Attachment IV-4

Environmental Monitoring Forms for EMoP (March 2023)

Environmental Monitoring Forms for EMoP
(January to March 2023)

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during the Report Period
During this period (from January to March 2023), the following environmental parameters were monitored: • Middle Marikina River: ambient noise level, vibration level, ambient air quality, river water quality, river water flow, sediment quality analysis for excavated/dredged materials, and tree cutting and relocation. • Disposal Site (in Taytay, Rizal): ambient noise level, ambient air quality, and groundwater quality	**Middle Marikina River:** Monitoring of ambient noise level was conducted on Jan. 3 to 7, 2023, in four stations of the Middle Marikina River in lieu of the monitoring of noise level which was not conducted in December 2022. To which results are incorporated in this report. The monitoring results show that the following stations and time zone exceeded the environmental standard and baseline: a) B-1 Daytime, Evening, Night time; b) B-2 Evening; c) B-3 Evening, Night time; d) B-4 Morning, Daytime, Evening, Night time. The ambient noise levels reflect not only the noise generated from the construction works of the project but also the noise from passing vehicles, residential activities, and animals such as dogs, birds, and chickens nearby. Regarding vibration, the average displacement velocity of both stations shows that the pile driving conformed to the allowable peak vibration level of 2.5 mm/s. The impacts of vibration caused by the sheet piling activity were not significant. There were no reported complaints from local residents regarding vibration so far. As for the ambient air quality monitoring, the results show that all stations are higher than the baseline values, particularly for TSP and NO2 but are still below the environmental limits set in the National Ambient Air Quality Guideline. Impacts from the project are considered not significant and temporary. Two (2) stations had higher values compared to the other stations, which can be attributed to the ongoing construction works near the stations. For the river water quality, the following are the summary monitoring results for all & limited parameters show that there are three (3) categories for exceeding the limits of environmental standard and baseline: a) Parameters(s) that exceeded both the standards and Baseline for all stations (Fecal Coliform); b) Parameters(s) that exceeded both the standards and Baseline for specified stations (BOD, Temperature, TSS, Iron, and Manganese); and

	c) Parameters(s) that exceeded the standards but comply with the Baseline for specified stations (BOD, TSS, Phosphate, Ammonia, and Iron) Fecal Coliform was the most significant parameter that exceeded the standards. It is possible that outside construction works that are not involved with the project had caused an increase in value for Fecal Coliform. The impact of the project is not significant. As for the monitoring of intensive parameters for river water quality, the monitoring result shows that three (3) out of ten (10) of the primary parameters; one (1) out of five (5) for inorganics; and two (2) out of eleven (11) for metals are not consistent to the DAO 2016-08 and DAO 2021-19. Parameters(s) that exceeded the standards were: a) Biochemical Oxygen Demand (BOD) b) Fecal Coliform c) Phosphate d) Ammonia as NH3-N e) Iron (Fe) f) Manganese (Mn) The results do not show a significant change in water quality when comparing it to the results from all and limited parameters. Impacts from the dredging are minimal. Regarding river water flow, the obtained river water flow data from the Effective Flood Control Operational System (EFCOS) were used for the analysis of monitoring results of river water quality. There are no discernible impacts on river water flow during the construction of the project. Regarding riverbed sediment, the results of laboratory analysis for elutriate test shows that heavy metals were not detected, and all samples passed the quality standard for Class C freshwater and Effluent. The results of laboratory analysis for the TCLP test show that concentrations of heavy metals are very low or not detected, and all passed the quality standards for hazardous waste management. During this period, The TCEB permits granted for this monitoring period have reported 1134 trees identified in the area, 723 trees identified for cutting, and 410 trees identified for earth-balling for relocation. CP-3, L14, Left Bank, Marikina City - Trees in the area: 567 - Trees for cutting: 152 - Trees for earth-balling: 401 CP-3, L6-L7, Left Bank, Marikina City - Trees in the area: 26

	- Trees for cutting: 15 - Trees for earth-balling: 9 CP-2, Right Bank, Quezon City - Trees in the area: 149 - Trees for cutting: 164 CP-2, Left Bank, Pasig City - Trees in the area: 392 - Trees for cutting: 392 Replacement of cut trees is carried out based on DAO 2012-02 with the following ratio: – 1:50 for planted trees – 1:100 for naturally growing trees **Disposal Site:** The noise and air quality monitoring was conducted on Dec. 28 to 31, 2022 to which all the results are incorporated in this report. For the ambient air quality monitoring, the monitoring results show that TSP and Lead are within the environmental standards in all stations. The impacts of the project were minimal. The results presented show that all values are below the environmental standard for ambient air quality set in the National Ambient Air Quality Guideline. As for the ambient noise level, the monitoring results show that the following station and time zone exceeded the environmental standard and baseline: a) B-5 Daytime, Evening; b) B-6 Daytime, Evening; and c) B-7 Daytime, Evening, Night time. The results show that the daytime noise level increased by 2 dBA for B-5, increased by 3 dBA for B-6, and increased by 11 dBA for B-7 compared to the baseline. The impact on ambient noise levels due to the project seem to be minimal based on actual observations at the monitoring site. It was observed that most noise sources are coming from passing vehicles, passing individuals, residential activities, insects, and domestic animals such as dogs and chicken. The increased noise levels during these monitoring periods are likely caused by the growing frequency of these noise sources and increased activity outside of construction works Regarding the groundwater quality, the monitoring results show that there are three (3) categories for exceeding the limits of environmental standards and baseline: a) Parameters(s) that exceeded both the standards and Baseline for all stations (BOD, Fecal Coliform, Phosphate, and Iron);

	b) Parameters(s) that exceeded both the standards and Baseline for specified stations (Ammonia and Manganese); and c) Parameters(s) that exceeded the standards but comply with the Baseline for specified stations (Ammonia and Manganese). Fecal Coliform and BOD were the most significant parameters that exceeded the standards. The results do not show a significant change in water quality when comparing it to the results from April to June 2022. Impacts from the disposal of dredged materials is not significant.

2. Monitoring in Pre-Construction Stage & Construction Stage

The Monitoring plans in the pre-construction stage and construction stage are shown below.

2.1 Monitoring Program

[Marikina River, Manggahan Floodway]

Item	Parameter	Frequency and Duration	Locations (Minimum quantity)
Noise	Noise level	One time before construction and semi-annually during construction (24 hours/time)	4 Points (Marikina River) and 2 Points (Manggahan Floodway)
Vibration	Displacement Velocity, Acceleration	At least 4 times during piling works	4 Points (Marikina River) 1 Point at Cainta Floodgate and 1 Point at Taytay Sluicegate
Air Quality	SO_2, NO_2, TSP	One time before construction and semi-annually during construction (24hours/time)	4 Points (Marikina River) and 2 Points (Manggahan Floodway)
River Water Quality (all parameters and intensive)	DAO 2016-08 (All the parameters in Table 3 to Table 6 (Class C))	Regular sampling :2 times/year, and Intensive monitoring upon the first dredging (2 times)	4 Points (Marikina River) and 2 Points (Manggahan Floodway)
River Water Flow	River Water Flow (m^3/s)	Secondary data collection from EFCOS, throughout the monitoring period	5 Points (Marikina River)
River Water Quality (BOD, TSS, DO)	BOD, TSS, DO	One time before construction and quarterly (4 times/year) * during construction	4 Points (Marikina River) and 2 Points (Manggahan Floodway)
Aquatic Biota	-Density and Diversity of phytoplankton and zooplankton - Density and Diversity of macrobenthic organisms -Nekton(fish)	One time before construction and once during construction	4 Points (Marikina River) and 2 Points (Manggahan Floodway)

	-Aquatic flora		
Tree Cutting and Replanting (Project-Affected Trees)	-Species -Size (diameter) -Location	One time before construction and one time after replanting	Along both banks of Marikina River and Manggahan Floodway

Note) *: This monitoring shall be done combined with River Water Quality Monitoring (all parameters)
**: Monitoring location is shown in Figure 1 to Figure 3 attached.

[Dredged Material Temporary Yard]
Dredged materials temporary yard is not to be established and monitoring of noise, air quality, or effluent is not conducted.

Item	Parameter	Frequency and Duration	Locations (Minimum quantity)
Noise	Noise level	One time before construction and semi-annually during construction (24 hours/time)	3 Points
Air Quality	TSP Hydrogen Sulfide Lead Ammonia	One time before construction and semi-annually during construction (24hours/time)	3 Points
Effluent	DAO 2016-08 Parameters in Table 9 (Class A)	Once/month during construction	Discharge Point(s)
Excavated/Dredged Material* (Before treatment)	Amount of Excavated/Dredged Material Items in DAO 2016-08 (See the form) Items in DAO 2013-22 (See the form)	One sample for every 5,000m^3 Excavated/Dredged Material	All the Excavated/Dredged Material
Disposal/Re-use of Excavated/Dredged Material* (After treatment if treatment is necessary)	Items in DAO 2016-08 (See the form) Items in DAO 2013-22 (See the form)	One sample for every 5,000m^3 Disposal/Re-use of Excavated/Dredged Material	All the Excavated/Dredged Material

[Disposal site]

Item	Parameter	Frequency and Duration	Locations (Minimum quantity)
Noise	Noise level	One time before construction and semi-annually during construction (24 hours/time)	3 Points
Air Quality	TSP, Lead	One time before construction and semi-annually during construction (24hours/time)	3 Points
Groundwater	Items in DAO 2016-08 (see the form)	One time before construction and semi-annually during construction	At least 2 points

(Note) *: Excavated/Dredged Material will be checked by the Contractor.

