

Initial Environmental Examination

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PHI: EDSA Greenways Project

Prepared by Ove Arup and Partners Hong Kong Ltd for the Department of Transportation and the Asian Development Bank.

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Job number 263707

Ove Arup & Partners Hong Kong Ltd
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
www.arup.com

ARUP

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		Name	Various	Corey Wong	Timothy Suen
		Signature			
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		Name	Various	Corey Wong	Timothy Suen
		Signature			
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		Name			
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			Prepared by	Checked by	Approved by
		Name			
		Signature			

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Appendix I

Traffic Performance Calculation

Abbreviations

Abbreviations	Description
ADB	Asian Development Bank
ADB SPS	Asian Development Bank's Safeguard Policy Statement
ALS	Alternative Learning System
ANSI	American National Standards Institute
AQMS	Air Quality Monitoring Section
BOD	Biological Oxygen Demand
BPO	Business Process Outsourcing
BRT	Bus Rapid Transit
BSWM	Bureau of Soils and Water Management
BWC-DOLE	Bureau of Working Conditions of the Department of Labor and Employment
CBD	Central Business District
CCO	Chief Compliance Officer
CCTV	Closed Circuit Television
CHED	Commission on Higher Education
CLUP	Comprehensive Land Use Plan
CMP	Community Mortgage Program
CNC	Certificate of Non-Coverage
CNO	Certificate of Non-Overlap
COC	Chief Compliance Officer
CWA	Clean Water Act
DAMPA	Damayan ng Maralitang Pilipinong Api
DAO	DENR Administrative Order
DED	Detailed Engineering Design
DENR	Department of Environment and Natural Resources
DENR-EMB	Department of Environment and Natural Resources-Environmental Management Bureau
DILG	Department of the Interior and Local Government
DMO	DENR Memorandum Order
DO	Dissolved Oxygen
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DOTr	Department of Transportation
DPWH	Department of Public Works and Highways

Abbreviations	Description
DPAC	Disabled Persons Affairs Committee
DPAO	Disabled Persons Affairs Office
DRRMP	Disaster Risk Reduction & Management Plan
DSWD	Department of Social Welfare and Development
EA	Executing Agency
ECA	Environmentally Critical Area
ECC	Environmental Compliance Certificate
ECD	Early Childhood Development
ECP	Environmental Critical Project
EDSA	Epifanio de los Santos Avenue
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMB	Environmental Management Bureau
EMB-MC	Environmental Management Bureau Memorandum Circular
EMI	Earthquake and Megacities Initiatives
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
ESR	Environment, Social and ROW Division
FEJODAP	Federation of Jeepney Operators and Drivers Association of the Philippines
FGD	Focus Group Discussion
FI	Financial Intermediary
FS	Feasibility Study
GBV	Gender-Based Violence
GST	Gender Sensitivity Training
HCDRD	Housing Community Development & Resettlement Department
HUC	Highly Urbanized City
HVRA	Hazards, Vulnerability and Risk Assessment
IA	Implementing Agency
IEC	Information and Education Campaign
IEE	Initial Environmental Examination
IFC	International Finance Corporation
INC	Iglesia ni Cristo
IP	Indigenous Peoples

Abbreviations	Description
IRR	Implementing Rules and Regulations
ISFs	Informal Settlers Families
KIIs	Key Informant Interviews
LBGT	Lesbian, Gay, Bisexual and Transgender
LCCAP	Local Climate Change Adaptation Plan
LFP	Labor Force Participation
LGU	Local Government Unit
LRT	Light Rail Transit
MCW	Magna Carta of Women
MGB	Mines and Geosciences Bureau
MMDA	Metropolitan Manila Development Authority
MMS	Metro Manila Subway
MRT	Metro Rail Transit
MWCI	Manila Water Company, Inc
MWSI	Maynilad Water Services, Inc
MWSS	Metropolitan Waterworks and Sewerage System
NAAQGV	National Ambient Air Quality Guideline Value
NCDA	National Council on Disability Affairs
NCR	National Capital Region
NIPAS	National Integrated Protected Areas System
NWRB	National Water Resources Board
O&M	Operation and Maintenance
OSCA	Office for Senior Citizen Affairs
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAGASA-CADS	Philippine Astronomic Geophysical and Astronomical Services Administration Climate and Agromet Data Section
PCW	Philippine Commission on Women
PD	Presidential Decree
PEISS	Philippine Environmental Impact Statement System
PEMO	PIU Environmental Management Officer
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PIB	Project Information Booklet
PIU	Project Implementation Unit
PM	Particulate Matter
PMO	Project Management Office

Abbreviations	Description
PNP	Philippine National Police
PPE	Personal Protection Equipment
PSA	Philippines Statistics Authority
PWD	Persons with Disability
RP	Resettlement Plan
REA	Rapid Environmental Assessment
ROW	Right-of-Way
ROWSAM	Right-of-Way Site Acquisition Manual
SOGIE	Sexual Orientation, Gender Identity, and Expression
SUDZ	Special Urban Development Zone
SWS	Social Weather Station
SY	School Year
TESDA	Technical Education and Skills Development Authority
TODA	Tricycle Operators and Drivers Association
UN	United Nations
UP CWGS	University of the Philippines Center for Women's and Gender Studies
UP SURP	University of the Philippines School for Urban and Regional Planning
VAT	Value Added Tax
V/C	Volume to Capacity
VPD	Vehicles per day
WEDC	Women in Especially Difficult Circumstances
WQMA	Water Quality Management Areas

Executive Summary

The EDSA Greenways Project aims to implement a series of pedestrian enhancements to improve walk conditions to/from and around urban rail stations along Epifanio de los Santos Avenue (EDSA), a major thoroughfare in Metro Manila. The improvement of the pedestrian conditions aims to achieve the universal design principle, making sure that it complies with gender, environment and social standards. The project will be implemented by the Department of Transportation through a loan from the Asian Development Bank.

The original proposal is for five stations to be constructed in two phases - Phase 1 is for short-term work involving only the Common Station – the convergence point of several rail systems, while Phase 2 is for the long-term construction of the five stations, including sections of the Common Station not covered in Phase 1. Two Feasibility Stage IEEs were prepared, one for each phase. This document is the Phase 2 IEE and includes environmental assessment for the long-term Common Station. The IEE Report focuses on five long-term schemes: (i) Balintawak Station, (ii) Common Station, (iii) Cubao Station, (iv) Guadalupe Station and (v) Taft Station (**Figure 3.15 to Figure 3.24**).¹ DOTr has decided to postpone the Common Station scheme from the proposed project until Common Station is completed and the other infrastructure projects have progressed or have clearer implementation timelines. Hence, the IEE will be updated during the detailed design and will only cover the four stations.

This Initial Environmental Examination (IEE) Report is aligned with the rules and regulation of the Philippines in relation to its compliance with the requirements of the Department of Environment and Natural Resources (DENR) and Asian Development Bank (ADB) Safeguards. Under the DENR requirements, the project needs to secure a Certificate of Non-Coverage (CNC), under Category D. The Environmental Management Bureau (EMB) of DENR has released the CNC dated 5 July 2019 for the following stations: Balintawak, Cubao, Guadalupe and Taft. While, according to the ADB Safeguard Policy Statement (SPS) 2009, these five long-term station schemes, packaged into one IEE, fall under Category B. This IEE report has been prepared as part of the Feasibility Study (FS) undertaken between November 2018 to July 2019. The IEE will be updated during detailed engineering design when more specific project information and construction methods become available. Impact assessment may then be further enhanced with mitigation measures and management plans made more project-specific when necessary.

Based on the current timeline, the pre-construction activities, including engineering design and procurement of contractors will take until second quarter of 2021 when construction for the EDSA Greenways could conceivably start. Thus, overall implementation timeline per station varies from 18-24 months, including finalization of the designs by contractors. Common Station is assumed to start construction in January 2023.

¹ The inclusion of the five stations (excluding Monumento) is consistent with the presentation approach for the Draft Final Report, in which the five stations (known as the “five-station” package for NEDA submittal) were presented. As noted in that document, Monumento was presented for reference only due to relatively poor economic performance given physical restrictions preventing a direct and convenient footbridge network around the station.

DESCRIPTION OF THE ENVIRONMENT

Physical Environment: The National Capital Region (NCR) is geographically situated in the southwestern part of Luzon. It is composed of 17 Local Government Units (LGUs) with 16 cities and 1 municipality. The EDSA Greenways project will cover three cities namely Quezon City, Makati City and Pasay City.

As for the climate of the National Capital Region (NCR), the region is classified as Type I with dry months from November to April and wet months on the rest of the year. Based on the DENR-NCR website, its Mean Annual Temperature is 30.8° and its Mean Annual Rainfall is 152.42 mm.

- **Quezon City** is situated on the northeast portion of Metro Manila, bounded by Caloocan and Valenzuela on the north, by Pasig, Mandaluyong and San Juan, Manila on the south, by Manila, Caloocan and Valenzuela and Marikina, San Mateo and Rodriguez on the east, respectively. It consists of Novaliches Loam Series, where the common soil type is adobe.

Among the five river systems in Quezon City, the Project is included in the San Juan River catchment, which has about 100 km of rivers and creeks from the drainage network within this basin. Based on the secondary data from the Environmental Management Bureau – National Capital Region (EMB-NCR), water quality (3rd quarter of 2018) in the San Juan River and Malabon-Navotas-Tullahan-Tinajeros River System showed exceedances under DAO 2016-08 Water Quality Guidelines and Effluent Standards for dissolved oxygen (DO), biological oxygen demand (BOD) and fecal coliform parameters. These parameters justify the amount of domestic and industrial wastewater discharge that the rivers and creeks accumulated in Quezon City.

- **Makati City** is the center of NCR. It is bounded by Pasig River on the north, Pateros on the east, Taguig City on the southeast and Pasay City in the south and southwest and northwest of City of Manila (Makati CLUP, 2013-2023).

The topography and hydrological conditions of Makati City is characterized by low-level areas and the low gradient of Pasig River. It has three (3) types of drainage namely open canals, reinforced concrete covered pipes and improved box culverts.

- **Pasay City** is within the western coast of NCR which is bounded by the Manila City on its north, Makati and Taguig City on its northeast, Parañaque City and Manila Bay on the west.

The western part of the city is level to nearly level, while the southern part is gently sloping to gently undulating. The coastal plains exist along Manila Bay in the west, while sloping areas extend in the southeast direction.

The terrain units of the city consist of eastern undulating and western alluvial portions, which extend to the Manila Bay area. Furthermore, Pasay City's two geologic formations are Quaternary Alluvial, which mostly consists of detrital deposits, silt, sand and gravel, and Guadalupe formation, which is part of the upper member of Diliman Tuff (*Pasay Comprehensive Development Plan, page C3-13*).

In general, there are only small pockets of trees in the area as part of the landscape design for shopping centers, institutions and sidewalks. This remains as the main vegetation within the Project site, in addition to the spotted private gardens and open spaces, mainly in forms of grass, woody shrubs, ornamental plants and trees.

Environmental Critical Area and Sensitive Receptors: One critical area is the location of Guadalupe Station. This station is located along the Pasig River, in proximity to Guadalupe Viejo and Pioneer creeks. The Pasig River Rehabilitation Commission (PRRC), through Executive Order No. 54 has been created in 1999, to rehabilitate this river and revert it to its pristine condition for recreation, transportation and tourism. In addition, Environmental Preservation Areas (EPA) are being placed along the shores of the Pasig and all its tributaries, stretching 10m from the shores on each side.

Manila Bay, approximately 3km from the Taft MRT-3 Station, is also one of the most important water bodies in the country due to historical, cultural and economic value. The sunset of the Manila Bay area serves as an aesthetic area and potential tourist spot.

All stations have risk possibilities from disasters triggered by natural and anthropogenic hazards. Pasay is susceptible to flooding, but areas such as Guadalupe in Makati may have flood-prone areas typically confined to creek and river channels in low-lying areas usually during typhoons.

Pasay City has high susceptibility to liquefaction, while Quezon City, Makati and Pasay may be affected by the West Valley Fault Line. Other issues of ECA relates to possibilities of disasters triggered by natural and anthropogenic hazards, such as floods during heavy rains and proximity to West Valley Fault Line are some of the possible risks.

Some of the identified sensitive receptors include schools, churches, hospitals and residential areas (**Section 4.4.2**). These are the direct receivers of the possible impacts that the project may cause.

SOCIO ECONOMIC ENVIRONMENT

Social and Cultural Resources: With the aim of improving travel conditions through the pedestrian improvement project, the EDSA Greenways Project will largely benefit the poor, particularly women, and increase their chances to participate in economic, social, and educational activities. Though the Project will be aligned in different barangays, the key concern of the Project would be the acquisition of some existing businesses or areas for use as landing areas and displacement of the affected informal business sector – the vendors (both ambulant and semi-fixed). There are landing sites anticipated for use and some of them will be permanently acquired. These are initially and briefly approximated – thus they may still vary throughout the study.

Stakeholders: Among the stakeholders, groups from the local government units and government agencies, non-government organisations, household and business, local institutions and communities were invited for consultation meetings to discuss the project and its perceived effects.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The overall goal of the EDSA Greenways Project is to enhance pedestrian mobility, access and safety around key rail stations along EDSA with targeted pedestrian infrastructure enhancements including, but not limited to, covered, elevated walkways leading to/from the stations and nearby land uses.

The Project does not pass through any protected areas, but impacts have been identified during the design, pre-construction, and construction phases on the physical environment such as land, air, water, and social-economic environment.

In general, due to civil works during construction, there should be awareness of traffic and hazard conditions along the area. Traffic management such as temporary alternative routes along with safety measures should be recommended. For air quality, the dust and gas pollutants generated during the construction of the Project shall be minimized by proper implementation of mitigation measures, such as proper scheduling of construction hour and sprinkling of water over crushed materials. For noise, construction and usage of equipment will generate noise, which shall be closely monitored to minimize high exceedances in permissible levels. Installation of noise barriers and replace heavy equipment and machines by quieter equipment. For water quality, silt runoff and sanitary wastes may temporarily deteriorate the surface water. Also, potential spillage of oil, grease and fuel may contaminate the nearby water. Although water bodies are distant to the construction site, best practices, such as proper management of construction material and solid waste, will be implemented. While the potential impacts are temporary during construction phase, air quality, noise and water quality impacts during the construction is considered minimal with proper implementation of mitigation measures. These and all other mitigation measures for environmental and social aspects will be elaborated in the EMP (**Table 5.1** and **Table 6.2**).

INSTITUTIONAL REQUIREMENT AND ENVIRONMENTAL MONITORING PLAN

DOTr, as the Executing Agency (EA) of the Project, will adopt a design and build (D&B) scheme to implement the project. A project management office (PMO) will be established to oversee overall project implementation and supervise the D&B contractor. DOTr will engage a construction supervision consultant (CSC) to support the PMO. The environment specialists of PMO and CSC will work closely together to ensure that the project's environmental management plan (EMP) will be implemented and monitored effectively and the project will be compliant with the Philippine government and ADB policies on environmental Protection and management. **A Grievance Redress Mechanism (GRM) will be established by DOTr to receive, evaluate, and address all project-related grievances.**

During the pre-construction stage, inventory and surveys will be undertaken should there be a need for land acquisition, diversion or relocation of public utility posts for electricity and telephone connections and tree cutting or earth balling. All government permits will be secured prior to the Project construction.

The Project has acquired Certificates of Non-Coverage (CNC) from the Environmental Management Bureau of the Department of Environment and Natural Resources (DENR-EMB). Monitoring will be undertaken for the project's environmental compliance. Monitoring activities are described in the EMP.

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Public consultation aims to inform and collect perception of the community – for instance, how will the proponent be affected and in what ways could they deliver to their needs. This may be conducted through stakeholders and consultation meetings, and series of Information and Education Campaign (IEC) activities in the

form of Focus Group Discussions (FGDs), Key Informant Interviews (KIIs) and perception surveys (**Chapter 7**).

From the FGD and perception survey conducted among the barangay representatives, civil society groups and pedestrians particularly women, sexual minorities (lesbian, gay, bisexual and transgender (LGBT)), and Persons with Disabilities (PWDs), most of the participants' responses noted that existing footbridges are not well lit hence, the risk of being mugged, held up or snatched is high. This highlights the need for immediate improvement of the facilities. The footbridges were perceived as not being beneficial to PWDs. The respondents suggested installation of elevators, lighting facilities and CCTV. Respondents also anticipated that the Project would create more jobs during construction phase. High participation from both FGD and KII respondents will be expected once the project is implemented.

In addition, current pedestrian facilities were perceived as unresponsive to the needs of PWD, youth/children, and senior citizens – and only responsive to female and LGBT groups.

Ensuring that pedestrian facilities are free from obstructions such as vendors, street people is another key recommendation from the participants.

From the results of the perception surveys, the respondents perceived that the Project will benefit all types of groups including vulnerable groups. With this, the respondents expressed a high degree of support for the Project ranging from 8-10.

FINDINGS AND RECOMMENDATIONS

The IEE Study indicates that environmental impacts for the EDSA Greenways Project are temporary and will mostly occur during construction, thus there should be awareness on traffic and hazard conditions along the area. Identified landings per station for stairs and elevators will be acquired, if necessary, to minimize issues on displacement. Traffic management and other mitigation measures for temporary impacts on air and water quality, noise level and soil, should also be implemented. as elaborated in the EMP.

Hence, the project's overall goal is to provide better linkages to pedestrian to organize the transport system in one of the known major thoroughfares are located-EDSA.

