 4A
  v. Laguna Lake Development Authority
  vi. Manila Bay Coordinating Office
  vii. Philippine National Railways
  viii. National Power Corporation
  ix. DENR Biodiversity Management Bureau
- **Interest groups, preferably those with mission/s specifically related to the type and impacts of the proposed undertaking**
  i. BF Federation Homeowner Associations, Inc.
  ii. Tahanan Homeowners Association
  iii. Ireneville 1 Homeowners Association
  iv. Jackielou Ville Homeowners Association
  v. Phase 1 HOA
  vi. Cub HOA
  vii. Patola HOA
  viii. Santos Homes 2 HOA
  ix. Perpetual Village HOA
  x. Las Pinas Royale Estates HOA
  xi. Vergonville HOA
  xii. St. Joseph HOA
  xiii. Samahang Mandaragat ng San Rafael
  xiv. Society for the Conservation of Philippine Wetlands
  xv. Wetlands International Philippines Program
- **Households, business activities, industries that will be displaced**
  i. Residents of Barangay Buli
  ii. Veco Paper Corporation
  iii. NAPOCOR
  iv. UBIX Service Facility
  v. Concepcion Industries/Foresight Realty Development Corporation
- **Local institutions (schools, churches, hospitals)**
  i. Buli Elementary School
  ii. Our Lady of the Most Holy Rosary Chapel
  iii. Las Piñas General Hospital and Satellite Trauma Center
- **Others**
  i. PEA Tollway Corporation (CAVITEX)
  ii. SMC SLEX Inc. (SLEX)

Project Proponent's Statement of Commitment and Capability to Implement Necessary Measures to Prevent Adverse Negative Impacts

29 The institutional organization of **Department of Public Works and Highways** (DPWH), under the Unified Project Management Office-Flood Control Management Cluster (UPMO-FCMC) and its

designated contractors, is shown in Figure 7. The project will be headed by the Project Manager and supported by the Assistant Project Manager. The organization is formed to achieve the following:

- Economical and safety operations and maintenance of the project's components;
- Implementation of **DPWH's** mandate and policies;
- Environmental compliance and sustainability; and
- Promotion and enhancement of the social acceptability of the proposed project.

30 **DPWH** and its designated contractors commit to:

- Comply with the conditions that will be stipulated in the ECC and other related environmental laws;
- Foster mutually beneficial partnership and cooperation with host communities;
- Develop training programs for its employees which will ensure that they will be continually prepared for the tasks assigned to them.

Figure 7: Organizational Chart for the Institutional Plan

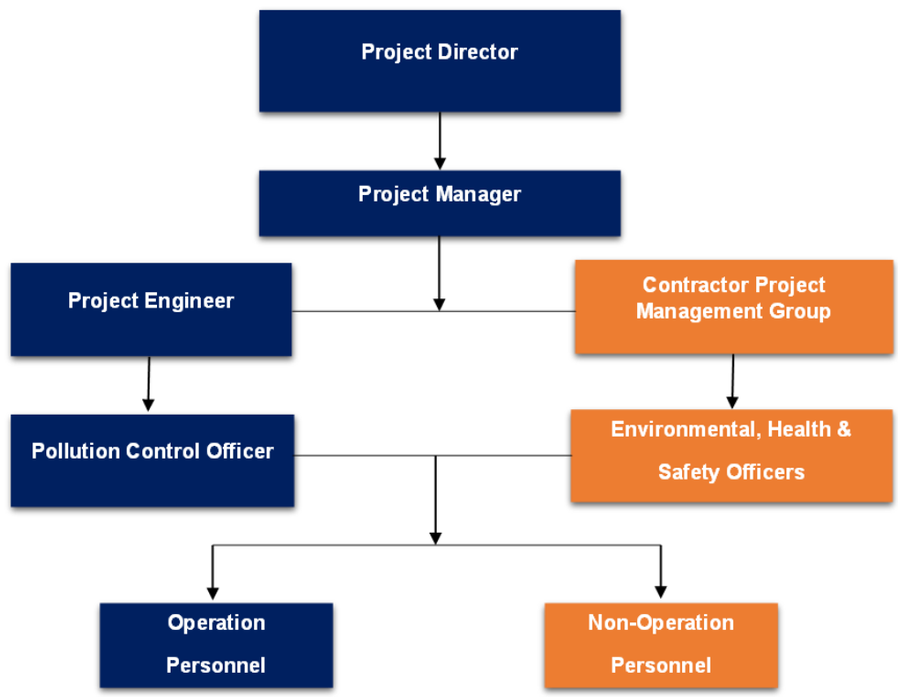

FIGURE TITLE:

Organizational Chart for the Institutional Plan

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
Department of Public Works and Highways Flood Control Management Cluster (FCMC) Unified Project Management Office	**PARAÑAQUE SPILLWAY PROJECT** Cities of Muntinlupa, Parañaque, Las Piñas and Bacoor	LCI ENVI CORPORATION