2.2 Monitoring Results

2.2.1 Middle Marikina River

2.2.1.1 Noise:

DENR Standards for Noise (NPCC Memorandum Circular No. 002, 1980) is applied.

Unit: (dBA)

Time	Class				
	AA	A	B	C	D
Daytime (0900-1800Hr)	50	55	65	70	75
Evening (1800-2200Hr)	45	50	60	65	70
Nighttime (2200-0500Hr)	40	45	55	60	65
Morning (0500-0900Hr)	45	50	60	65	70

Class AA – a section of contiguous area which requires quietness, such as areas within 100 meters from school sites, nursery schools, hospitals and special homes for the aged.
Class A – a section or contiguous area which is primarily used for residential purposes.
Class B – a section or contiguous area which is primarily a commercial area.
Class C – a section primarily zoned or used as light industrial area.
Class D – a section which is primarily reserved, zoned or used as a heavy industrial area

Monitoring Results:

Location*	**Construction Activity**	**Distance from Construction site**	**Date and time of monitoring**	**Monitoring Time Regime**	**Monitoring** Result (Ave.) (dBA)**	**Standard (dBA)**
B-1	During Construction	NA (Not Applicable)	Jan. 5, 2023	Daytime	56	55
	During Construction	NA	Jan. 5	Evening	53	50
	During Construction	NA	Jan. 5	Nighttime	52	45
	During Construction	NA	Jan. 4	Morning	51	50
B-2	During Construction	NA	Jan. 6	Daytime	58	55
	During Construction	NA	Jan. 6	Evening	62	50
	During Construction	NA	Jan. 6	Nighttime	61	45
	During Construction	NA	Jan. 7	Morning	52	50
B-3	During Construction	NA	Jan. 4	Daytime	55	55
	During Construction	NA	Jan. 4	Evening	57	50
	During Construction	NA	Jan. 4	Nighttime	52	45
	During Construction	NA	Jan. 3	Morning	52	50
B-4	During Construction	NA	Jan. 3	Daytime	62	55
	During Construction	NA	Jan. 3	Evening	66	50

	During Construction	NA	Jan. 3	Nighttime	64	45
	During Construction	NA	Jan. 4	Morning	61	50

Note: * Monitoring location is shown in Figure 1 to 4 attached.
** Red mark means failure to comply with NPCC MC 002, 1980.

2.2.1.2 Vibration: *Vibration Monitoring was conducted for the Pile Driving Works.*
The maximum allowable peak vibration level (displacement velocity) is 2.5 mm/s, which is the level not to cause adverse effects on residential buildings.

Monitoring Result (conducted by C/S Consultants) are as follows:

Location	Construction Activities	Date of Monitoring	Case	Baseline	Displacement velocity (mm/s)				Standard Value Set under this Project
					Trial 1	Trial 2	Trial 3	Ave.	
VB-CP-3-L (2) Barangay Calumpang, Marikina (Sta. 12+120)	pile driving, pile coping, excavation works	January 26, 2023	Max	0.5	1.1	0.7	0.9	0.9	2.5
			Min	0.1	0.9	0.5	0.8	0.7	
VB-CP-3-R (1) River Park, Marikina (Sta. 11+180)	pile driving	March 23, 2023	Max	0.5	1.6	2.4	2.1	2.0	2.5
			Min	0.1	1.0	1.0	0.9	1.0	

All the monitoring results conformed to the allowable peak vibration level, 2.5 mm/s.

2.2.1.3 Air quality:
Republic Act No.8749 is applied for evaluation.

Unit: (μ/m^3)

Pollutants	Short Term			
	$\mu g/m^3$	ppm	Averaging time	Remarks
SO_2	180	0.07	24 hours	-
NO_2	150	0.08	24 hours	-
TSP	230	-	24 hours	-

Monitoring Results:
Location: B-1
Date and time: January 4 to 5, 2023

Item	Unit	Measured Value (Average)	Standard Value
SO_2	$\mu g/m^3$	<4	180
NO_2	$\mu g/m^3$	5	150
TSP	$\mu g/m^3$	40	230

Location: B-2
Date and time: January 6 to 7, 2023

Item	Unit	Measured Value (Average)	Standard Value
SO_2	$\mu g/m^3$	<4	180
NO_2	$\mu g/m^3$	13	150
TSP	$\mu g/m^3$	22	230

Location: B-3
Date and time: January 3 to 4, 2023

Item	Unit	Measured Value (Average)	Standard Value
SO_2	µg/m^3	<4	180
NO_2	µg/m^3	5	150
TSP	µg/m^3	47	230

Location: B-4
Date and time: January 3 to 4, 2023

Item	Unit	Measured Value (Average)	Standard Value
SO_2	µg/m^3	<4	180
NO_2	µg/m^3	6	150
TSP	µg/m^3	30	230

2.2.1.4. River Water Quality:
DAO 2016-08 / DAO 2021-19 are applied for evaluation.

Monitoring Results:
Location: A-1
Date and time: January 9, 2023 (All Parameters) & March 7, 2023 (Limited Parameters)

Item	Unit	Country Standard (Class C)	Measured Value		Remarks
			January 2023	March 2023	
Primary Parameters					
BOD	mg/l	7	32	31	
Chloride	mg/l	350	29.5	-	
Color	TCU	75	5	-	
DO (Minimum)	mg/l	5	6.33	9.61	
Fecal Coliform*	MPN/ 100ml	200	92,000	-	
Nitrate as NO_3-N	mg/l	7	0.45	-	
pH (Range)	-	6.5 – 9.0	7.3	-	
Phosphate as Phosphorus*	mg/l	0.025	0.27	-	
Temperature	℃	25 – 31	26.09	-	
TSS	mg/l	80	160	42	
Secondary Parameters					
Inorganics					
Ammonia as NH_3-N*	mg/l	0.06	2.26	-	
Boron*	mg/l	0.75	0.638	-	
Fluoride	mg/l	1	0.1	-	
Selenium	mg/l	0.02	<0.0002	-	
Sulfate*	mg/l	275	21	-	
Metals					
As	mg/l	0.02	<0.0007	-	
Ba	mg/l	3	<0.20	-	
Cd	mg/l	0.005	<0.003	-	
Cr^{6+}	mg/l	0.01	<0.01	-	
Cu as Dissolved Copper*	mg/l	0.2	<0.005	-	
Fe	mg/l	1.5	14.48	-	
Pb	mg/l	0.05	<0.01	-	
Mn	mg/l	0.2	0.433	-	
Hg	mg/l	0.002	<0.0004	-	
Ni	mg/l	0.2	<0.02	-	

Zn	mg/l	2	0.076	-	
Organics					
Benzo(a)pyrene	mg/l	1.5	<0.3	-	
BTEX					
Benzene	mg/l	0.05	<0.0003	-	
Toluene	mg/l	4	<0.0003	-	
Ethylebenzene	mg/l	1.5	<0.0002	-	
Xylenes	mg/l	1.5	<0.0002	-	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	-	
Organophosphate	µg/l	3	<0.04***	-	
Oil and Grease	mg/l	2	1.6	-	
PCBs	µg/l	0.5	<0.05	-	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	-	
Surfactants (MBAS)	mg/l	1.5	<0.10	-	
Trichloroethylene	mg/l	0.9	<0.0003	-	
Total Organochorine Pesticiders	µg/l	50	<0.73**	-	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.
*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.
**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.
***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

Location: A-2
Date and time: January 9, 2023 (All Parameters) & March 7, 2023 (Limited Parameters)

Item	Unit	Country Standard (Class C)	Measured Value		Remarks
			January 2023	March 2023	
Primary Parameters					
BOD	mg/l	7	12	22	
Chloride	mg/l	350	12	-	
Color	TCU	75	5	-	
DO (Minimum)	mg/l	5	8.66	5.01	
Fecal Coliform*	MPN/ 100ml	200	35,000	-	
Nitrate as NO_3-N	mg/l	7	0.23	-	
pH (Range)	-	6.5 – 9.0	7.2	-	
Phosphate as Phosphorus*	mg/l	0.025	0.2	-	
Temperature	℃	25 – 31	24.78	-	
TSS	mg/l	80	42	33	
Secondary Parameters					
Inorganics					
Ammonia as NH_3-N*	mg/l	0.06	2.93	-	
Boron*	mg/l	0.75	0.243	-	
Fluoride	mg/l	1	0.09	-	
Selenium	mg/l	0.02	<0.0002	-	
Sulfate*	mg/l	275	20	-	
Metals					
As	mg/l	0.02	0.0021	-	
Ba	mg/l	3	<0.20	-	
Cd	mg/l	0.005	<0.003	-	