CONCLUSION

This IEE Report is prepared as part of the FS of the EDSA Greenways Project Phase 2 in order to fulfil the ADB safeguard requirement for an Environmental Category B project. This study includes all implications of environmental and social impacts through the various reviews, field visits and consultations. It can be concluded that the pedestrian construction plans will cause minimal environmental impacts but will also produce a beneficial impact to the public. Thus, the IEE Report provides proper mitigating measures to ensure that identified adverse environmental impacts particularly during construction phase will be properly managed.

Some negative environmental impacts are not discounted. However, this IEE concludes that these minimal and temporary environmental impacts will be

minimized through implementation of mitigating measures and monitoring plans to ensure the Project's compliance with the Philippine environmental regulations.

The project aims to integrate transport interchange (i.e. MRT, LRT, MMS, BRT and public transport terminals) through efficient, direct and safe pedestrian linkages. Thus, this pedestrian connectivity improvement will positively help the environment and the community since this will make the public transport more attractive and will encourage modal shift from private vehicles to the public transport network.

1 Introduction

1.1 Project Background

The construction of footbridges around Metro Manila is part of a concerted effort to reduce conflicts between vehicles and pedestrians. Metro Manila Development Authority (MMDA) has stressed that one of the principal causes of worsening congestion is jaywalking. This, among other conflicts along busy roads and intersections, has been the key impetuses for planning and constructing elevated footbridges with a goal to improve pedestrian safety.

Convenient, direct, and safe pedestrian walking environments encourage greater use and efficiency of the rail and public transport system. Better integrating walk and public transport modes (particularly future investments of the Build Build Build Policy) is needed to achieve congestion relief and mode shift goals.

Enhancement of the pedestrian environment is an urgent need to better integrate public transport interchange and link facilities. The planned interchange includes the urban rail network, such as the impending expansion of elevated Light Rail Transit or Metro Rail Transit (LRT/MRT) line of Manila and the Metro Manila Subway (MMS), various public vehicle terminals and Bus Rapid Transit (BRT) proposals. The wider implication of improving pedestrian connectivity around key public transport hubs is better integration of modes and station functionalities, making public transport more attractive and encouraging modal shift from private vehicles to the public transport network.

The Epifanio de los Santos Avenue (EDSA) Greenways Project (The Project) aims to enhance the pedestrian connectivity and facilities around five specific rail stations along EDSA - Balintawak Station, Common Station, Cubao Station, Guadalupe Station and Taft Station. This report focuses on these long-term pedestrian linkages. The goal of these efforts is to better integrate transport modes at key rail and public transport interchange stations and link surrounding areas with these stations and their key facilities through efficient, direct and safe pedestrian linkages.

This Initial Environmental Examination (IEE) is conducted to characterise the existing environmental and social conditions in the Project site, identify potential environmental risks and constraints, propose corresponding mitigation measures to address the identified risks, and prepare a permitting framework for the Project. The references used for this desktop review includes maps, information provided by the Quezon, Makati and Pasay Local Government Unit (LGU), published technical information, and other available internet sourced data mostly from government agencies' websites. Site reconnaissance was also undertaken to validate actual conditions in the Project site and get a general understanding of the physical, biological, and social environment of the area.

1.2 Purpose and Objectives of the Study

One underlying goal of the Project is to better integrate public transport interchange stations and connect to surrounding areas to facilitate efficient, direct and safe pedestrian linkages. For instance, pedestrians often overflow onto streets due to narrow sidewalks/ walkways that are congested with vendors and other street

activities. Pedestrians often must queue in the street waiting to transfer to other public transport modes or to access a transport hub. Although elevated pedestrian walkways are provided in some locations, the stairs leading up and down may be steep, while the facility itself may not provide protection from elements such as weather and pollution. The nexus of these issues is: (i) the limited design capacity of urban transport hubs coupled with uncontrolled land use has led to a high volume of pedestrian movements in many areas; (ii) piecemeal enhancements that are not coordinated or integrated; and (iii) poor planning for the integration of various modes of transports.

Thus, the EDSA Greenways Project aims to provide solutions to these problems. This IEE Report will include discussions on the plans and other possible impacts that the Project may also cause. The objectives of the IEE Report are as follows:

- To describe the Project together with its requirements and environmental benefits;
- To identify and describe elements of community and environment likely to be affected by the Project and/ or likely to cause adverse impacts to the Project, including natural and man-made environment and the associated environmental constraints;
- To present baseline levels based on available secondary data and 1-hr noise sampling activity, and determine the significance of impacts on sensitive receivers and potential affected users;
- To propose the provision of mitigation measures to minimize pollution, environmental disturbance and nuisance during construction and operation of Project;
- To identify significant impacts of the project and propose mitigating measures and mechanism for monitoring its effectiveness and implications;
- To design and specify environmental monitoring and management requirements and program; and
- To identify any additional studies necessary to implement the mitigation measures of monitoring and proposals recommended in the IEE report.

1.3 Scope and Limitations of the Study

Phase 2 of the EDSA Greenways Project will focus on the long-term pedestrian mobility at five mentioned stations, including terminals, various malls and other developments in the vicinity. The IEE Report will be updated during detailed design and the assessment will be further enhanced and will be made more site specific.

This IEE Report is prepared as part of the Feasibility Study (FS) of the Project in order to fulfil the ADB safeguard requirement for an Environmental Category B project. This will include all likely impacts and risks from unplanned but predictable developments that the Project may have caused. This will in turn propose corresponding mitigation measures to address the identified risks.

Completion of the report was achieved through desktop review (i.e. information provided by the cities of Quezon, Makati and Pasay - Local Government Units (LGUs), published technical information and maps, and other available data from reliable internet source and government agencies' websites, site reconnaissance

to validate actual conditions and community involvement (Focus Group Discussion/ FGDs and surveys).

The data reported in this study were limited to the data readily available from different government agencies. These sources include some historical data and some more updated data such as 2018 data. Most of these are mainly for reference to reveal the actual monitoring sites conducted by the agencies. The data gathered through different government offices and websites in relation to the Philippine legislation and sources of various information are listed below:

- Local Government Units (LGUs) of Quezon, Makati and Pasay – City Hall
- LGUs' City Planning Department
- Department of Environmental and Natural Resources (DENR)
- Environmental Management Bureau -from Water Quality Management and Air Quality Management Sections
- Philippine Astronomic Geophysical and Astronomical Services Administration Climate and Agromet Data Section (PAGASA-CADS)

However, there were no available data to be used for the study of noise and people, and hence baseline noise surveys were conducted to provide the necessary baseline data on these modules. Sampling efforts for noise surveys were limited to one-time, 1-hr sampling conducted at two different locations per station and were chosen based on their sensitive receptors and existing levels of noise. Perception surveys were done in a stratified method targeting the common users of pedestrian, while FGDs were separately conducted to barangays directly affected.

The IEE will be updated during detailed engineering design phase when more specific project information and construction methods become available. Impact assessment may then be further enhanced with mitigation measures and management plans made more project-specific, when necessary.

1.4 Executing Agency

The Department of Transportation (DOTr) is the Executing Agency (EA) for the Project. EA is the overall responsible party for Project coordination, implementation, and liaison with Asian Development Bank (ADB) and other government offices. The EA will establish a Project Management Office (PMO), who will oversee the EDSA Greenways Project. A design and build scheme will be adopted by the DOTr to implement the project. Construction Supervision Consultants (CSC) will be engaged to provide technical and management support to the PMO. The complete designation of assignments is discussed in **Chapter 6**.

1.5 Methodology

The methods for this IEE Report will be presented in this section from the collection of primary and secondary data, public consultations, assessment of the potential impacts and preparation of the Environmental Management Plans (EMP). This is described in detail as follows:

Compliance: This IEE Report has been prepared in accordance with the Asian Development Bank's Safeguard Policy Statement (ADB SPS) (2009), ADB's

Environmental Assessment Guidelines (2003), and the guidelines and requirements of the Philippines' Department of Environment and Natural Resources (DENR) Administrative Order 2003-30 (DAO 2003-30) – Implementing Rules and Regulations of Presidential Decree 1586 (Establishing Environmental Impact Statement System, including Environmental Management Bureau Memorandum Circular 2014-005 (EMB-MC 2014-005) - Revised Guidelines for Coverage Screening and Standardised Requirements under the Philippine EIS System (PEISS).

Categorization: Based on EMB-MC 2014-005 all types of pedestrian passages will only require a Certificate of Non-Coverage (CNC) through an online application, since this does not pose significant environmental impacts. Under the ADB SPS, the project is Environment Category B, as approved by ADB's Chief Compliance Officer (CCO). This requires an IEE Report, as cleared by the Operations Department. Other existing regulatory and institutional framework required for the Project from pre-construction, construction and operation phases will be presented in **Table 2.1**.

Review of Secondary Data: Readily available secondary data regarding the Project are used as baseline information. These were published materials made available by the local government and non-government bodies. These were reviewed to verify usefulness before adopting to be used in the report.

Field Survey and Sampling: Data not available from government agencies were noise and perception surveys. These were conducted in a one-time sampling run to provide representative data in the report. Sampling and surveys were completed in April 2019.

Data Processing and Analysis: Baseline data for both secondary and actual field surveys were compared to respective DENR Standards and guidelines as provided by DENR Administrative Order No. 2016-08 (DAO 2016-08) for water quality, DAO 2000-81 for ambient air and 2007 Environmental, Health and Safety (EHS) Guidelines of the International Finance Corporation (IFC) for Noise Management.

Mitigating Measures: Mitigating measures should be considered in relation to the laws and regulations for each respective module from the use of machineries, proper use and storage of materials, trainings of personnel, safety rules of contractors, staff and employees and traffic management.

1.6 Structure of the Report

The structure of this IEE Report consists of nine chapters as follows:

Table 1.1 Chapter Divisions in IEE Report

Chapter	Title	Objectives
1	Introduction	Introduce the Project background and the objectives of this IEE Report
2	Legal and Administration Framework	Summarizes the Philippines environmental laws and international agreements relevant to the project and the requirements of the ADB SPS.

3	Description of the Project	Describes the project scope and components, options considered, and construction methodologies and time lines.
4	Description of Baseline Information	Presents the environmental baseline information associated with the Project
5	Environment Impact and Mitigation Measures	Presents the assessment of potential environmental impacts resulting from the Project and the mitigation measures to manage the impacts
6	Environmental Management Plan	The EMP: 1. presents mitigation measures to manage environmental impacts during all project phases; 2. discusses institutional arrangements and responsibilities in the implementation of the EMP and the monitoring program; 3. includes a monitoring program to track the progress of EMP implementation and effects of project activities to the environmental quality; and 4. describes the Grievance Redress Mechanism to manage and resolve project-related complaints.
7	Public Consultation and Information Disclosure	Presents the information disclosure procedures, activities, and opinions and views of public
8	Findings and Recommendations	Summarizes the findings and recommendations, and the overall environmental acceptability of the Project
9	References	Lists all references used in the report

2.1 Country's Legal Framework and Regulatory Requirement: Philippine Environmental Impact Statement System

The PD 1586 requires projects that are classified as environmentally critical or operating in an environmentally critical area (ECA) to secure an Environmental Compliance Certificate (ECC) prior to commencement of construction. The ECC is a document issued by the Department of Environment and Natural Resources of Environmental Management Bureau (DENR-EMB) certifying that the proponent has complied with all the requirements of the PEISS and has committed to implement its approved Environmental Management Plan (EMP). The ECC also provides guidance to other agencies and to local government units (LGUs) on Environmental Impact Assessment (EIA) findings and recommendations, which need to be considered in their respective decision-making process.

Category A - projects or undertakings are classified as environmental critical projects (ECPs). Proponents of these projects implemented from 1982 onwards are required to secure an ECC.

Category B - projects or undertakings which are not classified as ECPs under Category A, but which are likewise deemed to significantly affect the quality of the environment or located in an ECA. Proponents of these projects implemented from 1982 onwards are required to secure an ECC.

Category C - projects or undertakings not falling in Category A or B, which are intended to directly enhance the quality of the environment or directly address existing environmental problems.

Category D - projects or undertakings that are deemed unlikely to cause significant adverse impact on the quality of the environment according to the parameters set forth in the Screening Guidelines. These projects are not covered in the PEISS and are not required to secure an ECC. However, such non-coverage shall not have construed as an exemption from the compliance with other environmental laws and government permitting requirements.

The Project is not considered as an ECP and is deemed unlikely to cause significant adverse impact on the quality of the environment according to the parameters set for the Coverage Screening Guidelines per EMB MC 2014-005. Based on EMB MC 2014-005, all types of pedestrian passages projects, including overpass projects, regardless of length, do not pose significant environmental impacts and are classified as Category D project.

Under Category D, projects are not covered in the PEISS thus not required to secure an ECC but these projects need to submit a project description (PD) through an online application to secure a CNC. EDSA Greenways Project is under this category. The EMB has released the CNC dated 5 July 2019 for the following stations: Balintawak, Cubao, Guadalupe and Taft (**Appendix H**).

Aside from online submission, Regional Office may still require the Proponent to submit a hardcopy of the PD to the DENR-EMB at National Capital Region (NCR) Office.

2.2 Relevant Laws and Regulations

Listed in **Table 2.1** below are the Philippine and other international agreements and policies relevant for the completion of this IEE Report.

Table 2.1 List of Related Laws for IEE Report

Technical Area	Description
General	<ul style="list-style-type: none"> DENR Administrative Order 2003-30: Implementing Rules and Regulations for the Philippine EIS System EMB Memorandum Circular 2014-005: Revised Guidelines for Coverage Screening and Standardised Requirements
Soils and Land Capability Assessment Terrestrial Ecology Assessment	<ul style="list-style-type: none"> Republic Act No. 7586: National Integrated Protected Areas System Act of 1992 DENR Administrative Order 1992-25: National Integrated Protected Areas System (NIPAS) Implementing Rules and Regulations Tree-Cutting/ Earth-balling Permit
Water Resources Assessment	<ul style="list-style-type: none"> Republic Act No. 9275: Philippine Clean Water Act Presidential Decree No. 1067: The Water Code of the Philippines 1976 DENR Administrative Order 2016-08: Water Quality Guidelines and General Effluent Standards of 2016
Ambient Air Quality	<ul style="list-style-type: none"> Republic Act 8749, otherwise known as the “Philippine Clean Air Act of 1999” DAO 2000-81: Implementing Rules and Regulations for Republic Act 8749
Noise and Vibration Assessment	<ul style="list-style-type: none"> Philippine Rules and Regulations of the National Pollution Control Commission (1978) Environmental Quality for Noise in General Areas Memorandum Circular No. 002 Series of 1980, Section 78- Ambient Noise Quality and Emission Standards for Noise IFC-EHS Guidelines for Noise Management
Social Impact Assessment	<ul style="list-style-type: none"> DENR Administrative Order 2003-30: Implementing Rules and Regulations for the Philippine Environmental Impact Statement System Republic Act No. 8371: Indigenous Peoples’ Rights Act 1997 DAO 2017-15 Guidelines on Public Participation under the Philippine Environmental Impact Statement (EIS) System Philippine National Framework and Guidelines for Environmental Health Impact Assessment 1997 Philippine Occupational Safety and Health Standards 2017
Stakeholder Engagement	<ul style="list-style-type: none"> DENR Memorandum Circular 2010-14: Standardisation of Requirements and Enhancement of Public Participation in

Technical Area	Description
	<p>the Streamlined Implementation of the Philippine EIS System</p> <ul style="list-style-type: none"> DENR Memorandum Circular 2008-08: Clarification of the Role of LGUs in the Philippine EIS System in Relation to MC 2007-08

2.3 ADB Environmental Requirements

This study will ensure that the Project is aligned with ADB SPS (2009), ADB Gender and Development Policy (1998) and World Bank Group's General Environmental, Health and Safety (EHS) Guidelines and applicable laws and regulations pertaining to environment, health, safety and social in terms of country's operations.

2.3.1 Environmental Safeguard Requirements

Category A - proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA, including an EMP, is required.

Category B - proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An IEE, including an EMP, is required.

Category C - proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

Category FI - proposed project involves the investment of ADB funds to or through a financial intermediary (FI). The financial intermediary must apply and maintain an environmental and social management system unless all the FI's business activities have minimal or no environmental impacts or risks.

Proposed projects are screened according to type, location, scale and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced, and cumulative impacts. The EDSA Greenways Project Phase 2 is Environment Category B because the potential adverse environmental impacts are site-specific and temporary during construction. These impacts can be managed by implementing the EMP. Rapid Environmental Assessment (REA) Checklist is used as technical guidance to categorize the project based on the possible impacts during pre-design (**Appendix A**).

2.3.2 Environmental and Social Criteria

The Project is categorised as Category B under ADB SPS 2009 for Environmental aspect; Category B for Resettlement and Category C for Indigenous Peoples (IP), thus the preparation for a standalone IEE Report and Resettlement Plan (RP) are needed.

Table 2.2 Environmental and Social Criteria for IEE Report

No.	Phases	Environmental Selection Guidelines
1	Pre-construction	Comply with all requirements of relevant national and local laws, rules and guidelines.
		Avoid where possible and minimize to extent feasible facilities in locations with social conflicts.
		Avoid where possible tree cutting and shrubs or land clearing.
		Design must be consistent with the ADB SPS and follow RP prepared for the project based on Right-of-Way Site Acquisition Manual (ROWSAM), as agreed by the government and ADB.
		Site selection process includes land acquisition and involuntary resettlement, and consider possible impacts on poor, women and youth.
		Reflect inputs from consultation meetings and stakeholder engagements.
		Provide necessary announcements and all relevant public disclosure for public awareness.
2	Construction	Comply with all requirements of relevant national and local laws, rules and guidelines, and international policies and other international agreements.
		Comply with prepared outline as indicated in the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP).
		Comply with the rules as indicated in traffic management plan.
		Project shall involve improvements within the boundary of existing facilities only.
		Ensure that pollution that the project will cause are controlled to minimize national and international standards, to protect human health, both within and outside the facility.
3	Operation	Manage project maintenance led by leading facilities in the area. Implement solid waste management for proper disposal.

