

SEPTEMBER 2020



**Light Rail Transit Authority (LRTA)**

# LRT LINE 2 WEST EXTENSION PROJECT

**EIS SUMMARY FOR THE PUBLIC (ESP)**  
**(ENGLISH)**

PREPARED BY:



**J.F. CANCIO & Associates**  
ENGINEERS CONSULTANTS



**TCGI ENGINEERS**



**Key ENGINEERS, CO.**



**SOOSUNG**  
ENGINEERING & CONSULTING



**KOREA RAIL  
NETWORK AUTHORITY**

## EXECUTIVE SUMMARY

## I. PROJECT FACT SHEET

<b>Name of Project</b>	: <b>LRT LINE 2 WEST EXTENSION PROJECT</b>
<b>Project Location</b>	: Manila City
<b>Project Proponent</b>	: <b>Light Rail Transit Authority (LRTA)</b>
<b>Proponent's Address</b>	: LRT 2 Depot, Marcos Highway, Santolan, pasig City
<b>Contact Person</b>	: <b>Lorelie L. Reyes</b>
<b>Position/ Designation</b>	: Project Manager, LRT A
<b>Contact No</b>	: 0917 189 7552
<b>Name of Consultant</b>	: <b>Westrax JV</b>
<b>Consultant's Address</b>	: Unit 2404 Antel Global Corporate Center, No. 3 J.Vargas Avenue, Ortigas Center, Pasig City, Metro Manila Philippines - 1605
<b>Contact Person</b>	: <b>Evangeline M. Razon</b>
<b>Position/ Designation</b>	: Project Manager, Westrax JV
<b>Contact No</b>	: 0917 812 5131
<b>E-mail Address</b>	: Nozarme_1@yahoo.com/ WESTRAXJV@gmail.com
<b>Estimated Project Cost</b>	: 10, 118.46 Million Pesos

The project is envisioned to provide an alternative means of transport within the City of Manila. This will generally improve the traffic situation within the project area due to expected shift of commuters from road-based to rail-based transport system. The project also aims to introduce a developed Transit Oriented Development (TOD). These are areas along the project alignment that can be tapped for development once the project is operational and will be linked by the operation of the project.

**Basic Design Information**

Item	Description	
Permanent way	Superstructure	Pre-stressed concrete box girder
	Substructure	Spread footing pile foundation
	Route length	13.52 km
	Gauge	1435 mm
	Rails	UIC 54 kg/m rail
	Tracks	Concrete Stab Track
	Minimum curve	175m (main line) 100m (depot)

	Number of stations	Additional 3 for the existing 11 stations and 2 stations to Masinag (east extension).
	Maximum gradient	5.0%
Electric Power Supply	Voltage	1500 VDC
	Feeder system	Overhead Catenary System
Train Control		ATP, ATO, ATS
Rolling stock	Fleet configuration	18 four-car trains
	Carbody length	22,500 mm
	Carbody width	3,200 mm
	Height	3,700 mm
	Axle load	16.6 tons
	Train Make-up	4 car/train
	Capacity	1,628 passengers per train
	Car Maker	Rotem Company, South Korea
	Maximum speed	80 kph
	Scheduled speed	32.8 kph
Travel Time		30 minutes
Feeder System		Overhead Catenary System
Voltage		1500 VDC
Signaling System		ATP, ATO, ATS
Headway		1.5 min

## II. PROCESS DOCUMENTATION

### ***Description of the Environmental Impact Assessment (EIA) Team***

NAME	SPECIALIZATION	REG. NO.
Evangeline M. Razon	Project Manager, Westrax JV	
Benigno T. Pauco	Team Leader, Key Engrs., Co.	
Marco Antonio Liwag	Sociologist/Resettlement Specialist	
Carol Barrias	Terrestrial Flora and Fauna	
Amesourita P. Panugaling	Hydrologist	
Cesar B. Cabrera	Geologist	
Danielle Danica Denise M. Solis	Environmental/Water Specialist	
Jaezel Anne V. Pabalate	Project Coordinator	
Carolyn P. Barrias	EIA Report Preparer	IPCO-481
Alma Regalado	EIA Report Preparer	IPCO-136

### ***EIA Study Schedule***

Activity	Date Completed/ Target Date
Information Education Campaign (IEC) Activities	November 13, 2019
Public Scoping	December 10, 2019
Terrestrial (Flora and Fauna)	November 17, 2019
Water Quality	November 29, 2019
Air and Noise Monitoring	December 23 & 26, 2019
Primary and Secondary data gathering	September 2019 to February 2020

### **Description of Key EIA Methodologies Including Sampling and Measurement Plan**

Environmental studies focused on the identified location of each component as the direct impact area. All information and data gathered were compiled and analyzed based on the Guidelines of DAO 03- 30. Field investigations and sampling were conducted, together with the secondary data gathered, and the critical parameters for the environmental conditions were established. The EIA methodology for each study modules are provided in the subsequent chapters and are summarized in the table below.