Cr^{6+}	mg/l	0.01	<0.01	-	
Cu as Dissolved Copper*	mg/l	0.2	<0.005	-	
Fe	mg/l	1.5	2.66	-	
Pb	mg/l	0.05	<0.01	-	
Mn	mg/l	0.2	0.191	-	
Hg	mg/l	0.002	<0.0004	-	
Ni	mg/l	0.2	<0.02	-	
Zn	mg/l	2	0.021	-	
Organics					
Benzo(a)pyrene	mg/l	1.5	<0.3	-	
BTEX					
Benzene	mg/l	0.05	<0.0003	-	
Toluene	mg/l	4	<0.0003	-	
Ethylebenzene	mg/l	1.5	<0.0002	-	
Xylenes	mg/l	1.5	<0.0002	-	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	-	
Organophosphate	µg/l	3	<0.04***	-	
Oil and Grease	mg/l	2	<1.0	-	
PCBs	µg/l	0.5	<0.05	-	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	-	
Surfactants (MBAS)	mg/l	1.5	<0.10	-	
Trichloroethylene	mg/l	0.9	<0.0003	-	
Total Organochorine Pesticiders	µg/l	50	<0.73**	-	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.
*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.
**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.
***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

Location: A-3
Date and time: January 9, 2023 (All Parameters) & March 7, 2023 (Limited Parameters)

Item	Unit	Country Standard (Class C)	Measured Value		Remarks
			January 2023	March 2023	
Primary Parameters					
BOD	mg/l	7	8	18	
Chloride	mg/l	350	12.5	-	
Color	TCU	75	5	-	
DO (Minimum)	mg/l	5	9.7	5.97	
Fecal Coliform*	MPN/ 100ml	200	17,000	-	
Nitrate as NO_3-N	mg/l	7	0.15	-	
pH (Range)	-	6.5 – 9.0	7.1	-	
Phosphate as Phosphorus*	mg/l	0.025	0.19	-	
Temperature	℃	25 – 31	25.71	-	
TSS	mg/l	80	23	31	
Secondary Parameters					
Inorganics					
Ammonia as NH_3-N*	mg/l	0.06	2.95	-	
Boron*	mg/l	0.75	0.236	-	

Fluoride	mg/l	1	0.09	-	
Selenium	mg/l	0.02	<0.0002	-	
Sulfate*	mg/l	275	20	-	
Metals					
As	mg/l	0.02	<0.0007	-	
Ba	mg/l	3	<0.20	-	
Cd	mg/l	0.005	<0.003	-	
Cr^{6+}	mg/l	0.01	<0.01	-	
Cu as Dissolved Copper*	mg/l	0.2	<0.005	-	
Fe	mg/l	1.5	1.9	-	
Pb	mg/l	0.05	<0.01	-	
Mn	mg/l	0.2	0.137	-	
Hg	mg/l	0.002	<0.0004	-	
Ni	mg/l	0.2	<0.02	-	
Zn	mg/l	2	0.014	-	
Organics					
Benzo(a)pyrene	mg/l	1.5	<0.3	-	
BTEX					
Benzene	mg/l	0.05	<0.0003	-	
Toluene	mg/l	4	<0.0003	-	
Ethylebenzene	mg/l	1.5	<0.0002	-	
Xylenes	mg/l	1.5	<0.0002	-	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	-	
Organophosphate	µg/l	3	<0.04***	-	
Oil and Grease	mg/l	2	<1.0	-	
PCBs	µg/l	0.5	<0.05	-	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	-	
Surfactants (MBAS)	mg/l	1.5	<0.10	-	
Trichloroethylene	mg/l	0.9	<0.0003	-	
Total Organochorine Pesticiders	µg/l	50	<0.73**	-	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.
*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.
**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.
***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

Location: A-4
Date and time: January 9, 2023 (All Parameters) & March 7, 2023 (Limited Parameters)

Item	Unit	Country Standard (Class C)	Measured Value		Remarks
			January 2023	March 2023	
Primary Parameters					
BOD	mg/l	7	7	64	
Chloride	mg/l	350	13	-	
Color	TCU	75	5	-	
DO (Minimum)	mg/l	5	6.53	8.59	
Fecal Coliform*	MPN/ 100ml	200	54,000	-	
Nitrate as NO_3-N	mg/l	7	0.14	-	
pH (Range)	-	6.5 – 9.0	7.3	-	

Phosphate as Phosphorus*	mg/l	0.025	0.23	-	
Temperature	℃	25 – 31	26.19	-	
TSS	mg/l	80	19	89	
Secondary Parameters					
Inorganics					
Ammonia as NH_3-N*	mg/l	0.06	2.89	-	
Boron*	mg/l	0.75	0.053	-	
Fluoride	mg/l	1	0.09	-	
Selenium	mg/l	0.02	<0.0002	-	
Sulfate*	mg/l	275	20	-	
Metals					
As	mg/l	0.02	0.0015	-	
Ba	mg/l	3	<0.20	-	
Cd	mg/l	0.005	<0.003	-	
Cr^{6+}	mg/l	0.01	<0.01	-	
Cu as Dissolved Copper*	mg/l	0.2	<0.005	-	
Fe	mg/l	1.5	2.02	-	
Pb	mg/l	0.05	<0.01	-	
Mn	mg/l	0.2	0.131	-	
Hg	mg/l	0.002	<0.0004	-	
Ni	mg/l	0.2	<0.02	-	
Zn	mg/l	2	0.031	-	
Organics					
Benzo(a)pyrene	mg/l	1.5	<0.3	-	
BTEX					
Benzene	mg/l	0.05	<0.0003	-	
Toluene	mg/l	4	<0.0003	-	
Ethylebenzene	mg/l	1.5	<0.0002	-	
Xylenes	mg/l	1.5	<0.0002	-	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	-	
Organophosphate	µg/l	3	<0.04***	-	
Oil and Grease	mg/l	2	<1.0	-	
PCBs	µg/l	0.5	<0.05	-	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	-	
Surfactants (MBAS)	mg/l	1.5	<0.10	-	
Trichloroethylene	mg/l	0.9	<0.0003	-	
Total Organochorine Pesticiders	µg/l	50	<0.73**	-	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.

*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.

**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.

***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

Location: WQ-D-CP-2 (Sta. 8+150)
Date and time: January 30, 2023 (Intensive Parameters)

Item	Unit	Country Standard (Class C)	Measured Value	Remarks
Primary Parameters				
BOD	mg/l	7	88	
Chloride	mg/l	350	24.0	
Color	TCU	75	50	
DO (Minimum)	mg/l	5	10.72	
Fecal Coliform	MPN/ 100ml	200	350,000	
Nitrate as NO_3-N	mg/l	7	0.07	
pH (Range)	-	6.5 – 9.0	7.3	
Phosphate as Phosphorus	mg/l	0.025	0.49	
Temperature	℃	25 – 31	25.19	
TSS	mg/l	80	56	
Secondary Parameters				
Inorganics				
Ammonia as NH_3-N	mg/l	0.06	9.76	
Boron	mg/l	0.75	<1.00	
Fluoride	mg/l	1	0.09	
Selenium	mg/l	0.02	<0.0002	
Sulfate	mg/l	275	30	
Metals				
As	mg/l	0.02	0.0019	
Ba	mg/l	3	<0.20	
Cd	mg/l	0.005	<0.003	
Cr^{6+}	mg/l	0.01	<0.01	
Cu as Dissolved Copper	mg/l	0.2	<0.005	
Fe	mg/l	1.5	5.76	
Pb	mg/l	0.05	<0.01	
Mn	mg/l	0.2	0.434	
Hg	mg/l	0.002	<0.0004	
Ni	mg/l	0.2	<0.02	
Zn	mg/l	2	0.117	
Organics				
Benzo(a)pyrene	mg/l	1.5	<0.3	
BTEX				
Benzene	mg/l	0.05	<0.0003	
Toluene	mg/l	4	<0.0003	
Ethylebenzene	mg/l	1.5	<0.0002	
Xylenes	mg/l	1.5	<0.0002	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	
Organophosphate	µg/l	3	<0.04	
Oil and Grease	mg/l	2	<1.0	
PCBs	µg/l	0.5	<0.05	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	
Surfactants (MBAS)	mg/l	1.5	1.14	
Trichloroethylene	mg/l	0.9	<0.0003	
Total Organochorine Pesticiders	µg/l	50	<0.73**	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.
*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.

**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.
***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

2.2.1.5. River Water Flow (Secondary Data)

Data Obtained from Effective Flood Control Operational System (EFCOS)

Station	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rodriguez	2021	51.81	51.36	51.03	44.25	42.70	30.10	54.60	44.39	44.00	40.78	35.75	36.47
		21.85	21.84	21.83	21.82	21.73	21.37	22.03	21.76	21.78	21.61	21.49	21.51
	2022	36.39	34.67	34.32	35.91	27.10	26.88	29.22	48.61	48.80	41.52	32.76	29.61
		21.50	21.46	21.45	21.48	21.21	21.21	21.37	21.78	21.79	21.63	21.40	21.30
Nangka	2021	65.84	46.81	46.81	46.38	45.83	46.59	63.74	55.11	54.77	51.96	50.38	50.02
		16.14	15.81	15.81	15.80	15.81	15.81	16.15	15.97	16.00	15.91	15.88	15.87
	2022	49.42	49.27	48.93	49.32	48.78	49.69	50.14	53.99	58.37	59.82	51.88	49.97
		15.86	15.86	15.85	15.85	15.85	15.87	15.88	15.95	16.03	16.05	15.91	15.87
Sto. Nino	2021	86.52	51.89	47.25	46.02	25.98	42.33	92.59	67.94	86.43	65.92	66.57	58.75
		12.66	12.17	12.07	12.05	11.50	12.02	12.76	12.42	12.68	12.42	12.41	12.32
	2022	45.74	42.55	41.74	37.83	39.83	23.81	32.51	61.35	74.46	71.21	91.33	65.88
		12.04	11.97	11.95	11.86	11.91	11.40	11.71	12.33	12.52	12.47	12.72	12.40
Rosario	2021	138.71	76.29	42.18	28.23	21.33	25.98	47.50	71.89	90.84	97.60	70.97	50.68
		12.43	11.85	11.27	10.88	10.65	10.80	11.43	11.79	12.04	12.09	11.78	11.49
	2022	37.20	26.86	24.68	32.36	36.17	46.12	59.60	85.32	76.07	86.11	130.64	89.06
		11.14	10.83	10.75	11.02	11.12	11.36	11.61	11.96	11.85	11.97	12.38	12.00
Angono	2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		12.49	12.04	11.60	11.20	10.99	11.02	11.42	11.87	12.12	12.11	11.83	11.56
	2022	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		11.38	11.12	11.00	11.01	11.02	11.16	11.31	11.66	11.80	12.00	12.58	12.32