3 Description of the Project

3.1 Location of the Project

The Project is initially located at six stations along EDSA, National Capital Region (NCR), Philippines. It is situated on the northeast portion of Metro Manila, which is the largest city. The five targeted stations (**Figure 3.1**) are:

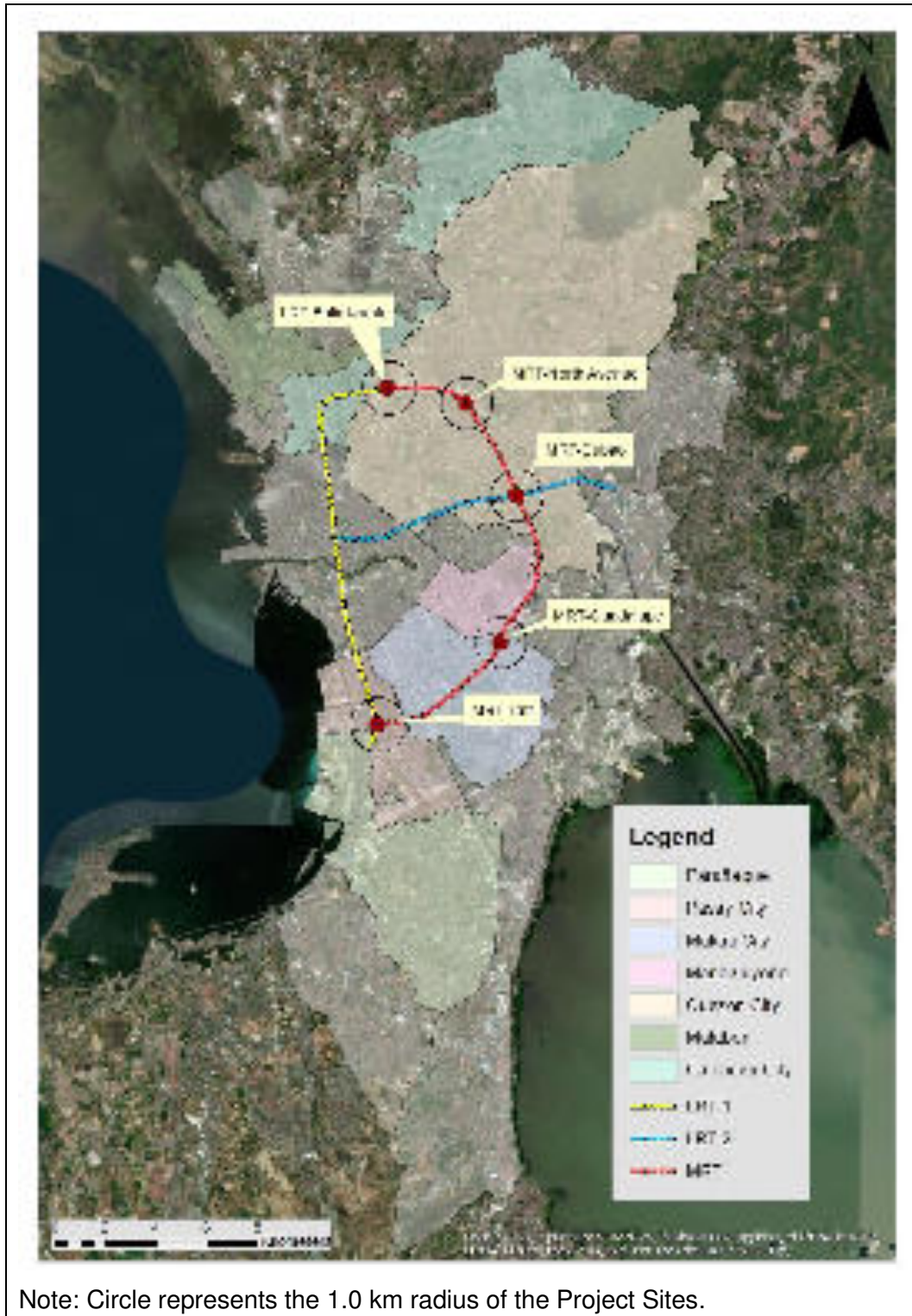
- Balintawak Station on LRT-1;
- Common Station (including the current North Avenue MRT-3 Station and Roosevelt LRT-1 Station, as well as the future MRT-7 and MMS North Avenue Station);
- Cubao Station on MRT-3;
- Guadalupe Station on MRT-3; and
- Taft Station on MRT-3.

This report initially assessed Monumento Station, which has been subsequently excluded throughout the FS of the EDSA Greenways Project (due to poor performance due to physical limitations at the site – it is presented in other FS documents for reference only).

While the Common Station is included in this IEE FS, it will not be included in the update for the detailed engineering design stage should DOTr exclude it under ADB financing. Common Station was excluded from the four-station NEDA submittal in Summer 2019 due to the following: (i) numerous infrastructure projects are proposed in the area around Common Station including Common Station and related railway extensions, MRT-7, MMS, the Metro Manila Interchange Project (including the North/Mindanao Ave. Interchange, the EDSA/North/West Ave. Interchange, and the EDSA/Roosevelt/Congressional Ave. Flyover), extensions to the malls – which may run concurrent with the EDSA Greenways footbridge construction; (ii) MRT-7 and Common Station are underway, although completion timeframe is unclear; and (iii) implementation timeline for the other noted infrastructure projects are also uncertain. Given these uncertainties, it was decided to postpone greenway construction around Common Station until Common Station is completed, and the other infrastructure projects have progressed or have clearer implementation timelines. Traffic and pedestrian diversion and other activities would need coordination at that time.

3.2

Description of the Project Corridor



3.2.1 Zoning and Land Use

Quezon City: Based on the 2016 Comprehensive Land Use Plan of Quezon City (**Figure 3.2**). Balintawak Station, Common Station and Cubao Station host a myriad of uses, with high density residential, major and metropolitan commercial, institutional zone and special urban development zone (SUDZ).

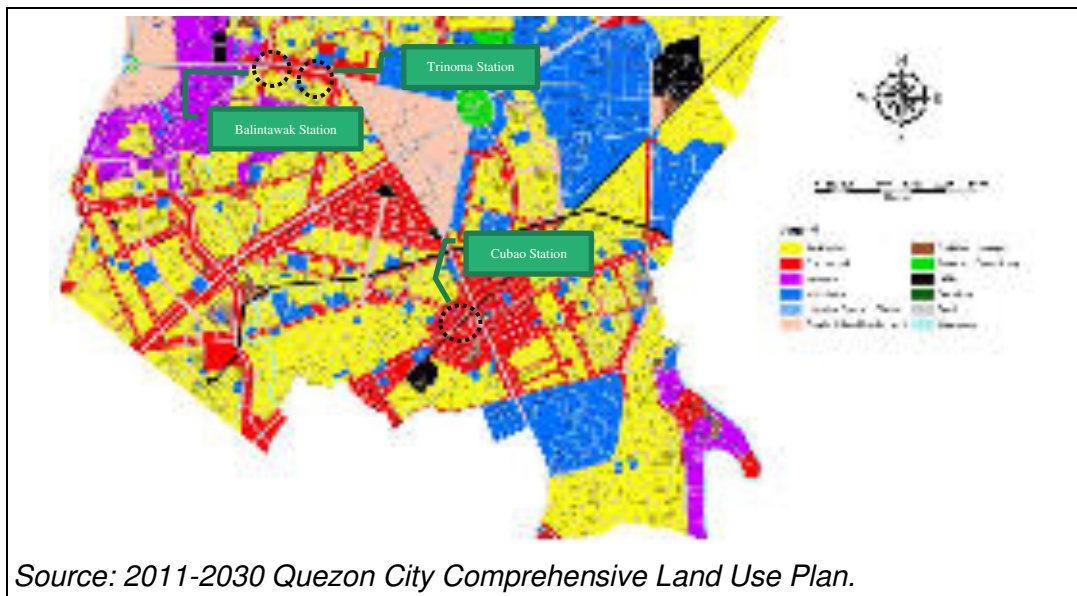


Figure 3.2 Quezon City Area Existing Land Use Map (2016)

Large portion of the land in Quezon City is meant for residential use. Residential uses cover the barangays of Unang Sigaw, Bagong Barrio West and Balingasa at Balintawak, Veterans, Phil-Am and Bagong Pag-asa at Common Station and Socorro at Cubao.

Meanwhile, most of the areas along EDSA are zoned major commercial. This include wet and dry markets as well as wholesale and retail stalls at Balintawak, at a major thoroughfare such as EDSA, North Ave., Mindanao Ave., and West Ave at Common Station and include shopping centers and market places, such as Araneta Center at Cubao. The neighbouring barangays of San Martin De Porres, E. Rodriguez and Kaunlaran, as well as parts of Pinagkaisahan and Immaculate Conception are a mix of residential and commercial uses.

Industrial activities, at Balintawak, include manufacturing, fabrication, warehouses and factories. Institutional uses such as schools and hospitals are scattered throughout the area, but not concentrated in any single areas.

Finally, the planned SUDZ is now mostly used for commercial purposes. SUDZ are zones with distinct or special character that needs preservation and protection or are areas in a state of slow growth, underdevelopment or deterioration requiring interventions to promote and hasten development or improvement. Common Station and surrounding area are part of a SUDZ included within the greater Central Business District (CBD)-Community Knowledge Center. In Cubao, the center of this CBD are several shopping centers and market places that generator high volumes of pedestrians - Gateway Mall, Araneta Center, SM Mall, Ali Mall, Farmer's Plaza and Farmer's Market. Araneta Coliseum, one of the most famous concert venues in the country, is also located at the center of the CBD.

Makati City (and Mandaluyong City): Figure 3.3 depicts the study area is centered around EDSA, along the south bank of the Pasig River. To determine the dominant land uses within the study area, both the Makati (2013) and Mandaluyong (2014) land use maps are analysed.

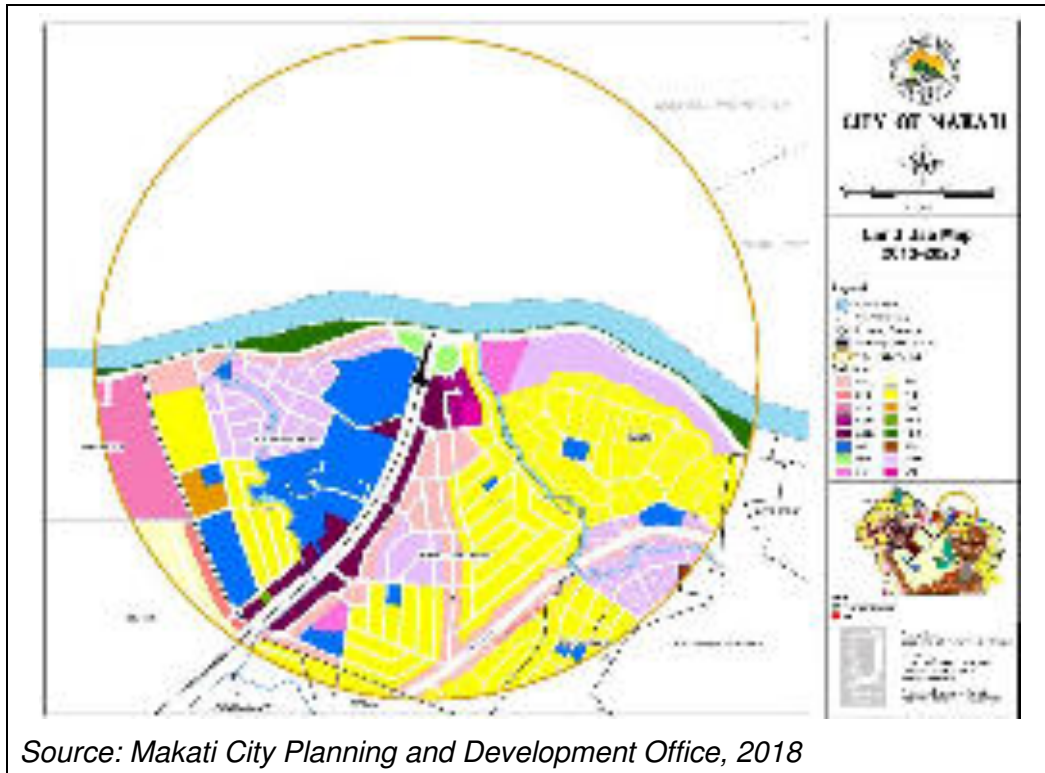


Figure 3.3 Guadalupe Study Area - Makati Side Existing Land Use Map (2013-2023)

The area south of the Pasig River (on the Makati City side) has a wide variety of land uses including: (i) medium-density residential uses (including areas such as Cembo and Guadalupe Nuevo – labelled R-2); (ii) various types of commercial uses mostly along EDSA and other major roads (C-1A to C-3D); (iii) institutional uses (mainly Our Lady Guadalupe Seminary and San Carlos Seminary); and (iv) Special Precincts for Urban Development (SPUR).

In the north of the Pasig River (Mandaluyong side), the prevailing land uses include: (i) commercial uses including Forum Robinsons; (ii) residential uses such as Barangka; and (iii) industrial uses along the river bank. Land use north of the river is shown in **Figure 3.4**.



Figure 3.4 Guadalupe Study Area - Mandaluyong Side Existing Land Use Map (2004)

Pasay City: Based on the 2014-2022 Land Use Plan of Pasay City, the Study Area is characterised largely by commercial uses (shown in red, accounting for more than 50% of the land area in the study area), followed by residential uses (shown in yellow) as depicted in **Figure 3.5**.

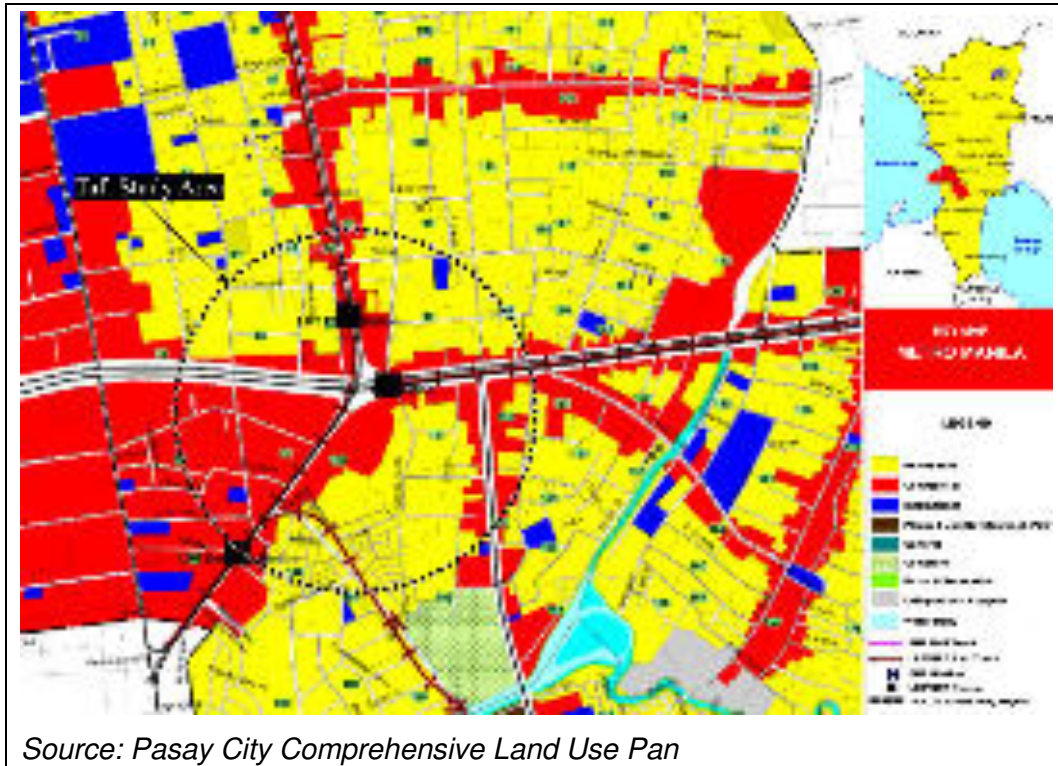
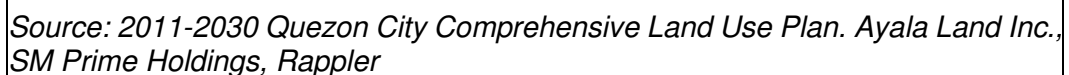


Figure 3.5 Pasay City Land Uses Map (2014-2022)

3.2.2 Future Land Use and Development Plans

Quezon City: The zoning map presented in **Figure 3.6** anticipates various developments in the Common Station Area up to 2030. Plans for mixed-use developments on both SM North and TriNoma sides are underway. These developments, which are also planned to interface with future transport plans, will create new pedestrian demand and possible needs for enhanced pedestrian connections and facilities.

Two major developments are planned as shown in **Figure 3.7**, including the Vertis North Complex and the SM BPO Hospitality Complex.



Vertis North Complex: Aligning with the proposed Quezon CBD-Knowledge Community District, the 29-hectare mixed use development known as Vertis North Complex will contain residential, commercial and office uses, as well as leisure facilities and open spaces. Vertis North will be connected to the various public transport facilities currently in operation (and the future Common Station and MMS North Avenue Station) via the TriNoma Mall, which will be linked directly. Any concepts for pedestrian improvement/expansion need to interface and align with this transformative development. As of now, new sidewalks and footpaths have been installed within the development. These pedestrian facilities are considerably wider and of higher quality than those facilities in the Common Station Area, with landscaping, proper lighting and underground utilities.