<b>Module</b>	<b>Methodologies</b>
Land Use and Classification	<ul style="list-style-type: none"> <li>• Review of existing literature (Comprehensive Land Use Plan) and maps of the project area.</li> <li>- Site Reconnaissance</li> </ul>
Geology/Geomorphology	<ul style="list-style-type: none"> <li>• Review and analysis of existing information from relevant government agencies and institutions, including               <ul style="list-style-type: none"> <li>- Mines and Geosciences Bureau (MGB);</li> <li>- Philippine Institute of Volcanology and Seismology (PHIVOLCS);</li> <li>- National Mapping and Resource Information Authority (NAMRIA)</li> </ul> </li> <li>• Ground validation</li> </ul>
Pedology	<ul style="list-style-type: none"> <li>• Review of existing literature (Soil Series and Types of Bureau of Soils and Water Management) and maps of the project area.</li> <li>• Site Reconnaissance</li> </ul>
Terrestrial ecology	<ul style="list-style-type: none"> <li>• Inventory of flora and fauna (in the alignment)</li> <li>• Review of existing literature</li> </ul>
Hydrology/Hydrogeology/ Geology Engineering	<ul style="list-style-type: none"> <li>• Review and analysis of existing literature (Feasibility Study conducted, meteorological Data from PAGASA and EIS conducted in 2015)</li> </ul>
Water Quality	<ul style="list-style-type: none"> <li>• In-situ water quality assessment</li> <li>• Grab sampling for laboratory analysis</li> <li>• Review and analysis of existing literature from previous EIS and FS conducted for LRT west project</li> </ul>
Freshwater Ecology	<ul style="list-style-type: none"> <li>• Review of relevant secondary information</li> </ul>
Meteorology/Climatology	<ul style="list-style-type: none"> <li>• Review and analysis of secondary information from various agencies and institutions:               <ul style="list-style-type: none"> <li>- Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)</li> <li>- Manila Observatory</li> </ul> </li> </ul>

Air Quality and Noise	<ul style="list-style-type: none"> <li>• Conduct of ambient air and noise quality monitoring (1 hour and 24 hours)</li> <li>• Review and analysis of primary and secondary information</li> </ul>
People	<ul style="list-style-type: none"> <li>• Review and analysis of primary and secondary information for the analysis of socioeconomic condition</li> <li>• Conduct IEC for public participation</li> <li>• Conduct Resettlement Action Plan</li> </ul>

## **SCOPING AND PUBLIC PARTICIPATIONS**

### **Summary of Information and Education Campaign (IEC) Activity**

The initial Information, Education and Communication Activity for the proposed LRT West Extension Project was conducted last November 13, 2019, 8:00am to 11:00am (for the barangays in Tutuban, Recto and Pier 4), and on November 14, 2019, 8:00am to 11:00am (for the barangays in Divisoria) both IEC activities located at the **Jollibee North Harbor, 985 Zaragoza St., Tondo, Manila**. The activity was attended by around **139 participants** all barangay officials of barangays along the alignment.

An open forum followed the presentation wherein the participants were given the opportunity to raise their issues, concerns, and suggestions regarding the proposed project for consideration in the EIA study.

### **Summary of Public Scoping**

The Public Scoping for the proposed LRT West Extension Project was conducted last **December 10, 2019** at the **Delpa Sports Complex Muelle Dela Industria, Tondo, Manila**.

The activity started around 01:00 pm. The representative from Key Engineers Co., explained and presented the purpose and objective of the scoping activity and the brief description of the project and the Environmental Impact Assessment process. The stakeholders were given the opportunity to raise their comments, suggestions, issues, concerns, and problems regarding the project through an Open Forum. The representatives from Key Engineers Co. responded to the queries whenever possible, while those comments, issues and concerns raised that were not immediately responded to were noted and will be included in the EIA study. After the open forum, Key Engineers Co. presented the next steps in the EIA process that will be undertaken after the Public Scoping. A total of **106 participants** attended the Public Scoping Activity.

## **III. EIA SUMMARY**

The proposed LRT Line 2 extension covers an entire length of 3 kilometers from the current CM Recto avenue station all the way to Pier 4 in the North harbor, hosting three (3) additional passenger stations of Tutuban, Divisoria and Pier 4.

## Technology Selection

The horizontal and vertical alignments as well as the routes of the proposed project minimized land acquisition issues and impacts along the routes. The project also aimed to reduce initial investment costs as well as operation and maintenance costs; provide a fast, convenient, safe, and comfortable service to users; and connectivity of the project to other transport modes and railway lines.