2.2.1.6 Tree Cutting and Relocation (for Project-Affected Trees)

During the monitoring period, two (2) Tree-Cutting / Earth-Balling (TCEB) permits were issued to the Proponent (DPWH). The permits were secured for the implementation of the removal of trees affected by the project. These TCEB permits are:

- No. 2022-11-513 TCBP-518 from the DENR-NCR – CP3 (Sta. 9+600 to 10+380)
- No. 2022-12-591 TCBP-581 from DENR-NCR – CP3 (Sta.11+040 to 12+000)

A. No. 2022-11-513 TCBP-518 from the DENR-NCR

Official ID / No.:	No. 2022-11-513 TCBP-518
Date of Issuance:	November 7, 2022
Name of Permittee:	[redacted], Project Manager III
Number of Targeted Trees:	567 trees
Sta. of the Target Area where the Trees are Located:	Contract Package No. 3, R3-R4, Sta. 9+600 to Sta. 10+380, Barangay Industrial Valley Complex (IVC), Marikina City
Replacement Ratio for Cut or Relocated Trees*	1:50 for planted trees 1:100 for naturally growing trees
Instruction in the Permit: Tree Cutting or Earth-Balling for Relocation	Cutting: 152 (naturally grown: 52, planted: 100, replacement by 10,200 seedlings in total), Earth-Balling: 401, Dead Trees: 13, Palm tree: 1 (13 dead trees and 1 palm are exempted from seedlings replacements)

Status of Permit as of this Monitoring Period:	The permit issued lapsed last March 7, 2023. A request for an extension was approved by the DENR-NCR for 120 days starting on February 17, 2023.

Note: *Based on DENR Memorandum Order No. 2012-02 "Uniform Replacement Ratio for Cut or Relocated Trees"

B. No. 2022-12-591 TCBP-581 from DENR-NCR

Official ID / No.:	No. 2022-12-591 TCBP-581
Date of Issuance:	December 27, 2022
Name of Permittee:	[redacted], Project Manager III
Number of Targeted Trees:	26 trees
Sta. of the Target Area where the Trees are Located:	Contract Package No. 3, R10a, Sta. 11+040 to Sta. 12+000, Barangay Tañong, Marikina City
Replacement Ratio for Cut or Relocated Trees*	1:50 for planted trees 1:100 for naturally growing trees
Instruction in the Permit: Tree Cutting or Earth-Balling for Relocation	Cutting: 15 (naturally grown: 0, planted: 15, replacement by 750 seedlings in total), Earth-Balling: 9, Dead Trees: 1, Palm tree: 1 (13 dead trees and 1 palm are exempted from seedlings replacements)
Status of Permit as of this Monitoring Period:	Completed.

Note: *Based on DENR Memorandum Order No. 2012-02 "Uniform Replacement Ratio for Cut or Relocated Trees"

As for the CP-2, below are the existing TCEB permits from the DENR-NCR for Project-Affected Trees at Quezon City and Pasig CENRO for Project-Affected Trees at Pasig City for the 4th Quarter – Contract Package No. 2 and their status as of this monitoring period.

- No. 2022-10-465 TCBP-469 from the DENR-NCR (Sta. 11+240 to 11+615)
- Permit to Cut from the Pasig CENRO (Sta. 6+700 to 9+300)

A. No. 2022-06-260 TCBP-269 from the DENR

Official ID / No.:	No. 2022-06-260 TCBP-269
Date of Issuance:	July 23, 2022
Name of Permittee:	[redacted], Project Manager III
Number of Targeted Trees:	149 trees
Sta. of the Target Area where the Trees are Located:	Contract Package No. 2, Sta. 6+700 – Sta. 9+200, Right Bank, Brgy. Bagumbayan and Brgy. Libis, Quezon City
Replacement Ratio for Cut or Relocated Trees*	1:50 for planted trees 1:100 for naturally growing trees TOTAL TREES for cutting: 164 Planted: 45 trees, 5 bamboos Naturally Growing: 114
Sapling Replacement:	(45x50) + (114x100) = 13,650 pcs 70% fruit bearing 30% ornamental Note: Already delivered to DENR La Mesa Dam Nursery
Status of Permit as of this Monitoring Period:	The permit issued lapsed last October 21, 2022. The request for an extension was approved by the DENR-NCR for 120 days starting on February 7, 2023.

Note: *Based on DENR Memorandum Order No. 2012-02 "Uniform Replacement Ratio for Cut or Relocated Trees"

B. Permit to Cut from the Pasig CENRO

Control No.:	039-22
Date of Issuance:	October 25, 2022

Validity:	November 25, 2022
Name of Permittee:	[redacted], Project Manager III
Number of Targeted Trees:	392 trees
Sta. of the Target Area where the Trees are Located:	Contract Package No. 2, Sta. 6+700 – Sta. 9+200, Left Bank, Brgy. Manggahan and Brgy. Santolan, Pasig City
Replacement Ratio for Cut Trees*	1:100 TOTAL TREES for cutting: 392
Sapling Replacement:	(392x100) = 39,200 pcs Fruit-bearing seedlings: 11,800 (30%) Ornamental plants: 27,400 (70%) Note: Already delivered to Pasig CENRO Nursery
Status of Cutting of Trees as of this Monitoring Period:	Cutting of Trees were currently suspended due to ROW issues. Extension of permit is also being requested from the Pasig CENRO.

Note: *Based on Pasig City Ordinance No. 31 Series of 2003

In accordance to DAO 2018-16 (Guidelines in the Processing and Issuance of Permits on the Removal and Relocation of Trees Affected By DPWH Projects) and DAO 2021-11 (Guidelines in the Processing and Issuance of Permits for the Cutting, Removal, and Relocation of Naturally Growing Trees), the TCEB permits granted for this monitoring period have reported 1134 trees identified in the area, 723 trees identified for cutting, and 410 trees identified for earth-balling for relocation. Replacement of cut trees are carried out based on DAO 2012-02 with the following ratio: 1:50 for planted trees and 1:100 for naturally growing trees. Sapling replacement for cut trees are being conformed following the DAO 2012-02 to compensate for the affected trees by the project. Compliance with the terms stipulated in the TCEB permits are being accomplished.

2.2.2. Dredged Material Temporary Yard

Dredged Materials Temporary Yard is not established in this monitoring period according to the Construction Contractors. Therefore, the following Parameters (noise, air quality, and effluent) are not monitored.

2.2.2.1. Excavated/Dredged Material

(1) Heavy Metal Concentration (Elutriate test)

DAO 2016-08 (Effluent) is applied
Point: Sta. 8+707.9 to Sta. 9+289.9
Date and Time: November 29, 2022

Parameter	Unit	Sampling location	Reporting Limit of Laboratory	Quality Standard (Class C, DAO 2016-08/ DAO 2021-19)	Monitoring Result (min. – max.)	Evaluation (Conformance to Quality Standard)
Arsenic (As)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.005	0.02	ND	Conformed
Cadmium (Cd)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.001	0.005	ND	Conformed
Chromium (Hexavalent) (Cr^{6+})	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.013	0.01	ND	Conformed
Lead (Pb)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.005	0.05	ND	Conformed
Total Mercury (T-Hg)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.0002	0.002	ND	Conformed
Cyanide (CN^-)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.025	0.1	ND	Conformed

Parameter	Unit	Sampling location	Reporting Limit of Laboratory	Quality Standard (Class C, DAO 2016-08/ DAO 2021-19)	Monitoring Result (min. – max.)	Evaluation (Conformance to Quality Standard)
Organophosphate Pesticide (OPP) as Malathion	µg/L	Sta. 8+707.9 – Sta. 9+289.9	0.28	3	ND	Conformed
Polychlorinated Biphenyls (PCBs)	µg/L	Sta. 8+707.9 – Sta. 9+289.9	0.25	0.5	ND	Conformed

Note) ND: Not Detected

(2) Heavy Metal Concentration (TCLP test)
DAO 2013-22 is applied
Point: Sta. 8+707.9 to Sta. 9+289.9
Date and Time: November 29, 2022

Parameter	Unit	Sampling location	Reporting Limit of Laboratory	Quality Standard (DAO 2013-22)	Monitoring Result (min. – max.)	Evaluation (Conformance to Quality Standard)
Selenium (Se)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.008	1	ND – 0.03	Conformed
Arsenic (As)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.005	1	ND – 0.02	Conformed
Barium (Ba)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.005	70	0.08 – 1.6	Conformed
Cadmium (Cd)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.001	0.3	ND – 0.07	Conformed
Total Chromium (T-Cr)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.005	5	ND – 0.02	Conformed
Lead (Pb)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.005	1	ND – 0.007	Conformed
Total Mercury (T-Hg)	mg/L	Sta. 8+707.9 – Sta. 9+289.9	0.0002	0.1	ND	Conformed

Note) ND: Not Detected

2.2.2.2. Disposal/Re-use of Excavated/Dredged Material (after treatment if treatment is necessary)
There are no treated materials after dredging/excavation.