17 May 2019

https://asiandevebank-my.sharepoint.com/personal/EABANGAN_ADB_ORG/Documents/EDSA_GREENWAYS/CHANGE_MEMO/REV_7AUG_2020/REV_10_AUG/FS_IFF_FDSA_GRFENWAYS_20200806_11.DOCX



Source: 2011-2030 Quezon City Comprehensive Land Use Plan.

Figure 3.7 Existing Sidewalks at Vertis North

Two new major developments are underway in in Cubao area as shown in **Figure 3.8**:

Activa by Filinvest: Activa is a 1.2-ha. mixed-use development located in the junction of EDSA and Aurora Blvd. Filinvest plans to have residential condominiums, an office tower, a mall and a hotel in the development. This is located at the northeast corner of the junction of EDSA and Aurora Blvd.

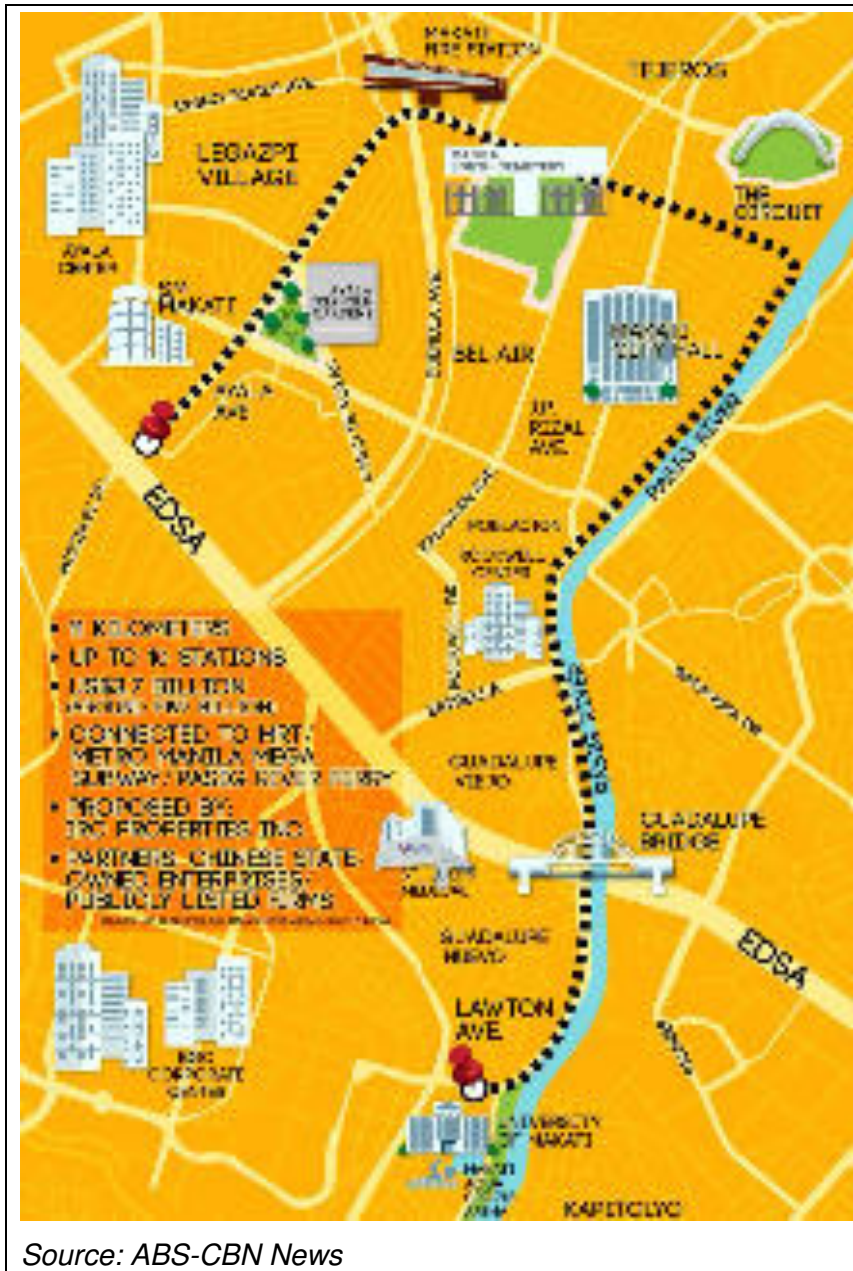
Gateway Mall Expansion: This second development is for the expansion of Gateway Mall in Araneta Center, which is due east of the Cubao MRT-3 Station. The expansion will be called Gateway 2 Mall and include a new hotel tower (IBIS Styles). These buildings are both located adjacent to the Araneta Coliseum.



Source: Filinvest, Araneta

Figure 3.8 Future Development Plans in Cubao Station

Makati City: The proposed Makati Subway Project is part of a plan to transform Makati into a “Smart City of the 21st Century”. The subway is a 10 km line with 10 stations, major stations around Makati City will include Rockwell Center and EDSA-Guadalupe. One of the stations will be near the planned Metro Manila subway so that passengers from one railway can easily transfer to the other. **Figure 3.9** shows the proposed alignment of the subway line as well as places of interest and key trip generators and attractors.

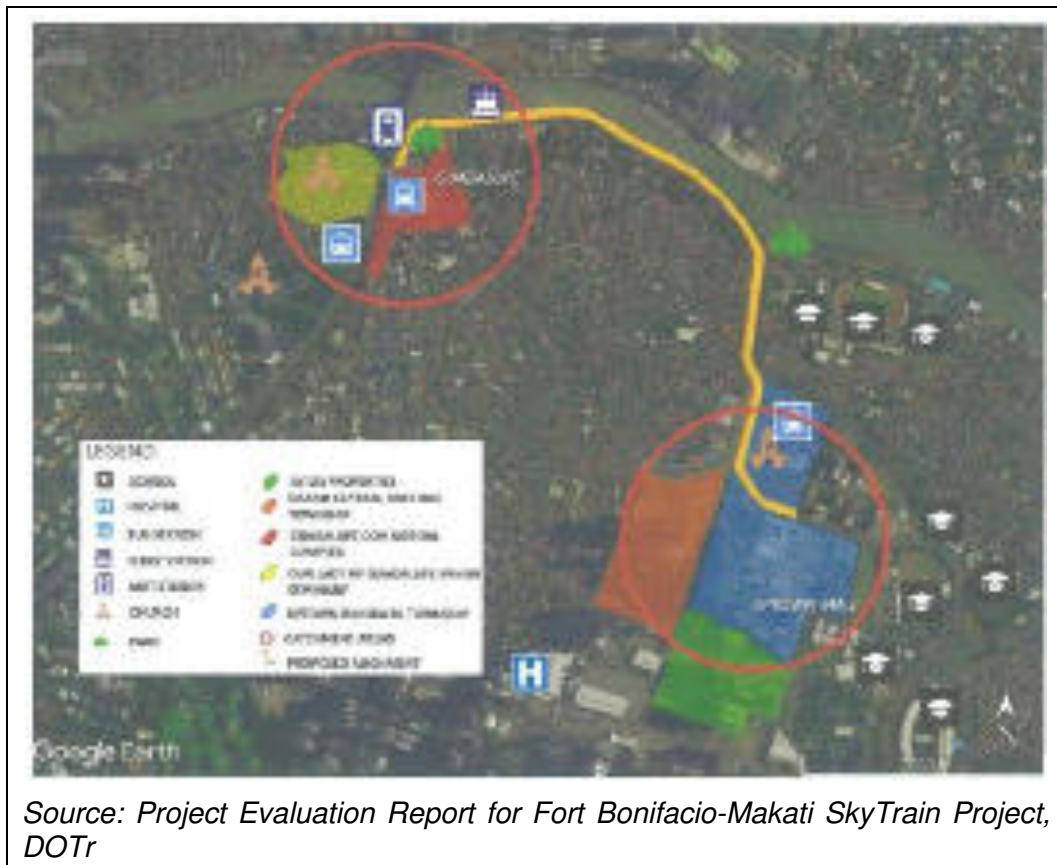


Source: ABS-CBN News

Figure 3.9 Makati Subway Alignment

On 12 December 2018, the ground-breaking took place between the Makati Subway project team and Makati local government unit (LGU) officials. Implementation of the line would impact any greenway plans west of the Guadalupe MRT-3 Station towards Rockwell Center along the Pasig River bank.

Another proposed development in Makati is the Fort Bonifacio-Makati SkyTrain project, which is a 1.87 km elevated transit system linking the Guadalupe MRT-3 Station to the Uptown Mall in Uptown BGC. The system is envisioned as an Automated People Mover (APM) system with only two stations (**Figure 3.10**). The project seeks to accelerate rapid development of BGC by enhancing accessibility to the area for residents and workers.



Source: Project Evaluation Report for Fort Bonifacio-Makati SkyTrain Project, DOTr

Figure 3.10 SkyTrain Alignment from Guadalupe MRT-3 Station to Uptown BGC

Pasay City: The EDSA Bus Rapid Transit (BRT) is a 48.6 km high-quality bus system with corresponding pedestrian and bicycle enhancements. The proposed system consists of four corridors: (i) a primary corridor along EDSA, which will serve the Taft MRT-3 Station Area; and (ii) branch corridors along Ayala Ave. to World Trade Center, Ortigas to Bonifacio Global City, and to NAIA. From the initial concept schemes of the Metro Manila BRT network released by DOTr, Taft Ave.-EDSA junction will have a bus stop that will connect to EDSA Station and Taft Station. Implementation of this line and specific station details are currently being deliberated by the Government.

No major road infrastructure projects fall within the study area. It is noted that two on-going Skyway projects are being implemented in the greater area: Quirino Ave to Roxas Boulevard Skyway Extension (interconnecting with Skyway Stage 3), and the Buendia Ave to Diosdado Macapagal Ave. Skyway Extension (interconnecting with Skyway Stage 3).

3.3 Proposed Improvement

3.3.1 Design Principles for Footbridges

Key principles adopted for footbridges are presented in **Table 3.1**.

Table 3.1 Design Principles for Footbridges

Element	Item	Assumption	Notes/Reference
Footbridge Design	Footbridge Width	5.0m	<ul style="list-style-type: none"> A 4.0m clear path is assumed to future proof the design, which aligns with the Makati and some of the Ortigas footbridge widths; this will allow two wheelchair users to pass one another comfortable, but also to accommodate peak fluctuations in demand and allow a comfortable walk environment compared to the footpaths. In some cases, a narrower clear path may be proposed to accommodate constrained physical conditions on the sidewalk, road right-of-way, etc. In such cases, a comfortable walk environment must still be provided that allows for wheelchair and PWD users, comfortable passing by pedestrians in the same direction, and accommodation of induced demand. 1.0m is assumed for the railings and landscaping
	Footbridge Amenities	Canopy Open Air	<ul style="list-style-type: none"> All footbridges are designed to be open-air and covered with a canopy
	Clear Height above Road	5.33m	<ul style="list-style-type: none"> Any overhanging or crossing structure must possess 5.33m height clearance over EDSA based on Metropolitan Manila Development Authority (MMDA) requirements. This rule is also applied to non-EDSA streets.
	Footbridge Location	On Footpath	<ul style="list-style-type: none"> Footbridges are assumed to be placed on the footpaths unless expressly noted. Height limitations of the LRT-1 or MRT-3 viaduct constrain placement of the footbridge entirely under the viaduct (see graphic and notes). Crossings of the rail viaduct occur at select locations, but may require less than ideal clearance height for pedestrians.

Element	Item	Assumption	Notes/Reference
	<i>Footpath Width Beneath the Footbridge</i>	<i>4.0m</i>	<ul style="list-style-type: none"> The footpath beneath the footbridge is assumed to be 4.0m (including 1.5m for the column. 0.5m for column setback from the road, 0.5m for utility poles, and 1.5m for a pedestrian zone). Pedestrians and wheelchair users will be able to maneuver around poles by using areas underneath the footbridge, so long as columns and utility poles are not placed at the exact same location perpendicular to the road (this will be further coordinated in the detailed design stage). In some cases, footpath widening into EDSA or the adjoining road would require reallocation of road space for the footbridge. No land acquisition would be required to construct the footpath and footbridge structure (although landings would require land acquisition – see below)
	<i>Landings</i>		<ul style="list-style-type: none"> Typical landings will have a stairwell and lift for “access for all” and persons with disabilities (PWD) access (depending on space availability and physical feasibility) The lift shaft is assumed to be 3.5m x 3.5m and can accommodate a wheelchair Lifts are designed for “roll-in” and “roll-out” operations so that wheelchair user always can move “forward” as space allows Stairwell and lift for a landing are typically adjacent to one another, but this depends on available land Land acquisition may be necessary for the landings (with vacant lots or parking spaces the preferred landing location to minimize impact on existing property owners)
	<i>Advertising Panels</i>	<i>See Notes</i>	<ul style="list-style-type: none"> Advertising panels will be placed along the fencing (assumed to be 0.5m tall) on both sides of the footbridge and visible to pedestrians walking on the footbridge.
	<i>Kiosks</i>	<i>See Notes</i>	<ul style="list-style-type: none"> Small kiosks will be placed at landings for merchants to sell food or other small

Element	Item	Assumption	Notes/Reference
			<p>products (two kiosks will be assumed at each landing).</p> <ul style="list-style-type: none"> No land acquisition will be required for the kiosks, which will be located within the envelope of the footbridge.
<i>Construction Zone Requirements</i>	<i>Construction Work Zone Requirements</i>	<i>6.0m</i>	<ul style="list-style-type: none"> A 6.0m work zone width is required for pile installation for any 5.0m wide footbridge to allow for storage of heavy vehicles, equipment and materials as well as movement of vehicles during the installation works This construction zone will be centred around the columns (with an assumed 30m area around each column for construction, equipment and materials) A narrower work zone is possible if the bridge width is under 5.0m (for instance a 3.5m wide footbridge would require a works area of 4.0m)
	<i>Temporary Footpath Width during Construction</i>	<i>1.5m</i>	<ul style="list-style-type: none"> A temporary footpath of 1.5m will be provided alongside the work construction zone to maintain pedestrian movement This footpath width may be narrowed or eliminated altogether if: (i) demand warrants; or (ii) alternate walk arrangements can be made (for instance use of the facing footpath on the other side of the road).
<i>Road Lane Widths</i>	<i>Minimum Lane Width on EDSA during Construction</i>	<i>2.8m</i>	<ul style="list-style-type: none"> Based on MMDA requirements Lanes must meet this temporary width during construction of the footbridge, unless expressly noted Traffic analysis to test viability of lane closure or narrowing.
	<i>Minimum Allowable Lane Width on EDSA after Implementation</i>	<i>3.1m</i>	<ul style="list-style-type: none"> Based on MMDA requirements Lanes must meet this width after construction of the footbridge, unless expressly noted (it is noted that some current lanes are narrower than 3.1m on EDSA) Traffic analysis to test viability of lane closure or narrowing.

3.3.2 Architectural Guidelines

Structure: The design will make use of compatible structural, planning and cladding grids. Building components can thus be standardized and repeated to simplify construction, minimize material wastage and streamline procurement for maintenance and replacement. The benefits of standardization will lead to greater cost effectiveness and an environmentally sustainable design.

Off-site prefabrication techniques could be employed so that congestion at the assembly site can be reduced. This will avoid the need to hire too many skilled workers to the construction site, and minimize causing lack of power, lack of water, exposure to weather or a hazardous environment.

Form: The form will be simple, low-tech but effective passive principles, with natural ventilation, shading, considering the local climatic and site conditions, with the addition of active systems only where these can bring cost effective benefits.

Space: The spatial quality of the environment and integration of new routes into the existing urban fabric will be a key driver of the design. Using the existing context to drive footfall, such as, linking commercial or office areas together will also be a consideration in the design concepts.

Light: The control of light is an important factor in the appreciation of space. Light from above, for instance, is more powerful than from vertical planes. Spaces that allow sunlight to penetrate the space feel more human and friendlier, due to the warm color of the light and movement of shadows, which animate the space and help with orientation.

Materials: The choice of materials must be appropriate and relates to aesthetics, function and context. The use of locally available materials to reduce costs and environmental impact will be a first choice.