To reduce initial investment costs, the LRT West Extension alignments will be elevated. The elevated structures will be designed to comply with the minimum vertical clearance requirement of DPWH and will be consistent with the latest version of Philippine and international standards on infrastructure and transportation development.

## Summary of Main Impacts and Residual Effects After Applying Mitigation

Discussed hereafter are the summary of the baseline data gathering for the **four (4)** aspects of the environment that includes The Land, The Water, The Air, and The People. Baseline characterization is presented in succeeding chapter of this EIS.

### Summary of Key Environmental Impacts and Environmental Management Plan

Environmental Component	Potential Impact	Mitigation/Enhancement Measures
<i>Pre-Construction/Construction</i>		
Land use and classification	Change in existing land use along project alignments	Final project alignment should be communicated to host LGUs to ensure that the project will be considered in the land use and zoning plans of host cities.
	Potential conflicts with other government and private infrastructure projects	LRTA should coordinate with concerned agencies such as DPWH and the host LGUs
	Project can affect visual aesthetics and devaluation of land value can occur if construction sites are not managed properly.	Installation of fence or screens to cover the construction site will minimize negative visual impacts. Unnecessary equipment and other materials should be removed from the site.
Geology	Project will be prone to seismic hazards such as groundshaking, liquefaction	Proper engineering design in accordance with the results of the geotechnical study and the requirements of the National Building and Structural Code of the Philippines;
	Change in subsurface/ underground geomorphology	Monitoring of changes in geological subsurface including rock formations or soil/sand characteristics and cracks that may have significant implications on design and integrity of the structure.

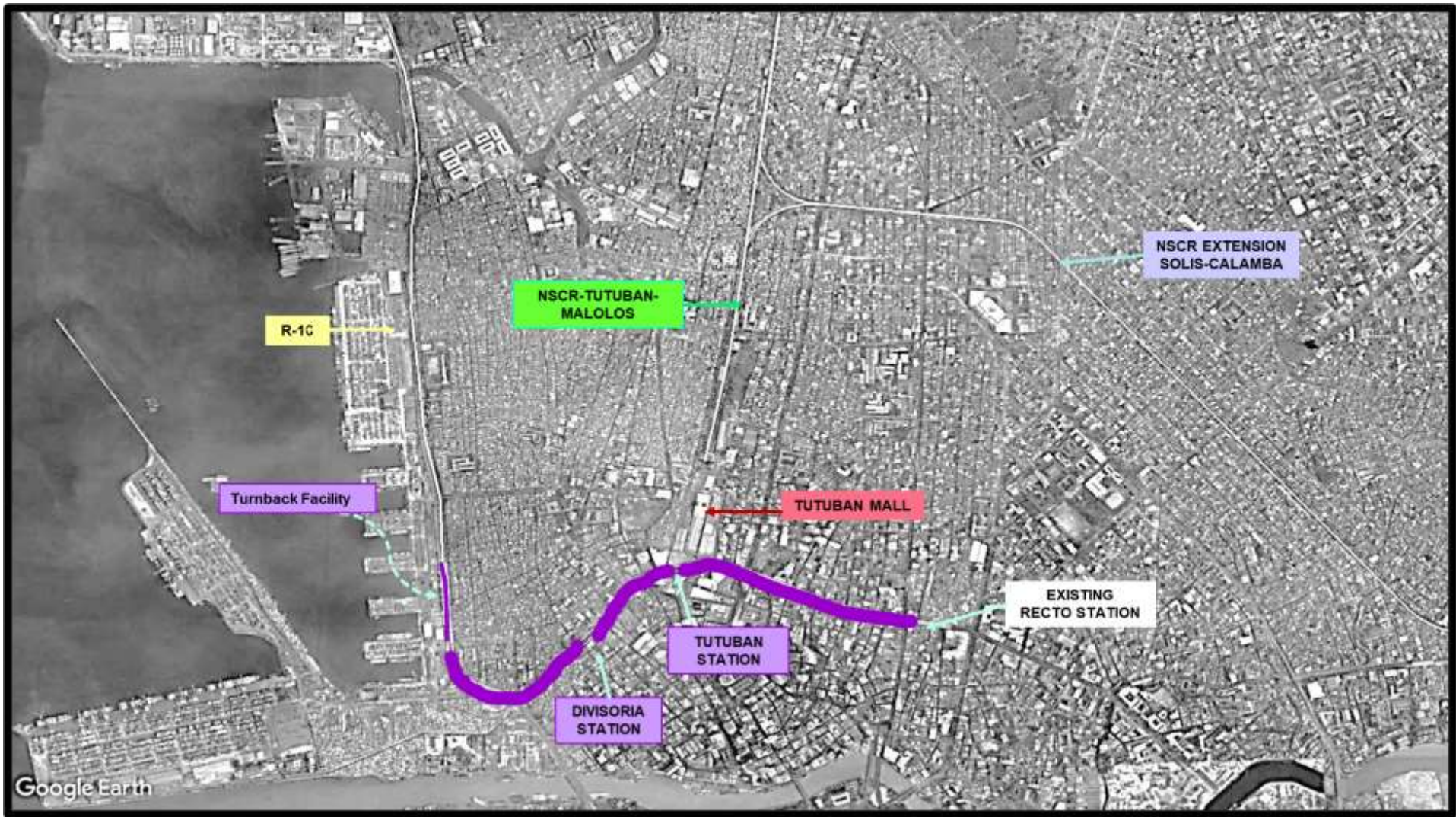
Environmental Component	Potential Impact	Mitigation/Enhancement Measures
Soils	Unprotected excavated soils can be washed off during heavy rains	Soils and construction wastes should be covered appropriately; topsoil should be secured and stored properly for later reuse during revegetation.
Terrestrial Ecology	Loss of habitat and habitat fragmentation due to vegetation removal along project alignment.	Green spaces should be maintained during the construction phase. Vegetation clearing should be kept to a minimum and done only when necessary
	Removal of vegetation cover can threaten the endemic plants in the project sites.	Plants that will be lost to clearing should be salvaged by collecting seedlings and tending them in a nursery for use in revegetating the area
Water Quality	Silt laden surface runoff from active construction areas can drain into nearby surface water bodies/ esteros	Silt control and silt protection measures such as silt traps should be in place in active construction
	Oil and grease contamination can occur due to spills and leaks from construction equipment and machinery	Oil sumps should be installed in active construction areas to minimize discharge of oil spills and leaks from construction equipment, machinery and vehicles.
Air Quality and	Dust generation will be significant in	Dust suppression techniques will be applied such
Noise	active construction areas	as water application and speed restriction. Water application should be done in 3.2 hr intervals and speed restriction at active construction sites can reduce fugitive dust generation. Trucks delivering construction materials and stockpiles of construction materials should be covered to prevent fugitive dust from escaping.
	Noise disturbance will be evident in active construction areas	Use of mufflers and regular maintenance of construction equipment, machinery and vehicles can minimize sound levels in active construction sites. Construction activities should be limited during leisure hours, hours of sleep and anytime when loud and continuous noises can affect certain special activities
	The proposed project will have a huge potential for job creation and will require the services of various types of professionals and workers	Proponent should have prior coordination with the host LGUs to ensure that a certain percentage of the workforce from host areas will be employed during construction and operation
	Traffic congestion will occur in active construction areas	Careful planning and implementation of rerouting schemes and traffic management including early installation of traffic signages and multimedia announcements of construction schedules, road closures and alternative routes