2.2.3 Disposal site
2.2.3.1 Noise:
DENR Standards for Noise (NPCC Memorandum Circular No. 002, 1980) is applied.

Unit: (dBA)

Time	Class				
	AA	A	B	C	D
Daytime (0900-1800Hr)	50	60	65	70	75
Evening (1800-22100Hr)	45	50	60	65	70
Nighttime (2200-0500Hr)	40	45	55	60	65
Morning (0500-0900Hr)	45	50	60	65	70
Class AA – a section of a contiguous area that requires quietness, such as areas within 100 meters from school sites, nursery schools, hospitals, and special homes for the aged.					

Class A – a section or contiguous area which is primarily used for residential purposes. Class B – a section or contiguous area which is primarily a commercial area. Class C – a section primarily zoned or used as a light industrial area. Class D – a section that is primarily reserved, zoned, or used as a heavy industrial area

Monitoring Results:

Location*	Construction Activity	Distance from Construction site	Date and time of monitoring	Monitoring Time Regime	Monitoring** Result (Ave.) (dBA)	Standard (dBA)
B-5***	During Construction	NA (Not Applicable)	Dec. 30, 2023	Daytime	74	55
	During Construction	NA	Dec. 30	Evening	72	50
	During Construction	NA	Dec. 31	Nighttime	67	45
	During Construction	NA	Dec. 30	Morning	68	50
B-6***	During Construction	NA	Dec. 29	Daytime	72	55
	During Construction	NA	Dec. 29	Evening	70	50
	During Construction	NA	Dec. 30	Nighttime	60	45
	During Construction	NA	Dec. 29	Morning	65	50
B-7	During Construction	NA	Dec. 28	Daytime	64	55
	During Construction	NA	Dec. 28	Evening	58	50
	During Construction	NA	Dec. 29	Nighttime	51	45
	During Construction	NA	Dec. 28	Morning	62	50

Notes: Red mark means failure to comply with the Memorandum Circular of the National Pollution Control Commission (NPCC), 1980

*. Memorandum Circular of National Pollution Control Commission (NPCC), 1980

**. Class A: a section or contiguous area which is primarily used for residential purposes

The division of the 24-hour period shall be as follows:

Morning 5:00 A.M. to 9:00 AM

Daytime 9:00 A.M. to 6:00 PM

Evening 6:00 P.M. to 10:00 PM

Nighttime 10:00 P.M. to 5:00 AM

***. For areas directly facing a public transportation route or an urban traffic artery, the standards are adjusted by adding five decibels (+5 dBA) to the existing standards.

2.2.3.2 Air Quality

Republic Act No.8749 is applied for evaluation.

Pollutants	Short Term			
	$\mu g/m^3$	ppm	Averaging time	Remarks
TSP	230	-	24 hours	-
Pb	1.5	-	24 hours	-

Monitoring Results:

Location: B-5

Date and time: December 30 to December 31, 2022

Item	Unit	Measured Value (Average)	Standard Value
TSP	µg/m^3	53.1	230
Pb	µg/m^3	<0.0006	1.5

Location: B-6
Date and time: December 29 to 30, 2022

Item	Unit	Measured Value (Average)	Standard Value
TSP	µg/m^3	77.3	230
Pb	µg/m^3	<0.0006	1.5

Location: B-7
Date and time: December 28 to 29, 2022

Item	Unit	Measured Value (Average)	Standard Value
TSP	µg/m^3	39.1	230
Pb	µg/m^3	<0.0006	1.5

2.2.3.3 Groundwater
DAO 2016-08/ are applied for evaluation.

Monitoring Results:
Location: GW-1
Date and time: January 11, 2023 (Primary Parameters and Secondary Parameters)

Item	Unit	Country Standard (Class C)	Measured Value	Remarks
Primary Parameters				
BOD	mg/l	7	13	
Chloride	mg/l	350	147.0	
Color	TCU	75	<5	
DO (Minimum)	mg/l	5	7.74	
Fecal Coliform	MPN/ 100ml	200	16,000	
Nitrate as NO_3-N	mg/l	7	1.74	
pH (Range)	-	6.5 – 9.0	7.2	
Phosphate as Phosphorus	mg/l	0.025	0.54	
Temperature	℃	25 – 31	26.43	
TSS	mg/l	80	24	
Secondary Parameters				
Inorganics				
Ammonia as NH_3-N	mg/l	0.06	7.67	
Boron	mg/l	0.75	0.314	
Fluoride	mg/l	1	0.14	
Selenium	mg/l	0.02	<0.0002	
Sulfate	mg/l	275	7	
Metals				
As	mg/l	0.02	<0.0007	
Ba	mg/l	3	<0.20	
Cd	mg/l	0.005	<0.003	
Cr^{6+}	mg/l	0.01	<0.01	
Cu as Dissolved Copper	mg/l	0.2	0.015	
Fe	mg/l	1.5	2.18	
Pb	mg/l	0.05	<0.01	

Mn	mg/l	0.2	1.829	
Hg	mg/l	0.002	<0.0004	
Ni	mg/l	0.2	0.02	
Zn	mg/l	2	0.023	
Organics				
Benzo(a)pyrene	mg/l	1.5	<0.3	
BTEX				
Benzene	mg/l	0.05	<0.0003	
Toluene	mg/l	4	<0.0003	
Ethylebenzene	mg/l	1.5	<0.0002	
Xylenes	mg/l	1.5	<0.0002	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	
Organophosphate	µg/l	3	<0.04	
Oil and Grease	mg/l	2	<1.0	
PCBs	µg/l	0.5	<0.05	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	
Surfactants (MBAS)	mg/l	1.5	<0.10	
Trichloroethylene	mg/l	0.9	<0.0003	
Total Organochorine Pesticiders	µg/l	50	n/a	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.
*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.
**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.
***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

Location: GW-2
Date and time: January 11, 2023 (Primary Parameters and Secondary Parameters)

Item	Unit	Country Standard (Class C)	Measured Value	Remarks
Primary Parameters				
BOD	mg/l	7	20	
Chloride	mg/l	350	72.0	
Color	TCU	75	<5	
DO (Minimum)	mg/l	5	8.86	
Fecal Coliform	MPN/ 100ml	200	24,000	
Nitrate as NO_3-N	mg/l	7	1.68	
pH (Range)	-	6.5 – 9.0	7.3	
Phosphate as Phosphorus	mg/l	0.025	0.46	
Temperature	℃	25 – 31	26.54	
TSS	mg/l	80	17	
Secondary Parameters				
Inorganics				
Ammonia as NH_3-N	mg/l	0.06	2.79	
Boron	mg/l	0.75	0.234	
Fluoride	mg/l	1	0.25	
Selenium	mg/l	0.02	0.0062	
Sulfate	mg/l	275	6	
Metals				
As	mg/l	0.02	<0.0007	
Ba	mg/l	3	<0.20	

Cd	mg/l	0.005	<0.003	
Cr^{6+}	mg/l	0.01	<0.01	
Cu as Dissolved Copper	mg/l	0.2	0.011	
Fe	mg/l	1.5	1.30	
Pb	mg/l	0.05	<0.01	
Mn	mg/l	0.2	5.651	
Hg	mg/l	0.002	<0.0004	
Ni	mg/l	0.2	<0.02	
Zn	mg/l	2	0.023	
Organics				
Benzo(a)pyrene	mg/l	1.5	<0.3	
BTEX				
Benzene	mg/l	0.05	<0.0003	
Toluene	mg/l	4	<0.0003	
Ethylebenzene	mg/l	1.5	<0.0002	
Xylenes	mg/l	1.5	<0.0002	
Cyanide as Free Cyanide	mg/l	0.1	<0.01	
Organophosphate	µg/l	3	<0.04	
Oil and Grease	mg/l	2	<1.0	
PCBs	µg/l	0.5	<0.05	
Phenol & Phonolic Substances	mg/l	0.05	<0.00006	
Surfactants (MBAS)	mg/l	1.5	0.12	
Trichloroethylene	mg/l	0.9	<0.0003	
Total Organochorine Pesticiders	µg/l	50	n/a	

Note: Red Mark means failure to comply with Water Quality Guideline as per DAO 2016-08/DAO 2021-19.

*: Parameters that have updated Water Quality Guidelines and General Effluent Standards as stipulated in DAO 2021-19. Parameters without * are stipulated in DAO 2016-08.

**: The highest detection limit (DL), toxaphene, was reflected as a value for the total organochlorine pesticides because the values of analytes detected for total organochlorine pesticides were less than the DL.