3.3.3 Concept Visualizations

The following three figures illustrate concept visualizations for the footbridge:

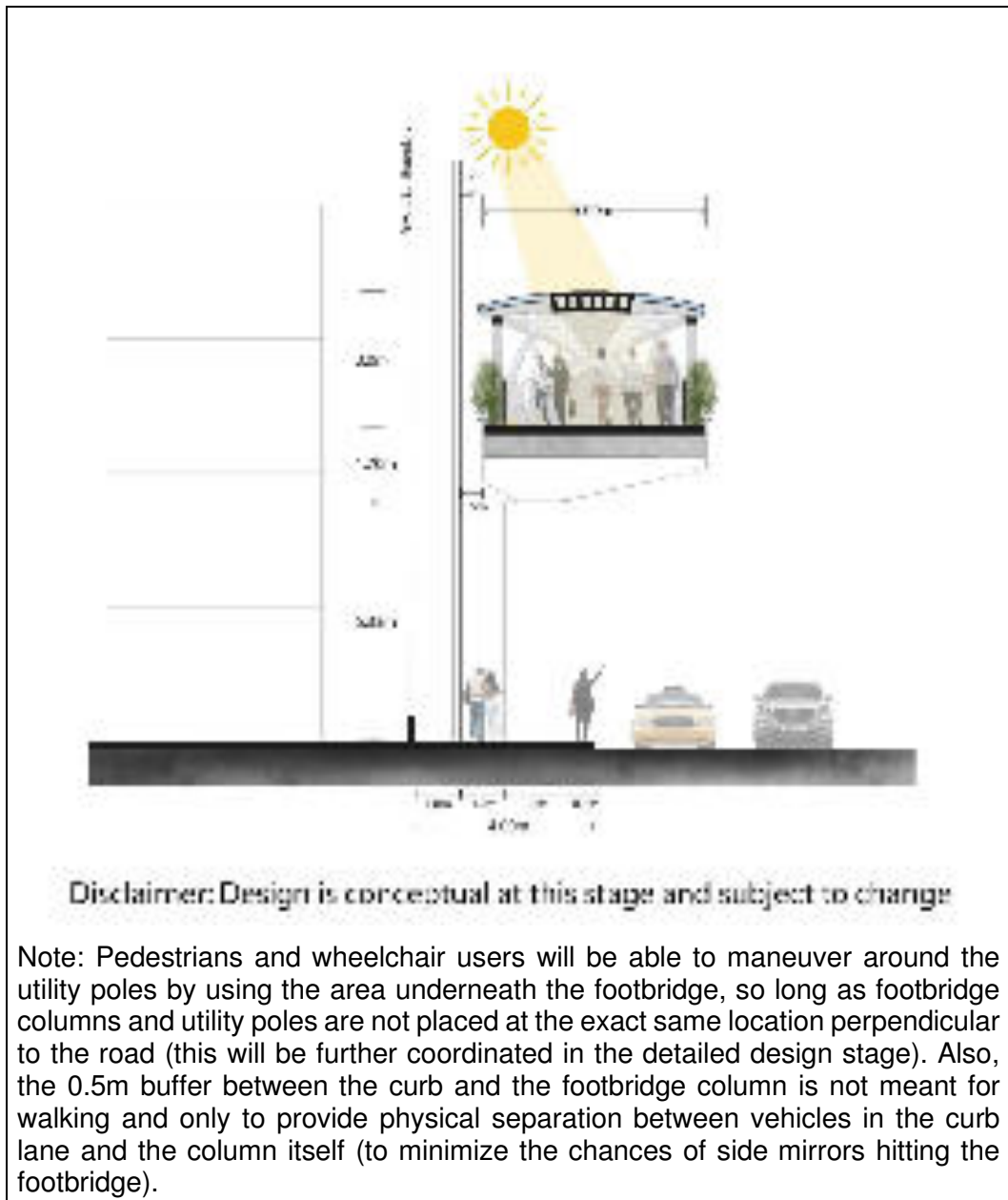


Figure 3.11 Conceptual Visualisation of Footbridge

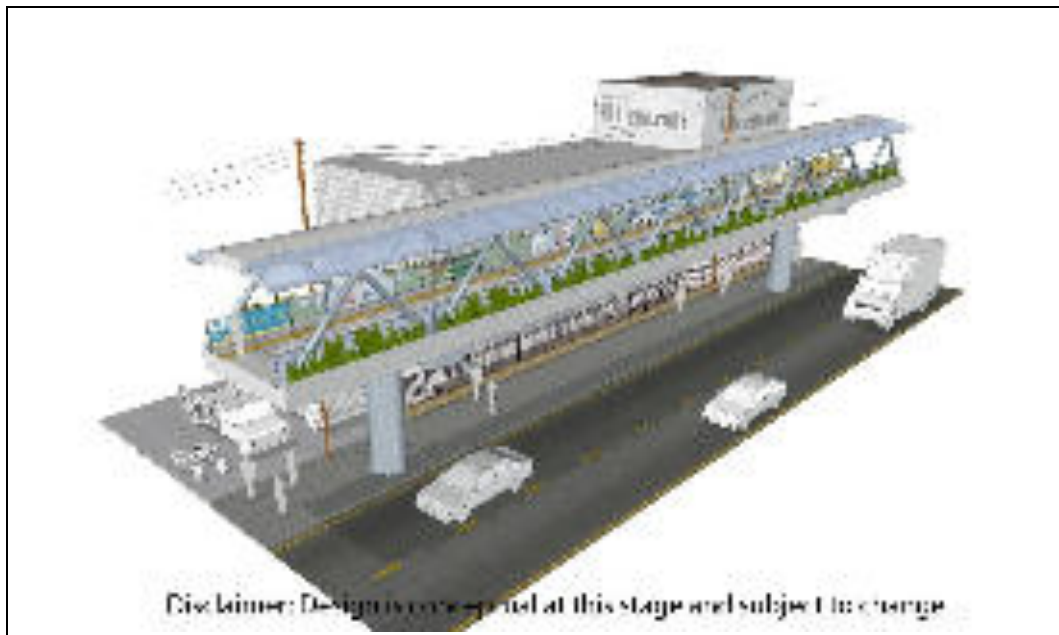


Figure 3.12 Conceptual Visualisation of Footbridge

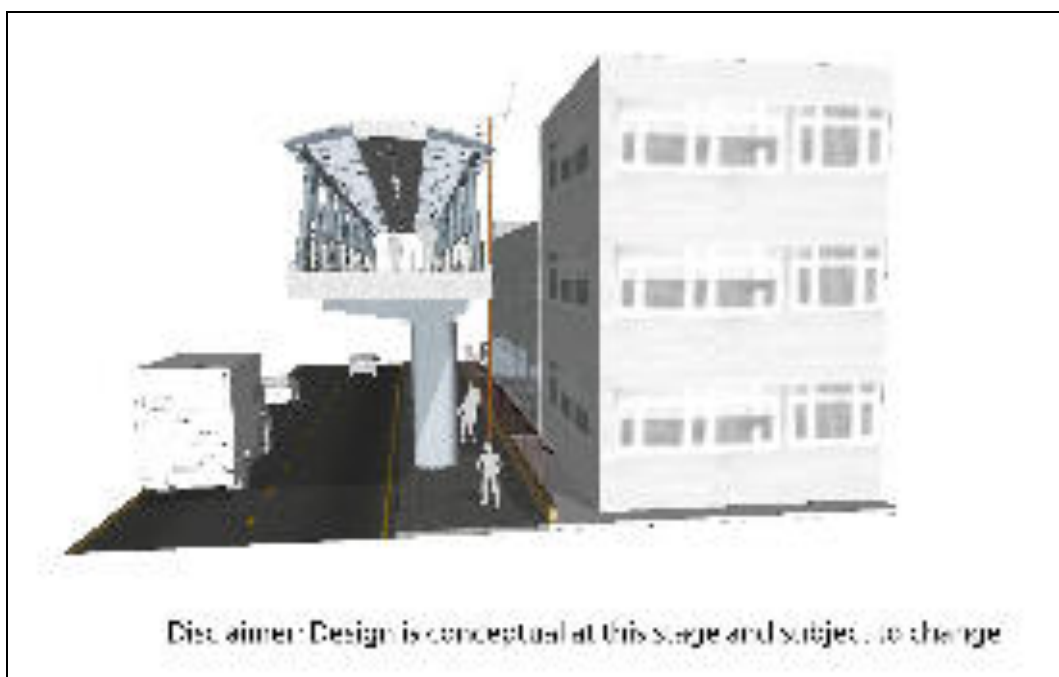


Figure 3.13 Conceptual Visualisation of Footbridge

3.3.4 Target Pedestrian Enhancement

All footbridge schemes would mirror the typical design that is:

- Footbridge would have a structural width of 5.0m;
- Minimum clear walking path of 4.0m (with the remaining 1.0m for the side fencing and landscaping);
- Partially enclosed structure with an overhead canopy;

- Footbridge height meeting minimum MMDA height requirements of 5.33m over EDSA; and
- Landings equipped with stairwells and elevators to ensure access-for-all.

Balintawak Station

The proposed footbridges at Balintawak Station focus on EDSA- to connect to LRT Balintawak, to north and southbound cloverleaf areas, to its vicinity and to existing footbridges that will undergo replacements (**Figure 3.14**). Most existing footbridges in the area will be replaced with the typical 5.0m covered footbridge. This is to provide a consistent enhanced walk environment throughout the area and replace deteriorated bridges without canopies and slippery surfacing. The key exception is the F1 Cloverleaf Interchange North Footbridge, which is retained as is since it is in good condition, relatively new, and is situated in an area with relatively lower demand which could be handled by its current width (this bridge will be improved with a canopy however).

The table below highlights the specific proposed footbridge enhancements.

Table 3.2 Proposed Footbridge Network – Balintawak Station

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvements	Notes
F1	Cloverleaf Interchange North Footbridge	-	-	0	Retain	Existing footbridge (install new canopy on 130m footbridge); owned by DPWH
F2	Cloverleaf Interchange NW Footbridge	3.5	215	753	New	New footbridge in median of northwest portion of Interchange between access maps
F3	Mariano Footbridge	5	50	250	Replace	Existing footbridge to be replaced; owned by MMDA
F4	Cloverleaf Interchange South Footbridge	5	295	1,475	New	New footbridge along southbound EDSA curb and footpath
F5	LRT-1 Cloverleaf Footbridge	5	305	1,525	New	New footbridge along southbound EDSA footpath

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvements	Notes
F6	Balintawak Market Footbridge	5	50	250	Replace	Existing footbridge to be replaced; owned by MMDA
F7	LRT-1 – Oliveros Footbridge	5	305	1,525	New	New footbridge southbound EDSA footpath
F8	Oliveros Footbridge	5	50	250	Replace	Existing footbridge to be replaced; owned by MMDA
F9	Cloverleaf Interchange NE Footbridge	3.5	225	788	New	New footbridge along northbound EDSA footpath and footpath along northeast portion of Interchange
F10	Camachile Footbridge	5	85	425	New	New footbridge along southeast portion of Interchange
F11	Cloverleaf Mall North Footbridge	3.5	145	508	New	New footbridge northbound A. Bonifacio Ave. footpath
F12	Cloverleaf Mall West Footbridge	5	35	175	New	New footbridge crossing A. Bonifacio Ave. (replacing demolished footbridge for flyover construction)
		Total	1,760	7,923		

Each landing would provide a stair and a lift for PWD access. Of the 12 landings proposed for the new Balintawak scheme, five of these would potentially encroach into private land (as shown in **Table 3.3**) – necessitating land acquisition (pending negotiations as part of the RAP). The estimated private land take is 600 m².



Figure 3.14 Proposed Footbridge Scheme – Balintawak Station

Table 3.3 Potential Private Land Acquisition at Landings –Balintawak Station

Landing	Address	Land Owner	Area (m²) A,B,C
4	A. Bonifacio Ave, A. Bonifacio, Quezon City, 1115 Metro Manila	Land Owner: Leandro B Sarangaya M/To Corazon Tombo Address: 26 Hercules St Tivoli Greens Subd., Batasan Hills, Quezon City	105
5	Ayala Cloverleaf, 476 A. Bonifacio Ave, A. Bonifacio, Quezon City, 1400 Metro Manila	Land Owner: South Gateway Development Corp Address: 31/F Tower One & Exchange Plaza Ayala Triangle, Makati City	105
7	10 North Diversion Rd Balintawak Quezon City	Land Owner: Castillo Marcelina C Et Al Address: 10 North Diversion Rd Balintawak Quezon City	150
8	1184-C Edsa Balintawak Quezon City	Land Owner: Felicitas Dizon Address: 1184-C Edsa Balintawak Quezon City	150
	1184 Edsa Balintawak Quezon City	Land Owner: Dizon Alejandra	
	1184 Edsa Balintawak Quezon City	Land Owner: Lea B Santos Address: Blk 76 Lot 30 Haring Constantino St Lagro Quezon City	
10	Puregold, EDSA, Balintawak, Quezon City, 1106 Metro Manila	Land Owner: VFC Land Resources Inc. Address: 1379 Gen San Gregorio St Paco Manila	90
Total			600

Note:

^A Estimated land take is based on 150% of stairwell and lift occupied lot area rounded up to the nearest unit of 5.

^B A minimum of 50m² is assumed given the lack of detailed parcellary and property information available at this time.

^C Exact land takes will need to be verified with further topographic and parcellary surveys.

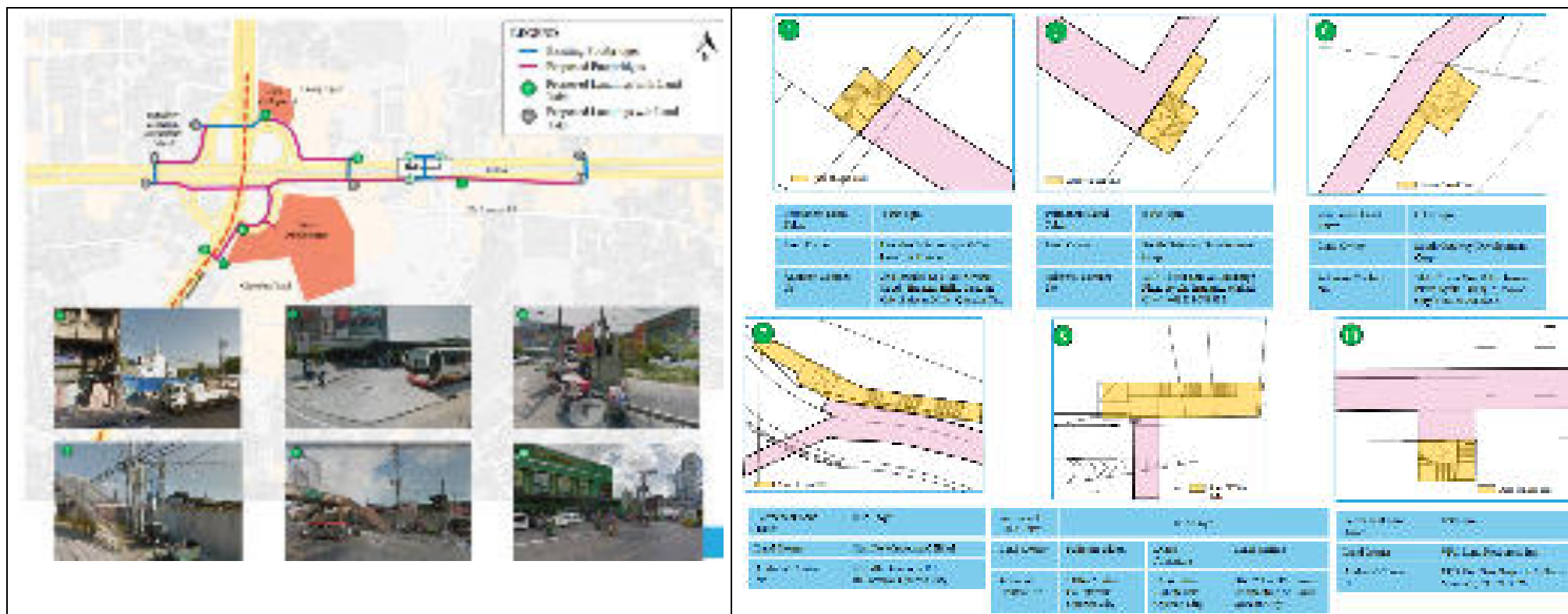


Figure 3.15 Proposed Landings and Estimated Private Land Acquisition – Balintawak Station

Common Station

The collected information is from parcellary surveys provided by the LGU City Assessors office, thus the owner of the structure may not be the same as the owner of the land and that the values will need to further refine after the topographic and parcellary study for the Project. The proposed footbridges at Common Station are concentrated along North Avenue and EDSA, including the existing footbridges, to connect to Common Station and to its vicinity. The new scheme for Common Station will have eleven (11) landings, nine (9) of which have a stair and lift. Two (2) landings will only have stairs. The design ensures PWD access throughout the network. Of the eleven (11) landings, seven (7) would potentially encroach into private land – necessitating land acquisition (pending negotiations as part of the Resettlement Plan or RP). The estimated private land take is 1,005 m² as presented in **Table 3.5**. **Table 3.4** and **Figure 3.16** presents the proposed footbridge network around Common Station for the long-term to coincide with opening of Common Station and the MMS Station. Details for individual landings are shown in **Figure 3.17** and **Figure 3.18**.

Table 3.4 Proposed Footbridge Network – Common Station

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvements	Notes
Common Station Short-Term Scheme (Roosevelt)						
FA	Congressional – Roosevelt Footbridge	5	245	1,225	New	New footbridge
FB	Roosevelt – SM North Footbridge	5	785	3,925	New	New footbridge
FC	Roosevelt LRT-1 East Footbridge	5	45	225	New	New footbridge
FD	Corregidor/Bansalangan Footbridge	5	40	200	New	Existing footbridge to be replaced; owned by MMDA
Short-Term Total:			1,115	5,575		
Common Station Long-Term Scheme (West and East Bridge)						
F1	Mindanao-North Avenue Footbridge (South Leg)	5	95	475	New	New footbridge; see WP5 - Section 5.5.3 on the connection to the MMS Station
F2	Mindanao-North Avenue Footbridge (West Leg)	5	40	200	Replace	Existing footbridge to be replaced; owned by MMDA
F3	Trinoma Connection	5	50	250	New	New footbridge
F4	Common Station/Mindanao Footbridge ^A	8	180	1,440	New	New footbridge under the future MRT 7 viaduct along North Avenue with a portal configuration (see WP5 - Section 5.5.3)

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvements	Notes
F5	North Ave. Footbridge (North Leg)	5	35	175	New	New footbridge
F6	North Ave. Footbridge (South Leg)	5	35	175	New	New footbridge
F7	EDSA Skybridge (North Ave. Leg)	5	75	375	Replace	Existing footbridge to be replaced; owned by MMDA
F8	EDSA Skybridge (EDSA Leg)	5	60	300	Replace	Existing footbridge to be replaced; owned by MMDA
F9	EDSA Skybridge (West Ave. Leg)	5	60	300	Replace	Existing footbridge to be replaced; owned by MMDA
F10	Emerson Tower Building Walkway	-	-	0	Retain	No improvement proposed, but new replaced segments would tie into this walkway
F11	SM North Footbridge	5	75	375	Replace	Existing footbridge to be replaced; owned by SM Supermalls
Long-Term Total:			705	4,065		
Common Station Total:			1,820	9,640		

Note:

^A As noted, JDT assessment of this footbridge finds that an 8.0m width would be needed to satisfy future flows. This information has been validated and tested in a simulation model as noted above.