Environmental Component	Potential Impact	Mitigation/Enhancement Measures
<b>Operation</b>		
Land use and classification	Commercial and residential development will occur in undeveloped areas near the proposed LRT west extensions stations	Project alignment should be communicated to host LGUs so that the project can be incorporated in the local land use and development plans.
Terrestrial Ecology	Revegetation of cleared out areas along the project alignment will improve aesthetic value and enhance its ecology	Planting materials should be bird-diversity
Air Quality and Noise	Noise will be generated during the passage of trains	<ul style="list-style-type: none"> <li>• Increase distance between noise source and receiver</li> <li>• Install noise barriers between noise source and receiver to interrupt the path of the noise</li> <li>• Incorporate noise criteria in specifications and selection of equipment</li> </ul>
People	Operation of the railway infrastructure	Regular and proper maintenance of railway project
	will make social services such as housing facilities, health care and educational opportunities more accessible to host and neighboring LGUs	to ensure continuous and uninterrupted service to railway users.
	Huge infrastructures and electronically-run systems can pose risks to public safety	Provision of adequate lighting, clear signages, functional security surveillance systems and assignment of adequate number of security personnel in entrance/exit points and in the platforms
	Operation of micro-businesses in the LRT stations can create jobs for local residents	Provision of space for micro-businesses should be incorporated in the design of the LRT west extension stations
	The project can boost tourism in the host cities	Proper and regular maintenance of the railway project will increase its positive impact to the users.

### ***Risks and Uncertainties Relating to the Findings and Implications for Decision Making***

The proposed project has minimal impacts that are expected to persist even with the implementation of recommended mitigating measures. In the determination of risks and uncertainties, natural and man-made hazards were assessed to aid decision makers in reducing risks for the multipurpose project. this assessment will only help as a guide and as supplement to the wide array of information available to decision makers.





Project Location of the Proposed Alignment



Proposed Alignment of the LRT West Extension Project