***: The detection limit (DL) has been changed due to the adoption of a different analysis method.

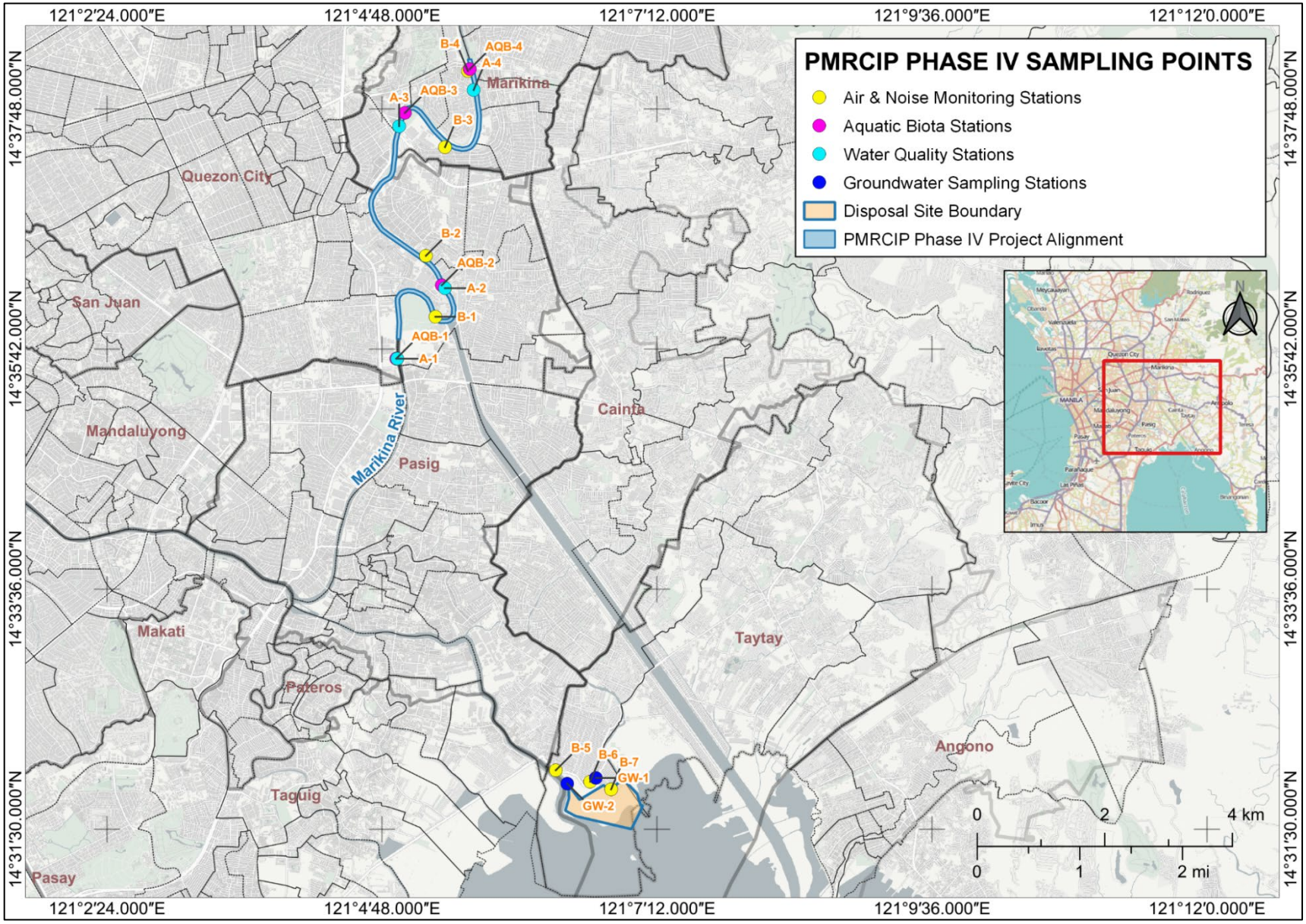

Figure 1 Location Map of Monitoring Station (Whole Area)

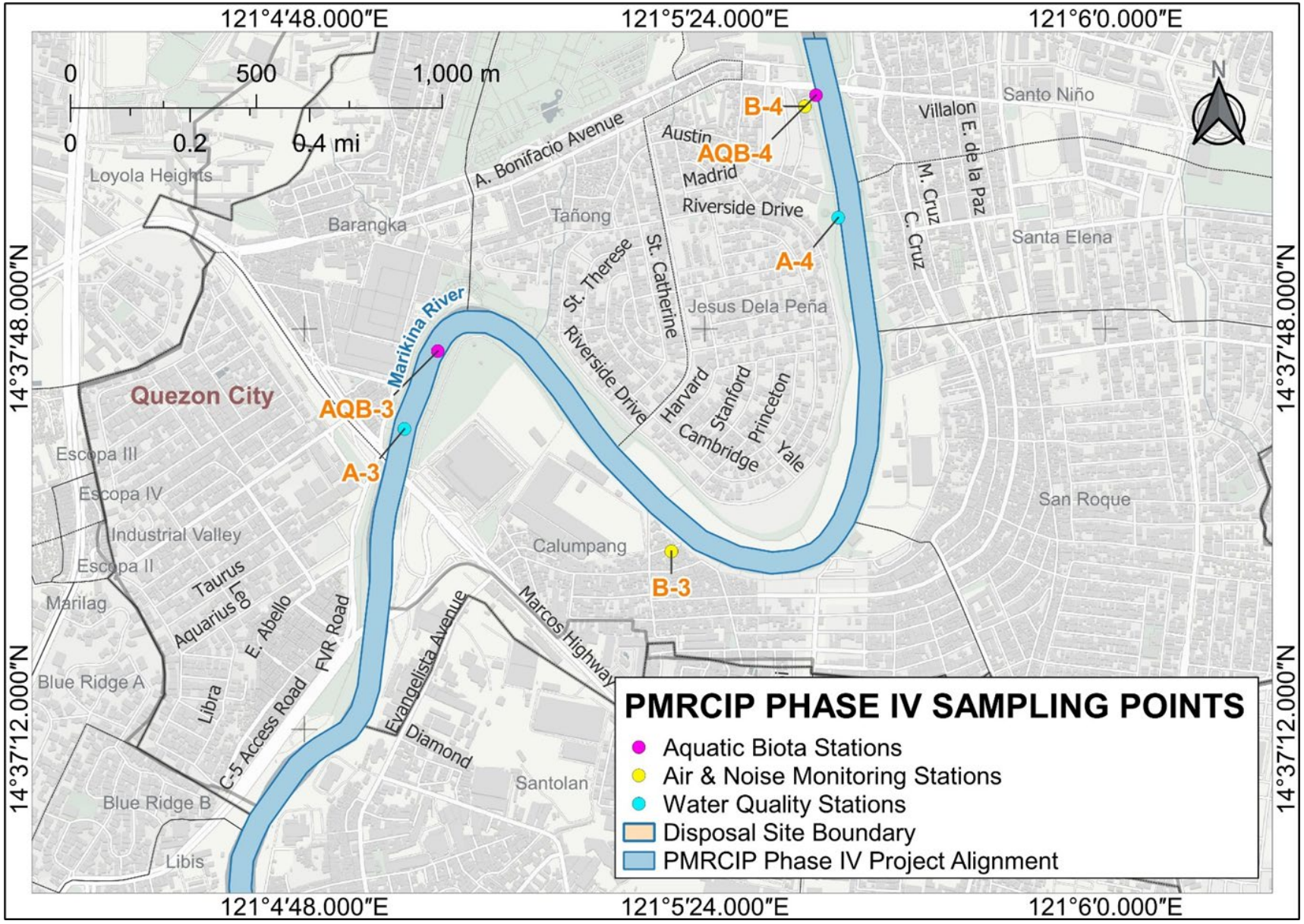

Figure 2 Location Map of Monitoring Station (Upstream Area of Middle Marikina River)