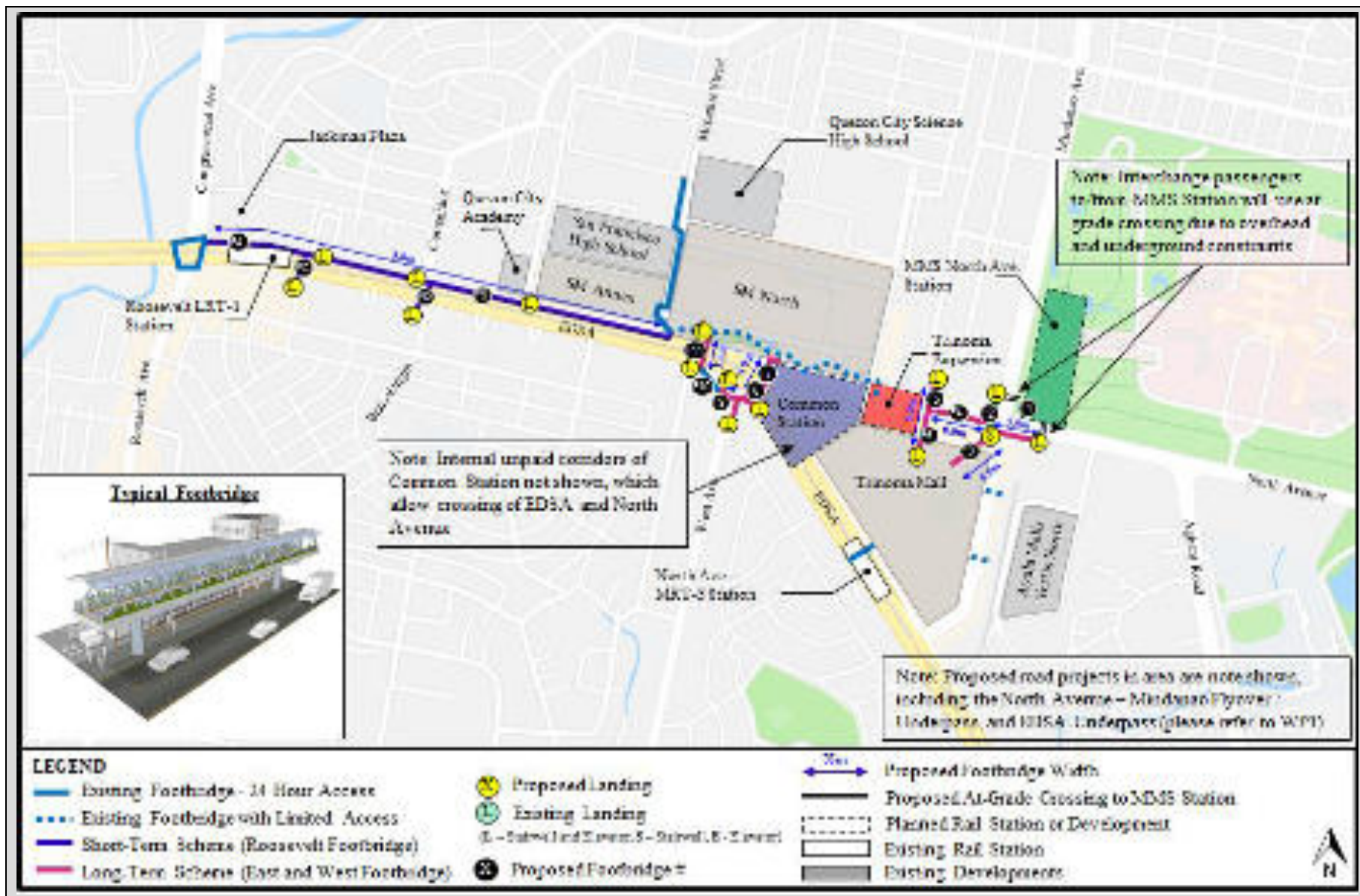


Figure 3.16 Proposed Footbridge Scheme – Common Station (Short-Term + Long-Term)

Table 3.5 Potential Private Land Acquisition at Landings – Common Station

Landing	Lot Location	Land Owner/ Address/ Contact Details	Area (m²) A,B,C
1	SM North EDSA	Land Owner: SM Prime Holdings Inc. Address: Bldg. A, SM Central Business P Bay Blvd. Brgy. 76, Pasay, Metro Manila Tel: 0920 297 9751	170
2	Emerson Tower	Land Owner: SM Investment Corporation Address: Harbor Drive Mall of Asia Complex, San Antonio Avenue, Pasay City Tel: (02) 911 3661	120
6	SM North EDSA	Land Owner: SM Prime Holdings Inc. Address: Bldg. A, SM Central Business P Bay Blvd. Brgy. 76, Pasay, Metro Manila/ 0920 297 9751	75
7	North Ave. Project 6, Quezon City	Land Owner: Paulino PE Address: 63-F D Tuazon, Quezon City	205
8	Ayala Malls Trinoma	Land Owner: Ayala Corporation Address: 66760 Ayala Ave, Legazpi Village, Makati, Metro Manila Tel: (02) 908 3000	125
9	Mindanao Ave. Cor North Ave. Quezon City	Land Owner: GDF Trading Corp. Address: 41 June St., Congressional Village, Project 8	160
11	Vertis North Estate	Land Owner: Ayala Land Inc. Address: Tower One and Exchange Plaza, Ayala Triangle, Ayala Avenue, Bel-air, Makati, 1226 Metro Manila Tel: (02) 908 3111	150
Total			1,005

Note

^A Estimated land take is based on 150% of the stairwell and lift land area, rounded to the nearest unit of 5.

^B A minimum of 50 m² is assumed, given the lack of detailed parcellary and property information available at this time.

^C Exact land takes will need to be verified with further topographic and parcellary surveys.



Figure 3.17 Proposed Landings and Estimated Private Land Acquisition – Common Station (Landing Locations)



Figure 3.18 Proposed Landings and Estimated Private Land Acquisition – Common Station (Estimated Land Acquisition by Location)

Cubao Station

The proposed footbridges at Cubao Station focus on EDSA and Aurora Boulevard to connect to Cubao MRT and LRT Stations (**Figure 3.19**). The one exception to the design is the Aurora-Roxas Footbridge (F7), which is constrained by the overhang of the Vivaldi Residences/ Eurotel and Bureau of Fire Protection (BFP) fire access requirements. Therefore, the footbridge would have a structural width of 2.7m (or 2.2m clear walk path). This would be sufficient for two wheelchairs to pass simultaneously (assuming 0.8m per wheelchair).

The table below highlights the proposed footbridge network.

Table 3.6 Proposed Footbridge Network – Cubao Station

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvement	Notes
F1	Monte de Piedad Footbridge	5	50	250	Replace	Existing footbridge to be replaced; owned by MMDA
F2	Monte de Piedad - Aurora Footbridge	5	230	1150	New	New footbridge (on southbound EDSA footpath)
F3	Monte de Piedad - Activa Footbridge	5	75	375	New	New footbridge (on northbound EDSA footpath)
F4	EDSA – Gen. Santos Footbridge	5	75	375	New	New footbridge (on westbound Aurora footpath)
F5	EDSA / Aurora Footbridge	5	240	1,200	Replace	Existing footbridge to be replaced including four wheelchair lifts along the north and south legs to connect under the MRT-3 viaduct; owned by MMDA
F6	Aurora – Cubao LRT-2 Footbridge	5	210	1,050	New	New footbridge (on eastbound Aurora footpath)
F7	Aurora - Roxas Footbridge	2.7	160	432	New	New footbridge (on northbound EDSA footpath); width constrained by fire requirements
F8	Farmer's Footbridge	5	55	275	Replace	Existing footbridge to be replaced; one wheelchair lift installed to access the MRT-3 entrance;

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvement	Notes
						owned by New Farmer's Plaza Inc. (Araneta Group)
F9	Arayat Footbridge	5	75	375	New	New footbridge (on southbound EDSA footpath)
F10	Farmer Market Footbridge	5	220	1100	New	New footbridge (on northbound EDSA footpath)
F11	Gen MacArthur Footbridge	5	55	275	Replace	Existing footbridge to be replaced; owned by MMDA
		Total	1,445	6,857		

Most landings would provide a stairwell and a lift to facilitate PWD access. Of the seven (7) landings proposed for the new Cubao scheme, three (3) of these would potentially encroach into private property/land (shown in **Table 3.4**) – necessitating land acquisition (pending negotiations as part of the RP). The estimated private land take is 460 m². Land takes are indicative and are based on recent Quezon City parcellary information and basemap provided DOTr's rail sector. This will be updated as the study progresses.

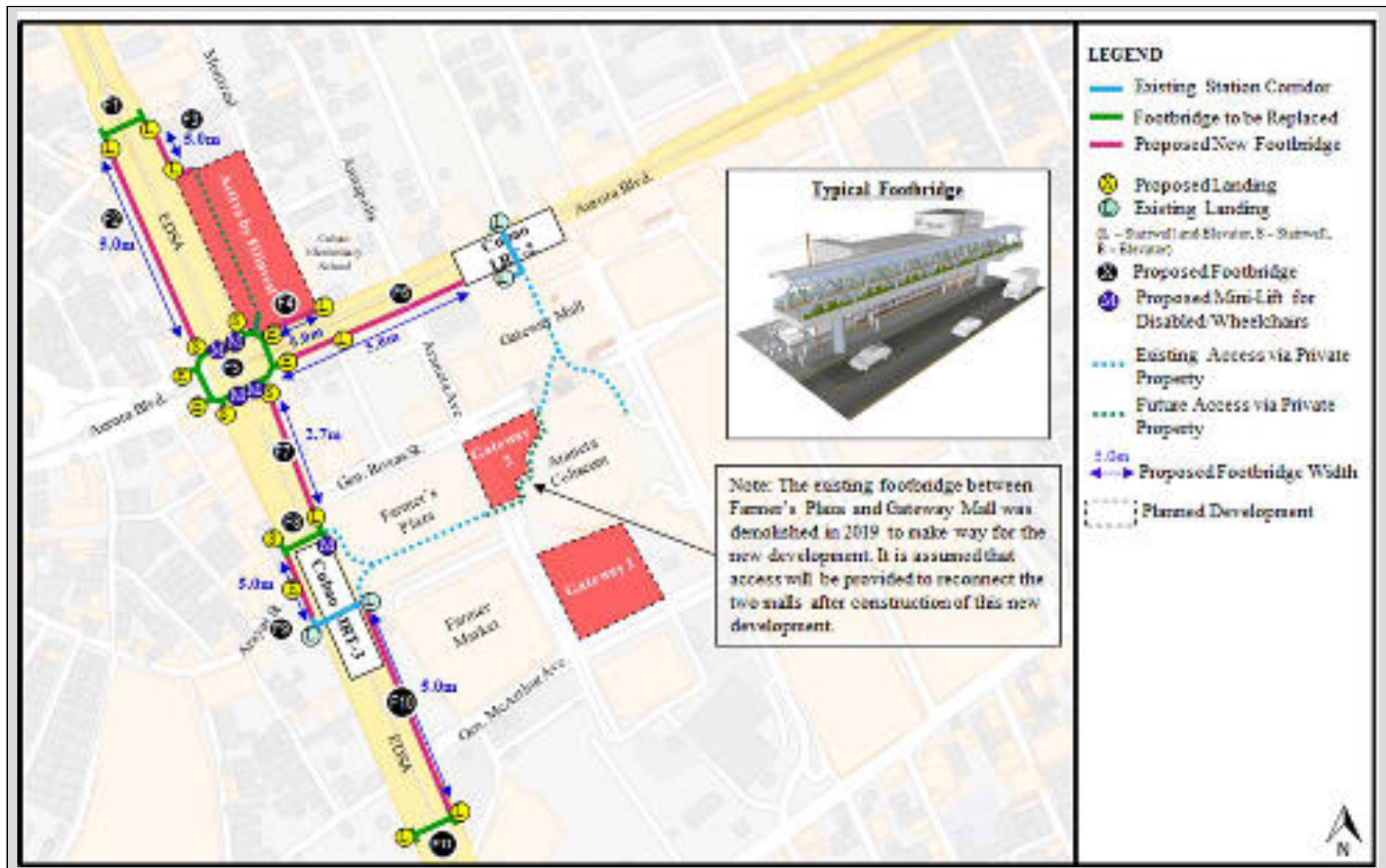


Figure 3.19 Proposed Footbridge Scheme – Cubao Station

Table 3.7 Potential Private Land Acquisition at Landings – Cubao Station

Landing	Lot Location	Land Owner/ Address/ Contact Details	Area (m²) A,B,C
1	Activa Flex Development, EDSA cor Aurora Blvd., Cubao Quezon City	Land Owner: Filinvest Land Inc. Address: Filinvest Bldg. 79 EDSA Highway Hills, Mandaluyong Tel: 0917 545 7788 / (63 2) 918-8188	205
3	Art Theatre Bldg., Aurora Blvd., Cubao, Quezon City	Land Owner: General Theatrical & Films Exchange Corp.	75
4	Farmer's Plaza, EDSA Cor. Gen. Roxas Araneta Center	Land Owner: New Farmer's Plaza Inc. Address: 16 th 18 th Aurora Tower, Araneta Center, Quezon City Tel: (02) 588 4000	180
Total			460

Note:

^A Estimated land take is based on 150% of the stairwell and lift land area, rounded to the nearest unit of 5.

^B A minimum of 50 m² is assumed, given the lack of detailed parcellary and property information available at this time.

^C Exact land takes will need to be verified with further topographic and parcellary surveys.



Guadalupe Station

The proposed footbridges at Guadalupe Station focuses on EDSA to connect to MRT Station (**Figure 3.21**). The footbridge along southbound EDSA between the Guadalupe Viejo Cloverleaf Park and Bernardino (i.e., a portion of the MRT-3 – Pasig River West Footbridge and the MRT-3 – Guadalupe West Footbridge) would be 3.5m and no footpath would be provided on this stretch. This is due to the lack of right-of-way width for a properly sized permanent footpath and the need to maintain traffic flow on EDSA. The table below highlights the proposed footbridge network.

Table 3.8 Proposed Footbridge Network – Guadalupe Station

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvement	Notes
F1A	MRT-3 - Pasig River West Footbridge	5.0	80	400	New	New footbridge (thru Guadalupe Viejo Cloverleaf Park)
F1B		3.5	65	228	New	Narrower portion of footbridge along EDSA between the Cloverleaf Park and the MRT-3 Station
F2A	MRT-3 – Guadalupe West Footbridge	3.5	100	350	New	New footbridge along southbound EDSA curb (no footpath provided) between the MRT-3 Station and Bernardino
F2B		5.0	100	500	New	New footbridge along southbound EDSA curb (wider portion south of Bernardino)
F3	Guadalupe Footbridge	5.0	60	300	Replace	Existing footbridge to be replaced
F4	MRT-3 – Guadalupe East Footbridge	5.0	205	1,025	New	New footbridge along northbound EDSA footpath
F5	MRT-3 – Pasig River East Footbridge	5.0	180	900	New	New footbridge (thru Guadalupe Nuevo Cloverleaf Park)
Total			790	3,703		

Each landing will have a stair and a lift for PWD access. Of the eight landings proposed, three (3) will potentially encroach into private land (as shown in **Table 3.9**) – necessitating land acquisition (pending negotiations as part of the RP). The estimated private land take is 525 m². Land takes are indicative and are based on the information provided by LGU City Assessor's office. This will be revised once topographical and parcellary studies have been conducted specifically for the Project.

Table 3.9 Potential Private Land Acquisition at Landings – Guadalupe Station

Landing	Address	Land Owner	Area (m²) A,B,C
2	EDSA, Guadalupe Nuevo, Makati City	Land Owner: N. Dela Merced and Sons, Inc. Address: CCC Building, EDSA, Guadalupe Nuevo, Makati City	90
3	Bernardino St. cor EDSA, Guadalupe Viejo, Makati City	Land Owner: Roman Catholic Archbishop of Manila Address: 121 Arzobispado St., Intramuros, Manila	195
4	EDSA, Guadalupe Viejo, Makati City	Land Owner: SM Development Corporation Address: Two Ecom Center, 15th Floor, Harbor Drive, MOA, Pasay City	240
Total			525

Note:

^A Estimated land take is based on 150% of stairwell and lift surface area and rounded to the nearest unit of 5.

^B A minimum of 50m² is assumed given the lack of detailed parcellary and property information available at this time.

^C Exact land takes will need to be verified with further topographic and parcellary surveys.

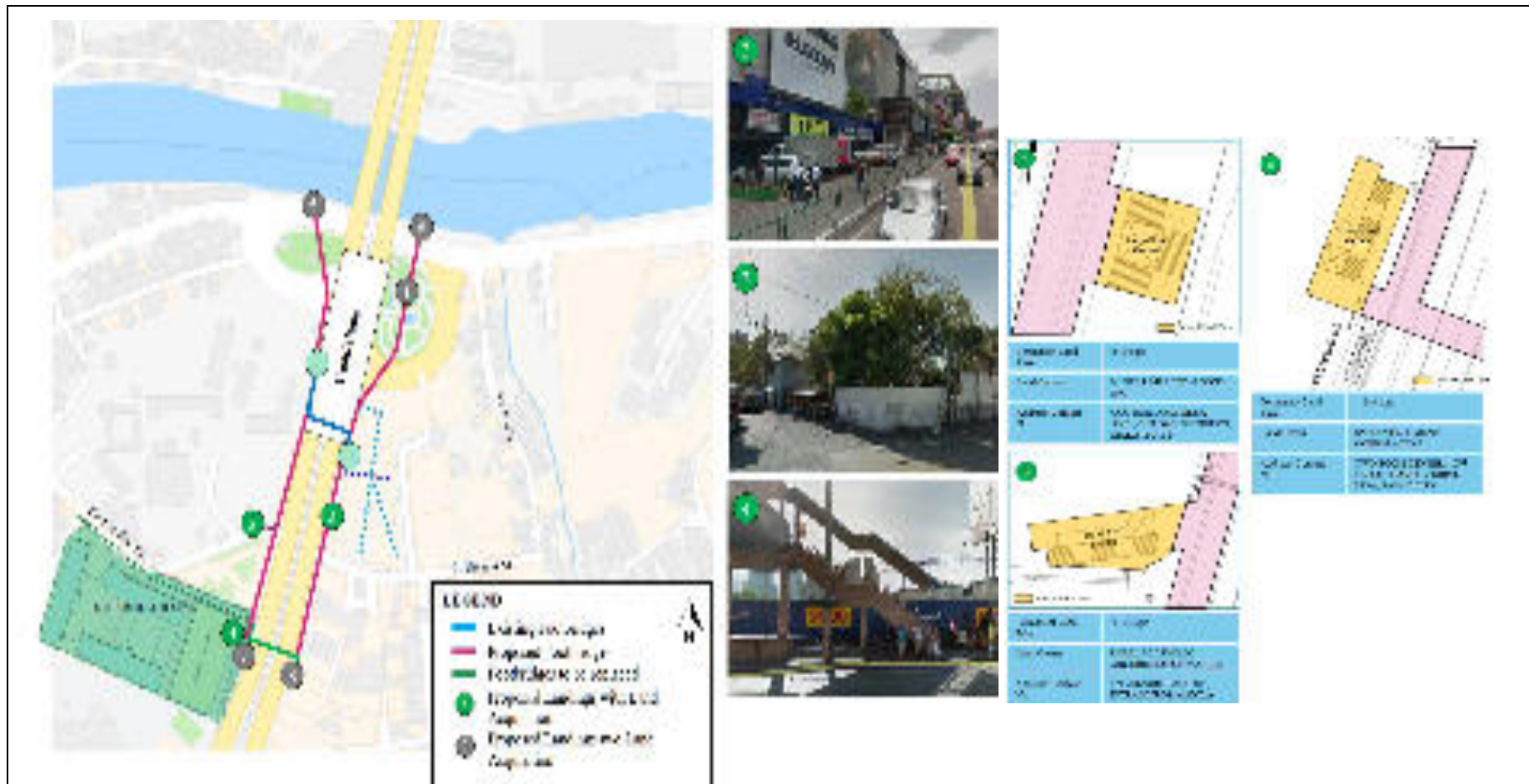


Figure 3.22 Proposed Landings and Estimated Private Land Acquisition – Guadalupe Station

Taft Station

The proposed footbridges at Taft Station focus on EDSA and Taft Avenue Extension to connect to Taft MRT and LRT Stations (**Figure 3.23**). Two specific segments will not have this design: (i) the Metropoint Footbridge will be widened from its current 4.0m width to 6.0m width to better handle peak interchange flow from the MRT-3 to the LRT-1; and (ii) the elevated deck on the west side of the EDSA/Taft Footbridge will have a width of 20.0m, which will allow landscaping and retail stalls on top of the deck to create a more leisurely and enjoyable public space. The table below presents the proposed network.

Table 3.10 Proposed Footbridge Network – Taft Station

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvement	Notes
F1	LRT-1 South Footbridge	-	-	0	Retain	No improvement, although new stairwell provided from southwest side
F2	EDSA / Taft Footbridge – Northwest Leg	5	80	400	Replace	Existing footbridge to be replaced; owned by MMDA
F3	Northwest Footbridge Leg from EDSA/Taft Deck	5	90	450	New	New footbridge
F4	EDSA / Taft Footbridge / West Leg Deck	21	50	1050	New	New elevated deck
F5	Southwest Footbridge Leg from EDSA/Taft Deck	5	40	200	New	New footbridge
F6	EDSA / Taft Footbridge – South Leg	5	115	575	Replace	Existing footbridge to be replaced; owned by MMDA
F7	Taft Ave. Ext. Footbridge	-	-	0	Retain	Existing footbridge - no improvement
F8	Metropoint Footbridge	6	110	660	Widen	Existing footbridge to be replaced; owned by LRTA/ MRTC
F9	Taft MRT-3 West Footbridge	-	-	0	Retain	Internal station access across EDSA, not improved as per DOTr directions
F10	Taft-Cabrera Footbridge	5	390	1,950	New	New footbridge

Segment	Name	Width (m)	Length (m)	Area (m ²)	Improvement	Notes
F11	Aurora Footbridge	5	50	250	New	New footbridge
F12	Cabrera Footbridge	5	50	250	Replace	Existing footbridge to be replaced; owned by MMDA
Total			975	5,785		

The new scheme for Taft will have ten (10) landings, six (6) of which will have a stair and lift. The remaining four (4) will only have a stair. The overall design ensures that PWD access is provided throughout the network. Of the eleven (11) landings, two (2) would potentially encroach into private land (as shown in **Table 3.11**) – necessitating land acquisition (pending negotiations as part of the RP). The estimated private land take is 195 m².

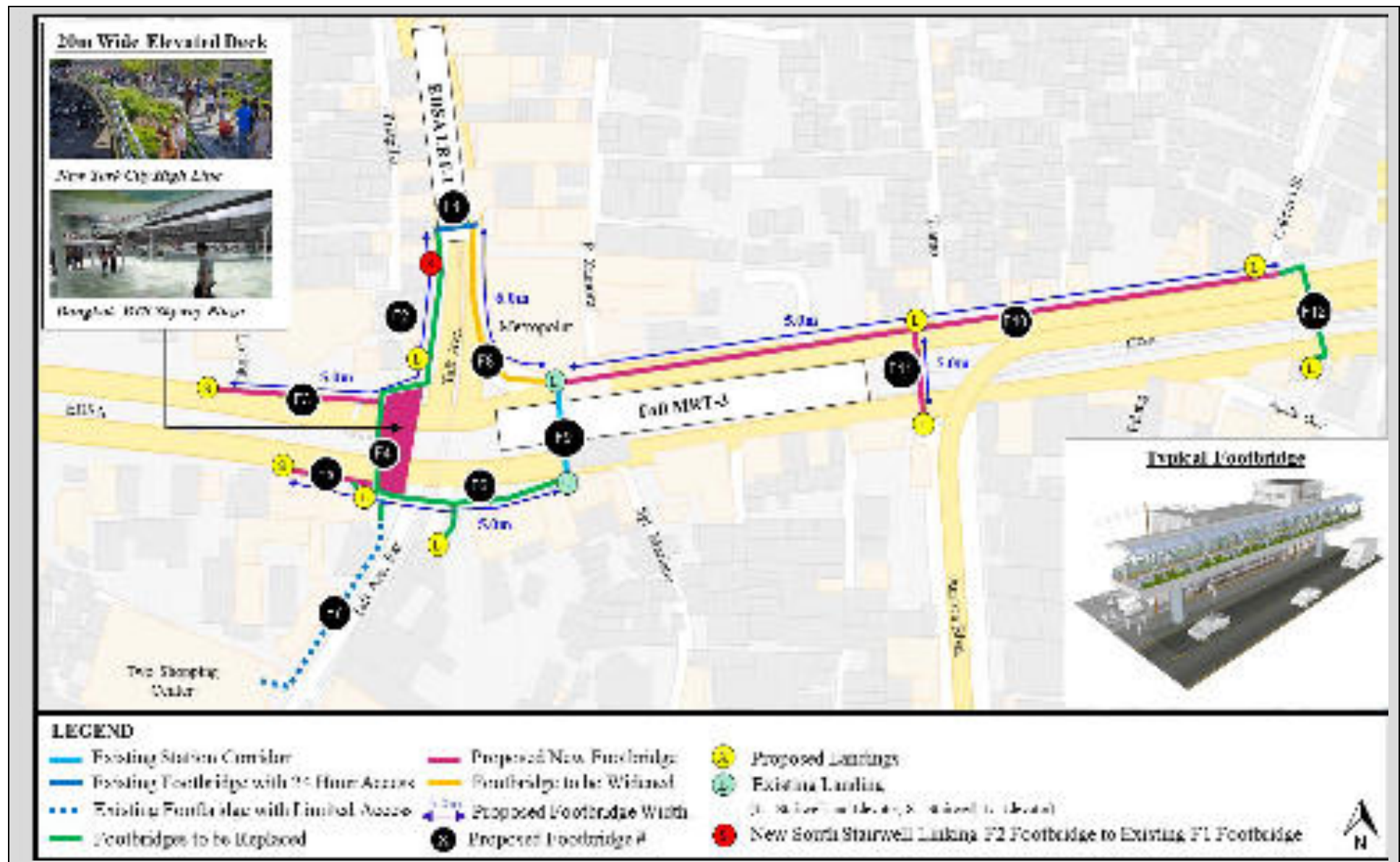


Figure 3.23 Proposed Footbridge Scheme – Taft Station

Table 3.11 Potential Private Land Acquisition at Landings – Taft Station

Landing	Lot Location / Address	Land Owner/ Address	Area (m²) A,B,C
2	455 Tramo Cor. EDSA Pasay City St., Metro Manila, Philippines	Land Owner: Disco Club (Nha) Guni-Guni	75
3	2113, Cabrera St. Pasay City St., Metro Manila, Philippines	Land Owner: Twinvestor Realty Consulting Corp Address: Flying V Gas Station, New York Cor. Cambridge ST., Cubao, Quezon City	120
		Total	195

Note:

^A Estimated land take is based on 150% of stairwell and lift surface area and rounded to the nearest unit of 5.

^B A minimum of 50m² is assumed given the lack of detailed parcellary and property information available at this time.

^C Exact land takes will need to be verified with further topographic and parcellary surveys.



Figure 3.24 Proposed Landings and Estimated Private Land Acquisition – Taft Station

The proposed alignment, landing and temporary impact areas are summarised in **Appendix B**. The total area for construction will temporarily be used for 16-21 months. After this, the total property will permanently be acquired as part of the Project.

3.4 Overall Implementation Schedule and Cost

3.4.1 Implementation Timeline

For individual stations, construction timeframe ranges from 15-21 months, excluding designing – this assumes day and night work with two shifts per day and provision of the required works area from Day One for 24 hours / 7 days per week. However, there are several activities that must be completed prior to construction – including:

- Additional surveys to ascertain specific ground, topographic and parcellary information (thus additional surveys may include ground investigation, geotechnical studies, topographic, as well as parcellary surveys);
- Detailed Engineering Design (DED) to advance the design and cost estimate to allow for a formal construction tender package to be created and bid out;
- Preparation of temporary Traffic Management (TTM) Plan;
- Public Consultation with relevant stakeholders and LGUs to allow public feedback and provide information to them regarding construction impacts, etc. and to negotiate for land purchase where land takes are required;
- Procurement for the main works contract to provide a bid, receive and evaluate tenders, and finalize the contract for construction to begin; and
- Construction, which is noted to take between 15-21 months by station and includes day/night work with two shifts per day).

Other key assumptions for the implementation activities include:

- Design and Build (D&B) contracts;
- DED works starts Day 1, the “grey” areas on the schedule represent the waiting period for survey data and the bid assessment period;
- Main Works Contract Assessment period includes DOTr/PMO Final Design approval;
- DOTr submittal responses received in 2 weeks;
- Topographic surveys are conducted prior to the DED activities (in blue);
- Utility pole realignment is completed before the main works contract starts;
- Land acquisition is completed before the main works contract starts;
- Environmental permits are obtained prior to Day 1 of construction;
- Works areas are maintained 24/7 from Day 1 of construction; and
- Day & night work will be conducted with two shifts per day.

Based on this timeline, the pre-construction activities will take one year from July 2019 to June 2020, when construction for the EDSA Greenways could conceivably start (except Common Station). Thus, overall implementation timeline per station varies from 28-33 months as presented **Figure 3.25**. The construction of EDSA Greenway Project at Common Station is assumed to start in January 2023 after completion of Common Station and other surrounding works. This schedule is a

preliminary one developed based on the best available information at the time and includes the following assumptions, which may be subject to revision during the Detailed Engineering Design (DED) phase:

- Lane closures of up to one lane in each direction;
- 24 hour, seven-day per week work schedule;
- Early NEDA approval and DED;
- No assumed land issues (as parcellary survey had yet to be finalized);
- No major underground / above ground utilities diversion before foundation construction; and
- Tree removal and compensation approval before construction contract award.

Key dates from this schedule are as follows:

- D&B contract Preparation and Assessment– August 2020
- Completion of Balintawak/Guadalupe – end of June 2022
- Partial operation for Taft and Cubao – end of May 2022.
- Completion of Cubao/Taft – end of 2022.

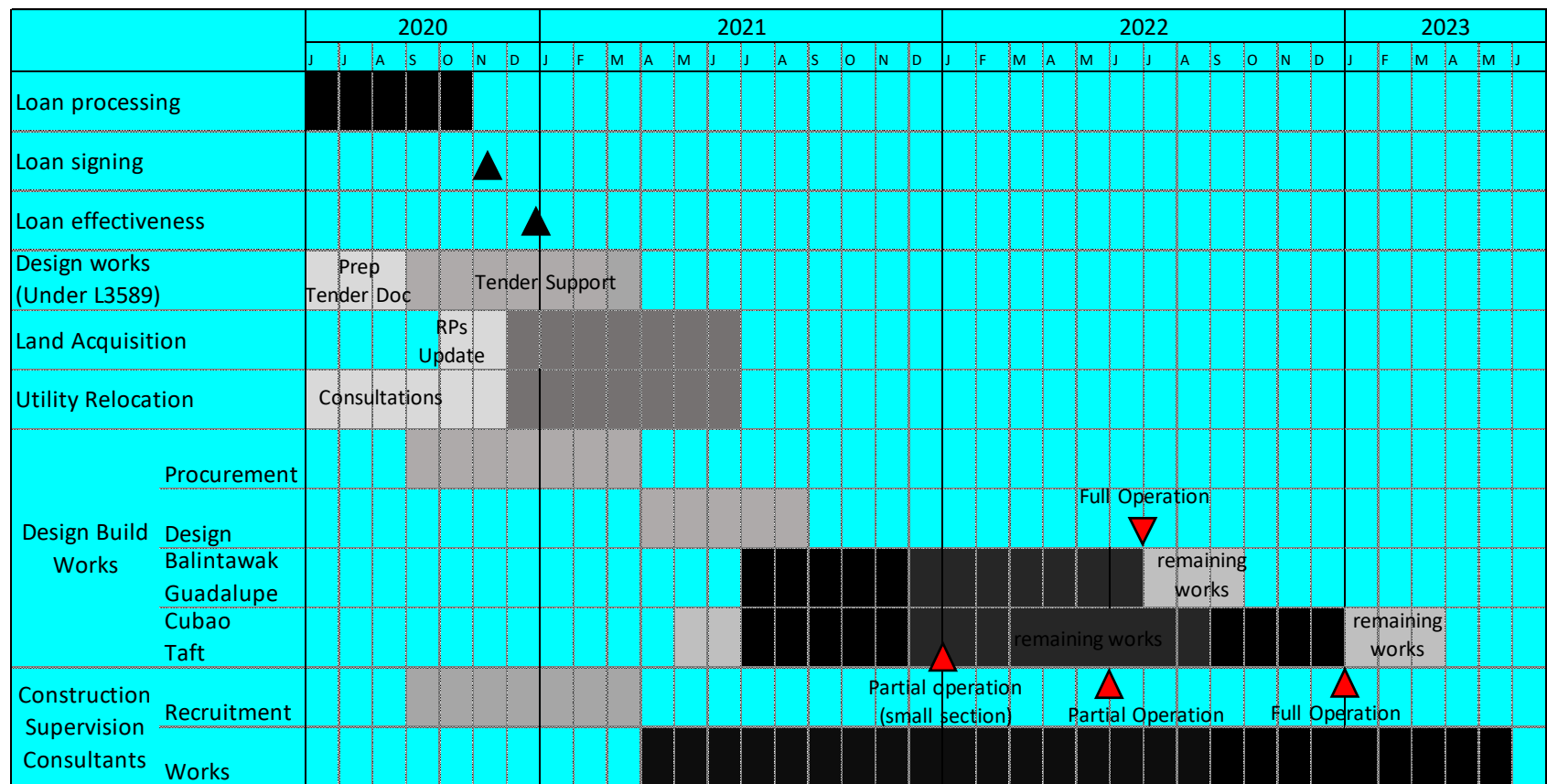


Figure 3.25 Overall Implementation Timeline for EDSA Greenways (Prior to and Including Construction Timeline)

3.4.2 Overall Costs – Footbridge

Capital Cost

Preliminary capital costs have been estimated based on the concept designs for the six stations. Given that the design is only at the concept stage and background information and site-specific data is not available (i.e., topographic and ground conditions, etc.), the estimate has been made based on various assumptions presented above for contingency and preliminaries. As more details and information are gathered in the detailed design stage, more precision in the unit costs and assumptions can be made for the cost estimate.