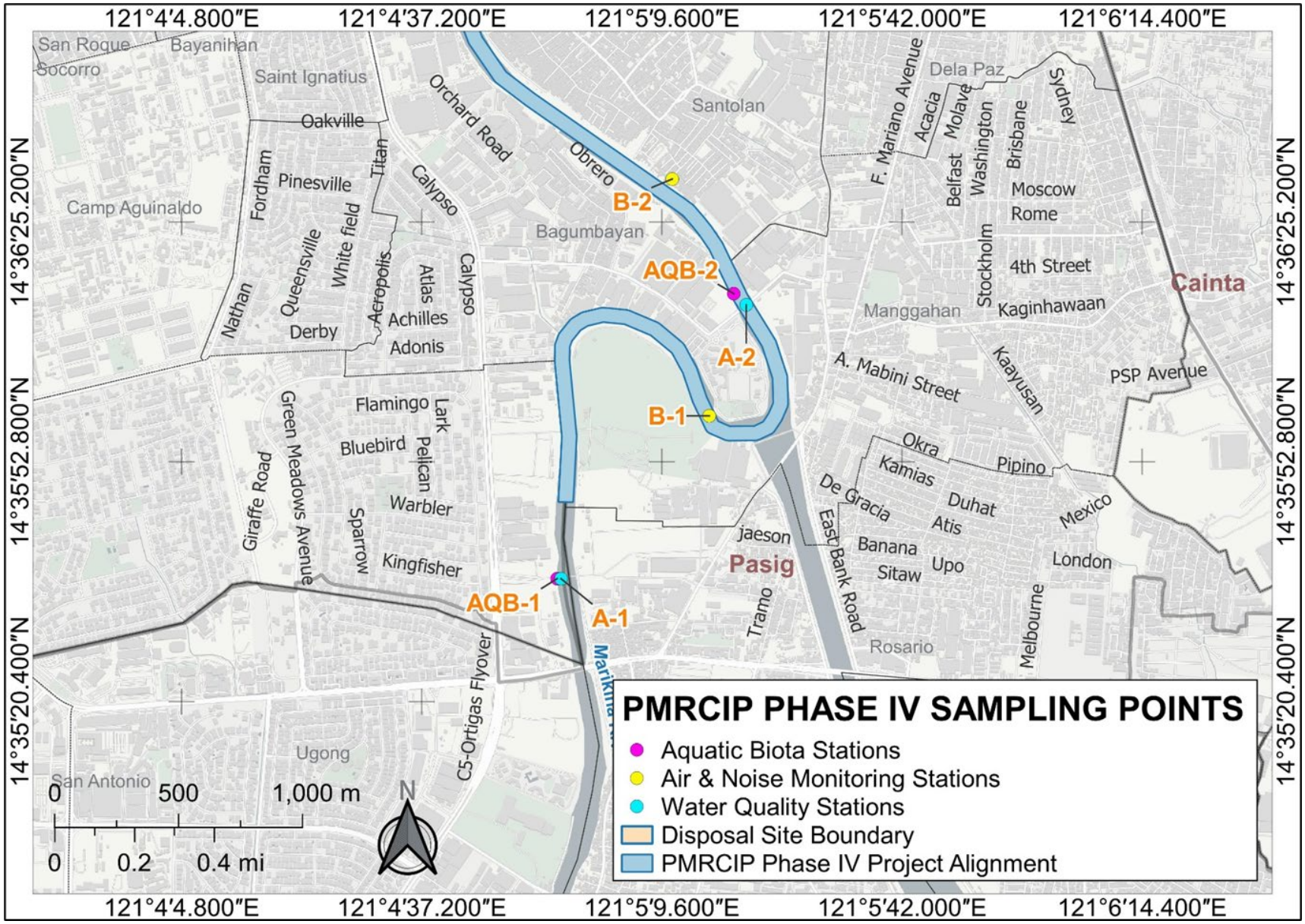

Figure 3 Location Map of Monitoring Station (Downstream Area of Middle Marikina River)

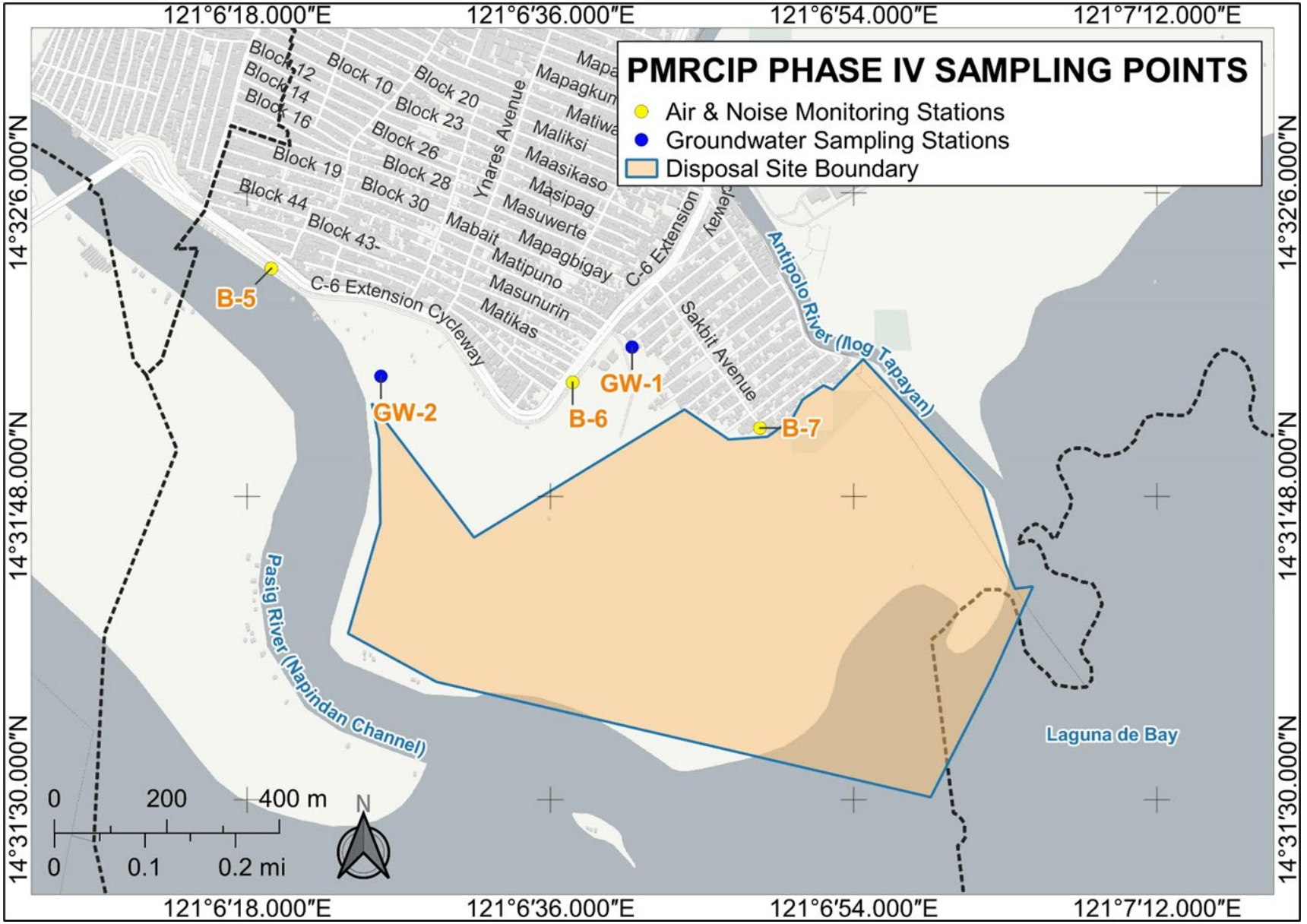

Figure 4 Location Map of Monitoring Station (Disposal Site)

Attachment IV-10

RAP Monitoring Form

RAP Monitoring Form: Pasig-Marikina River

RAP Monitoring Form: Pasig-Marikina River
(as of March 2023: the period from January to March 2023)

1. Public Consultations

No.	Date	Place / No. of Participants	Contents of the Consultation	Concerns from Participants	Correspondences
1	1 Jun '21 3 Jun '21	• Barangay Hall- Bagumbayan (19 persons) • Barangay Hall- Bagumbayan (35 persons)	• Validation of ISFs • Reasons why the ISFs must be relocated • Procedures for submitting required documents • Who can pre-qualify	Concerns why the ISFs failed to pre-quality: • Not included in the census in 2015 • House registered in the name of husband • Husband died / Husband left (live-in) • Two families living in one roof but cooked separately – one is renting the room so not covered in the census, etc.	Most of the participants understand and agreed with explanations from NHA and the barangay.
2	14 Jul '21	Bagumbayan Elementary School Basketball Court – total (294 ISFs)			
3	3 Nov '21	Private-Public owners of property [land and structures] in Quezon City.		- Process and procedures - Valuation of property - Schedules of activities	Follow-up were done through personal visits and social media.

2. Grievance Redress

No. of grievance redress procedures filed			No. of the conflicts resolved		
During the Quarter	Till the Last Quarter	Up to the Quarter (in total)	During the Quarter	Till the Last Quarter	Up to the Quarter (in total)
0 case	2 cases	2 cases	N/A	N/A	N/A

No.	Date of Receipt of Complaints	Contents of the Complaints	Correspondences	Resolved / Not yet resolved
1	11 March 2022	Request to avoid two structures in Olandes (9km+300, right-bank).	The Lawyer of [redacted] have submitted Documents regarding on his claims to DPWH, this documents have been forwarded to the Departments legal office verification.	Under resolving process

2	July 2022	[redacted] requested compensation for the area inside the river (river-side of the existing dike in front of their land)	DPWH have already compensated [redacted] 100% for the affected structure, while only 50% for the affected land area	Under resolving process
3	11 January 2023	• Drainage system in the resettlement site • Permanent Connection of basic Utilities in the Resettlement Site • Access to Health care in the Resettlement Site	• Small flooding was observed during heavy rain, rain water accumulated in the lowest elevation on the road but will quickly subside after the rain. • No permanent connection to the electric company, ISFs are still connected to a submitter from a local resident. Not all houses have permanent water connection. • Community access to ambulance and health care workers/Doctors are limited. • Around 6 individuals got infected by dengue from August to November last year. This can be considered an outbreak and no fogging activity from the Brgy to control the Virus.	• Under resolving process • Under resolving process • The cases regarding the healthcare of the relocates was brought to the attention of the Brgy. Bagumbayan for immediate course of action
4	March 9, 2023	• Identified 11 Kangkong Farmers and 1 Boat Ferry Service in Sta. 9+240 to sta. 9+260	• March 20, 2023 the 11 kangkong Farmers, Brgy. Santolan and Toyo Contractor had a meeting to discuss the relocation and possible compensation of the Farmers.	• A follow up meeting on March 29, 2023 together with the Philippine Coast Guard, DPWH, Toyo is scheduled to further discuss and resolve the issue

3. Progress of Land Acquisition and Resettlement

Resettlement Activities	Planned Total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organization
			During the Quarter	Till the Last Quarter	Up to the Quarter (Total Progress)	Till the Last Quarter	Up to the Quarter (Total Progress)		
Implementation of Census Survey	1	Set	Completed	Completed	Completed	100 %	100 %	Done in 2015 (Quezon)	Quezon City
Updates of RAP	1	Set	Abbreviated Resettlement Action Plan was prepared for the dumping site in Taytay Municipality and the additional areas of the Cainta Flood Gate in Cainta Municipality (Finalized in August 2021)					ARAP was prepared in August 2021	DPWH (UPMO and ESSD)
Approval of updated RAP	1	Time	RAP validation / updating shall be done including ARAP after the detailed alignment and relocation sites are determined. Existing approved RAP, however, is still effective for RAP implementation.					In 2022	DPWH (UPMO and ESSD)
Deployment of External Monitoring Agency (EMA)	1	Set	[redacted], signed the contract for the PMRCIP-IV as the External Monitoring Agency of the project last June 1, 2022.			Baseline survey for Bagumbayan was conducted and completed on June 27-28, for the ISFs in Pasig city, this was completed on August 15, while for the disposal site in Taytay was completed on August 16. Social Survey of EMA for Brgy. Bagumbayan Relocatees in Baras was conducted and completed on March 9 -10 for the first monitoring period.		June 2025	DPWH
Land Acquisition	104 * in RAP	Case	0	0	0	0%	0%	In 2022	Quezon City / NHA / DPWH
ISFs Relocation (in Quezon City)	71 * in RAP	HHs	11	35	46	49.3%	64.8%	April 2023	Quezon City / NHA / DPWH
ISFs Relocation (by Pasig City)	266 (65 Priority)	HHs	0	0	0	0%	0%	In 2023	Pasig City / NHA

4. Implementation of Livelihood Restoration Assistance

DPWH proposed early commencement of livelihood restoration program (LRP) to LGUs of Quezon City and Baras. In the attachment of Minutes of Agreement (MOA) signed in January 2022 between Quezon City and Municipality of Baras, Housing, Community Development and Resettlement Department (HCDRD), former Urban Poor Affairs Office (UPAO), of Quezon City secured the Five Years Work and Financial Plan (WFP) for resettlement site services including health sector, security sector and environmental sector. As a part of the WFP, relevant LGUs shall start the LRP soon after ISF's living status becomes stable in the resettlement site in Baras.

Brief Description of the Implemented Livelihood Restoration Program (LRP)	Results during Report Period (No. of trainings implemented, No. of Participants, etc.)	Location
Small Business and Cooperatives Development and Promotions Office (SBCDPO) of Quezon City with relevant institutions organized an occupational training course between 7-8 June.	ISFs of the project among 35 cases which was relocated during the 1st batch participated the course.	The relocation site in Baras
Orientation of the Baras LGUs regarding on the Social and basic Services available in the Municipality of Baras that the relocatees from Bagumbayan can avail, was held on September 19, 2022.	The Orientation was attended by the 269 relocatees from Brgy. Bagumbayan. They were divided into two, the morning session started at 8AM to 12PM and the afternoon commence at 1AM and lasted until 4PM.	NHA Relocation Site in Baras, Rizal

5. Restoration of Income and Living Standard

The External Monitoring Agency (EMA) will implement a Social survey to understand the socio-economic situation of ISFs in Baras March 2023.

No.	Description about Surveyed Area	No. of Surveyed HHs	No. of HHs with Increased Incomes	No. of HHs with Decreased Incomes	No. of HHs with Unchanged Incomes	Types of Problems Encountered	Perceived Need for Additional Assistance
1	71 Project Priority ISFs in Bagumbayan that were relocated in One Ynares Baras Rizal	36 ISFs of the total 47 ISFs that were already relocated in Baras	Processing of data is ongoing	Processing of data is ongoing	Processing of data is ongoing	Processing of data is ongoing	Processing of data is ongoing

6. Others

RAP Monitoring Form: Manggahan Floodway

RAP Monitoring Form: Manggahan Floodway
(as of March 2023: the period from January to March 2023)

1. Public Consultations:

No.	Date	Place / No. of Participants	Contents of the Consultation	Concerns from Participants	Correspondences
1	• January 31, 2023 • February 2, 2023	• Covered court of Brgy. San Andres Cainta Rizal/80 ISFs participated in the Pubcon • Covered Court San Juan Cainta Rizal/800	• Resettlement Action Plan of the project and change from In-city to off-City Relocation site • NHA relocation process • Presentation of Hermosa ville as the relocation site of the Project	• Schedule and Timeline of the relocation • Documentation and procedures to avail of the relocation program from NHA • Livelihood and source of income from the resettlement site	• DPWH explained regarding the time line of the construction activity in the 1st priority area • NHA explained the procedures and documents that the ISF needs to prepare and submit top NHA • The Consultants and DPWH discussed the options livelihood programs the ISFs may avail
	• February 8, 2023 • February 10, 2023	• participated in the Pubcon Covered Court, San Juan Taytay Rizal/40 ISFs participated in the Pubcon • Open Court, Santa Ana Taytay Rizal/300 ISF participated in the PubCon			
	• February 23, 2023	• Pre Relocation Tripping (PRT) for Taytay ISFs, estimated 350 ISFs participated in the activity	• The NHA documentary requirements/ The monthly Payment / Amortizations	N/A	N/A

2. Grievance Redress

No. of grievance redress procedures filed			No. of the conflicts resolved		
During the Quarter	Till the Last Quarter	Up to the Quarter (in total)	During the Quarter	Till the Last Quarter	Up to the Quarter (in total)
N/A	N/A	N/A	N/A	N/A	N/A

No.	Date of Receipt of Complaints	Contents of the Complaints	Correspondences	Resolved / Not yet resolved
1	N/A	-	-	-

3. Progress of Land Acquisition and Resettlement

Resettlement Activities	Planned Total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organization
			During the Quarter	Till the Last Quarter	Up to the Quarter (Total Progress)	Till the Last Quarter	Up to the Quarter (Total Progress)		
Implementation of Census Survey	1	Set	0	0	1	100 %	100 %	Completed	NHA/DPWH-UPMO-FCMC/LGU-UPAO/-BARANGAY
Implementation of the validation Census Survey in Cainta (1st Priority)	1	Set	1		1	0%	100 %	Completed for the First Priority - Overall output (March 20-24, 2023) 1. 1,073 structures were tagged 2. 1,013 respondents were interviewed 3. 137 were Out During Census Survey (ODC)	

Resettlement Activities	Planned Total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organization
			During the Quarter	Till the Last Quarter	Up to the Quarter (Total Progress)	Till the Last Quarter	Up to the Quarter (Total Progress)		
Implementation of the validation Census Survey in Cainta (Remaining)	1	Set	0	0	0	0%	0%		
Implementation of the validation Census Survey in Taytay								April 12 to 14, 2023	NHA/DPWH-UPMO-FCMC/LGU-UPAO/-BARANGAY
Updates of RAP	1	Set	Abbreviated Resettlement Action Plan (ARAP) was prepared for the additional areas of the Cainta Flood Gate in Cainta Municipality (Finalized in August 2021)					ARAP was prepared in August 2021	DPWH (UPMO and ESSD)
Approval of updated RAP	1	Time	Existing approved RAP is still effective for implementation. Schedule and priority of relocation is under discussion along with revised MOA. RAP shall be updated depending on the changes of relocation policy from in-city to off-city.					In 2022	DPWH (UPMO and ESSD)
Deployment of External Monitoring Agency (EMA)	1	Set	After the RAP reviewing process, TOR of EMA shall be prepared.			N/A		September 2022	DPWH
1st Priority ISFs Relocation (in Cainta City)	720 * in MoA	HHs	0	0	0	0%	0%	In 2024	Cainta / NHA / DPWH
1st Priority ISFs Relocation (in Taytay City)	350 * in MoA	HHs	0	0	0	0%	0%	In 2024	Taytay / NHA
Remaining ISFs in both Cainta and Taytay	7,876 * Based on RAP	HHs	0	0	0	0%	0%	In 2028	Cainta / Taytay / NHA
ISFs Relocation (by Pasig City)	2,798	HHs	0	0	1,076	38.4%	38.4%	In 2028	Pasig City / NHA

Resettlement Activities	Planned Total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organization
			During the Quarter	Till the Last Quarter	Up to the Quarter (Total Progress)	Till the Last Quarter	Up to the Quarter (Total Progress)		
Land Acquisition and ISF Relocation at the land-side of Cainta Gate	34 * in ARAP	HHs	0	0	0	0%	0%	In 2024	Cainta / NHA / DPWH

4. Implementation of Livelihood Restoration Assistance

DPWH will monitor the changes of the living standard of the PAFs before the resettlement. When the PAF are found that their living standard worsen, or whose present means of livelihood became not-viable, DPWH, in coordination with other appropriate institutions, will provide assistances, such as skills and livelihood trainings. **In the revised MOA between the DPWH and the NHA, it was stated that NHA must plan and implement livelihood restoration program (LRP) for the ISFs**

Brief Description of the Implemented Livelihood Restoration Program	Results during Report Period (No. of trainings implemented, No. of Participants, etc.)	Location
LRP is described in RAP for Manggahan and ARAP for Cainta Flood Gate	N/A	N/A

5. Restoration of Income and Living Standard

Date of Survey:

No.	Description about Surveyed Area	No. of Surveyed HHs	No. of HHs with Increased Incomes	No. of HHs with Decreased Incomes	No. of HHs with Unchanged Incomes	Types of Problems Encountered	Perceived Need for Additional Assistance
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

6. Others