The capital costs for the six stations consist of the following elements:

- Material and Labor (this includes the construction materials and workforce costs to build the footbridge)
- Land Acquisition and Resettlement (see individual station sections for the land acquisition amount and expected resettlement costs);
- Preliminaries (assumed to be 20% of the material and labor costs; this include setup, plant, accommodation, temporary services, insurance, etc.);
- Contingency (assumed to be 20% of the material and labor cost)
- Contractor's Mark-up (assumed to be 20% of the material and labor cost)
- Value Added Tax (assumed to be 12% and applies to all cost components except for land acquisition and resettlement)
- Consulting and Management Fee (assumed to be 15% and applies to material and labor costs)

Table 3.12 presents the total capital costs (including all components above) for the six stations. Overall, the total cost for the package of five stations for the NEDA submittal (Balintawak, Common, Cubao, Guadalupe, and Taft) is PhP13.6 billion in 2019 prices (or PhP13.4 billion without land acquisition and resettlement costs). Of this, material and labor make up about 43% and shown in **Figure 3.26**. For reference, the costs for the four-station package (excluding Common Station) is shown in **Table 3.13**.

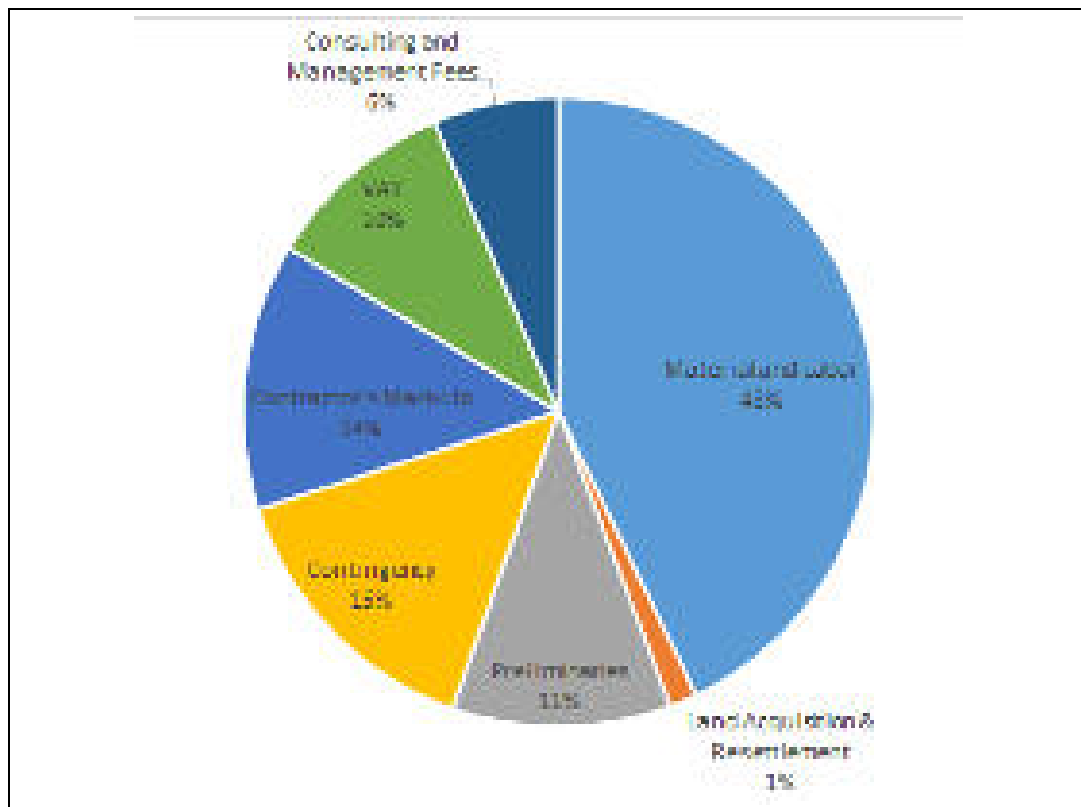


Figure 3.26 Footbridge Enhancements – Breakdown of Capital Costs by Component for Five-Station NEDA Package (2019 Prices)

Table 3.12 Footbridge Enhancements - Capital Costs by Station (2019 Prices)

Stations	Material and Labor	Land Acquisition & Resettlement	Preliminaries (20%-40%)	Contingency (20%-40%)	Contractor's mark-up (20%)	12% Value Added Tax	Consulting and Management Fees (15%)	Total Cost without Land Acquisition (i.e., Construction Related Costs)	Total Cost with Land Acquisition
	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions
	A	B	C = A x 20%	D = (A+C) x 20%	E = (A+C+D) x 20%	F = (A+C+D+E) x 12%	G = A x 15%	H = A+C+D+E+F+G	I = B+H
Included in NEDA Five-Station Package									
Balintawak	1,311.3	19.4	262.3	314.7	377.7	271.9	196.7	2,734.6	2,754.0
Common Station - Short-Term (Roosevelt Footbridge) ^A	1,113.4	18.4	445.4	623.5	436.5	314.2	167.0	3,100.0	3,118.4
Common Station - Long-Term (East and West Footbridge) ^A	698.5	41.2	279.4	391.2	273.8	197.1	104.8	1,944.8	1,986.0
Common Station (Combined) ^A	1,811.9	59.6	724.8	1,014.7	710.3	511.4	271.8	5,044.8	5,104.4
Cubao	1,188.6	27.9	237.7	285.3	342.3	246.5	178.3	2,478.6	2,506.5
Guadalupe	613.7	66.7	122.7	147.3	176.7	127.3	92.1	1,279.8	1,346.5
Taft	904.4	19.7	180.9	217.1	260.5	187.5	135.7	1,886.0	1,905.7
Total	5,829.9	193.3	1,528.4	1,979.0	1,867.4	1,344.6	874.5	13,423.7	13,617.1
Other Stations (Not Included in NEDA Five-Station Package – For Reference Only)									
Monumento ^B	1,217.0	7.0	243.4	292.1	350.5	252.4	182.5	2,537.9	2,544.8
Total	1,217.0	7.0	243.4	292.1	350.5	252.4	182.5	2,537.9	2,544.8
Overall Total for All Stations (For Reference Only)									
Total	7,046.9	200.3	1,771.8	2,271.1	2,217.9	1,596.9	1,057.0	15,961.6	16,161.9

Note:

^A Common Station has higher utility diversion/relocation unit costs, as well as higher assumed preliminaries and contingencies than the other stations due to uncertainties of potential concurrent construction with interfacing projects (and/or modified baseline conditions after completion of these interfacing projects).

^B Monumento land acquisition and resettlement costs exclude some 3,250 m² of potential land area as designation (public or private) is not known at this time. As this station is not part of the five-station package for NEDA, this issue can be resolved if this concept is pursued at another time. Total land acquisition cost with these additional areas (if all assumed to be private land) is estimated at 3,700 m² or a total of PhP57.2 million (compared to the PhP7.0 million listed in the table above).

Table 3.13 Footbridge Enhancements – Capital Costs by Four Station (2019 Prices)

Stations	Material and Labor	Land Acquisition & Resettlement ^A	Preliminaries (20%)	Contingency (20%)	Contractor's mark-up (20%)	12% Value Added Tax	Consulting and Management Fees (15%)	Total Cost without Land Acquisition (i.e., Construction Related Costs)	Total Cost with Land Acquisition
	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions	PhP Millions
	A	B	C = A x 20%	D = (A+C) x 20%	E = (A+C+D) x 20%	F = (A+C+D+E) x 12%	G = A x 15%	H = A+C+D+E+F+G	I = B+H
Included in NEDA Four-Station Package									
Balintawak	1,311.3	19.4	262.3	314.7	377.7	271.9	196.7	2,734.6	2,754.0
Cubao	1,188.6	27.9	237.7	285.3	342.3	246.5	178.3	2,478.6	2,506.5
Guadalupe	613.7	66.7	122.7	147.3	176.7	127.3	92.1	1,279.8	1,346.5
Taft	904.4	19.7	180.9	217.1	260.5	187.5	135.7	1,886.0	1,905.7
Total	4,018.0	133.7	803.6	964.3	1,157.2	833.2	602.7	8,378.9	8,512.6

For all six stations, total station costs range from PhP1.4 billion for Guadalupe improvements to PhP5.0 billion for Common Station improvements (including both short- and long-term proposals). The **Figure 3.27** shows the breakdown of costs by component for each station.

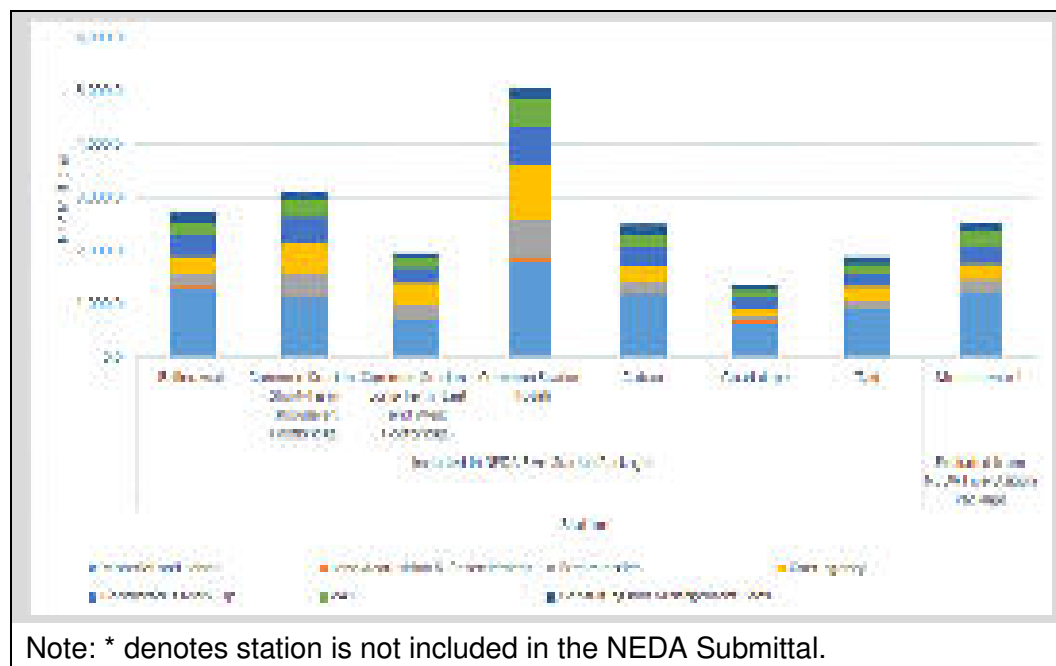


Figure 3.27 Footbridge Enhancements - Capital Cost by Component by Station (2019 Prices)

In terms of composition of cost components, material and labor comprise most of the costs at just less than half the total capital costs for each station as shown in **Figure 3.28**. While other cost components (such as VAT, construction management, etc.) are set percentages of the total construction cost, land acquisition and resettlement costs differ by station.

For the five-station NEDA package, Guadalupe appears to have the most substantial land acquisition costs required (in terms of percent of total cost) – about 5% of the total. As noted, contingency and preliminaries proportion for Common Station is relatively high compared to other stations (due to related uncertainties with potential concurrent construction with interfacing projects and/or modified baseline conditions after completion of interfacing projects prior to the greenways).

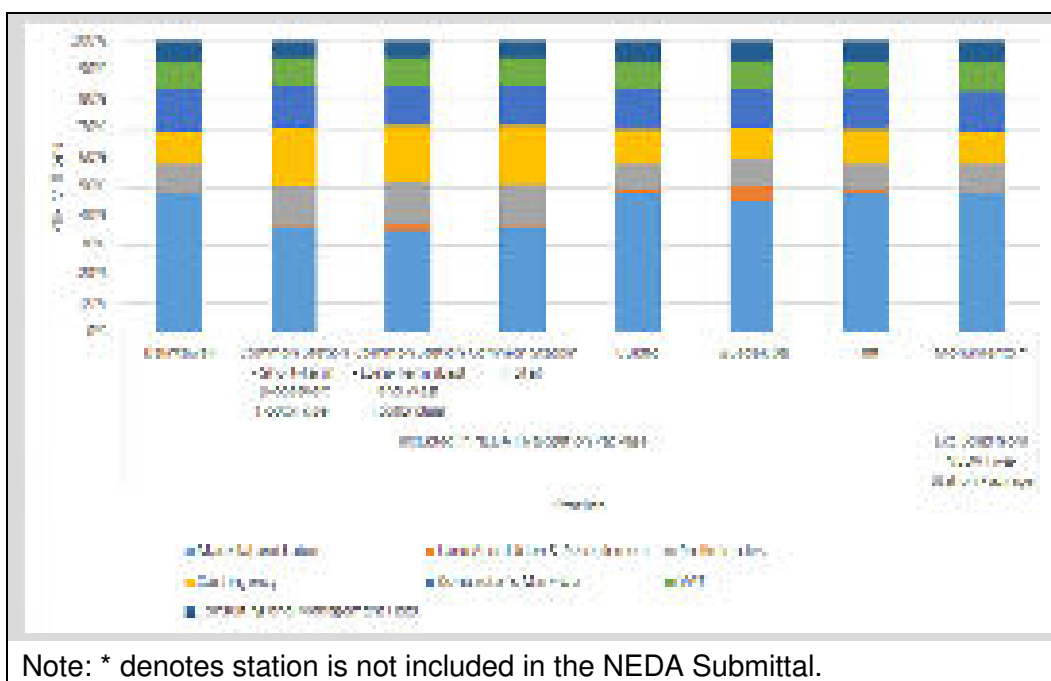


Figure 3.28 Footbridge Enhancements - % of Capital Cost by Component (2019 Prices)

Table 3.14 shows the capital costs per length and per area by station. Common Station Long-Term has the highest unit costs at PhP2.82 million per m, while Common Station Short-Term has the highest unit costs at PhP0.49 million per m². Balintawak Station has the lowest unit costs at PhP1.56 million per m and PhP0.35 million per m².

Table 3.14 Footbridge Enhancements – Capital Costs per Length/Area by Station (2019 Prices)

Station		New/Enhanced Footbridge Length	New/ Enhanced Footbridge Area	Capital Cost	
				Per Length	Per Area
	Unit:	m	m ²	PhP Million	PhP Million
Included in NEDA Five-Station Package					
Balintawak		1,760	7,923	1.56	0.35
Common Station - Short-Term (Roosevelt Footbridge)		1,115	5,575	2.80	0.56
Common Station - Long-Term (East and West Footbridge)		705	4,065	2.82	0.49
Common Station (Combined)		1,820	9,640	2.80	0.53
Cubao		1,445	6,857	1.73	0.37

Station	Unit:	New/Enhanced Footbridge Length	New/ Enhanced Footbridge Area	Capital Cost	
				Per Length	Per Area
				PhP Million	PhP Million
Guadalupe		790	3,703	1.70	0.36
Taft		975	5,785	1.95	0.33
Total		6,790	33,907	2.01	0.40
<u>Other Stations (Not Included in NEDA Five-Station Package – For Reference Only)</u>					
Monumento		1,410	7,050	1.80	0.36
Total		1,410	7,050	1.80	0.36
<u>Overall Total for All Stations (For Reference Only)</u>					
Total		8,200	40,957	1.97	0.39

O&M Costs

O&M costs include the following items:

- General Cleaning (including cleaning of decks, drain cleaning, etc.)
- Lift Checking and Maintenance
- Painting
- Drainage Repair and Replacement
- Wear and Tear (i.e., replacement of tiles, cladding, railing, lighting, etc.)
- Electricity Bill for Operations (including CCTV, lighting, lift, etc.)
- Bearing and Movement Joint Replacement
- Kiosk Maintenance
- Advertising Panel Replacement
- Administrative and corresponding Labour Costs
- Footpath Maintenance

Assumed workers and frequency for each activity are indicated in the tables below. As noted, VAT of 12% applies to non-labor elements of the O&M costs (assumed to be 40% for all activities, except for lift checking and maintenance – assumed to be 50%). Overall O&M costs for the entire 30-year lifespan of the footbridges for the five stations included in the NEDA package is PhP352.6 million as shown **Table 3.15** – on an annualized basis this averages about PhP11.8 million for these five stations combined.

Table 3.15 Footbridge Enhancements - O&M Costs by Station (2019 Prices)

Station s		O&M Cost (without VAT) over Lifespan	12% VAT (on Non- Labor Portion)	Total O&M Cost over 30-year lifespan	Life Span (Years)	Annual O&M Cost (PhP Million)
	Unit:	PhP millions	PhP millions	PhP millions	Years	PhP millions
	Calculation:	A	$B = A \times 12\%$	$C = A + B$	D	$E = C / D$
<u>Included in NEDA Five-Station Package</u>						
Balintawak		68.0	5.2	73.2	30	2.4
Common Station - Short-Term (Roosevelt Footbridge)		35.6	2.7	38.2	30	1.3
Common Station - Long-Term (East and West Footbridge)		50.1	3.8	54.0	30	1.8
Common Station (Combined)		85.7	6.5	92.2	30	3.1
Cubao		91.7	6.5	98.1	30	3.3
Guadalupe		40.4	3.0	43.4	30	1.4
Taft		42.5	3.1	45.7	30	1.5
Total		328.3	24.3	352.6	30	11.8
<u>Other Stations (Not Included in NEDA Five-Station Package – For Reference Only)</u>						
Monumento		61.0	4.7	65.7	30	2.2
Total		61.0	4.7	65.7	30	2.2
<u>Overall Total for All Stations (For Reference Only)</u>						
Total:		389.3	29.0	418.3	30	13.9

Figure 3.29 shows the costs graphically by station. Cubao has the highest overall O&M costs at PhP98.1 million over the 30-year period (thus averaging about PhP3.3 million per year), which has the most extensive footbridge system planned. Guadalupe has the lowest overall O&M cost at about PhP43.4 million over the 30-year lifespan (or about PhP1.4 million per year) – this is due to the shorter footbridge network proposed.

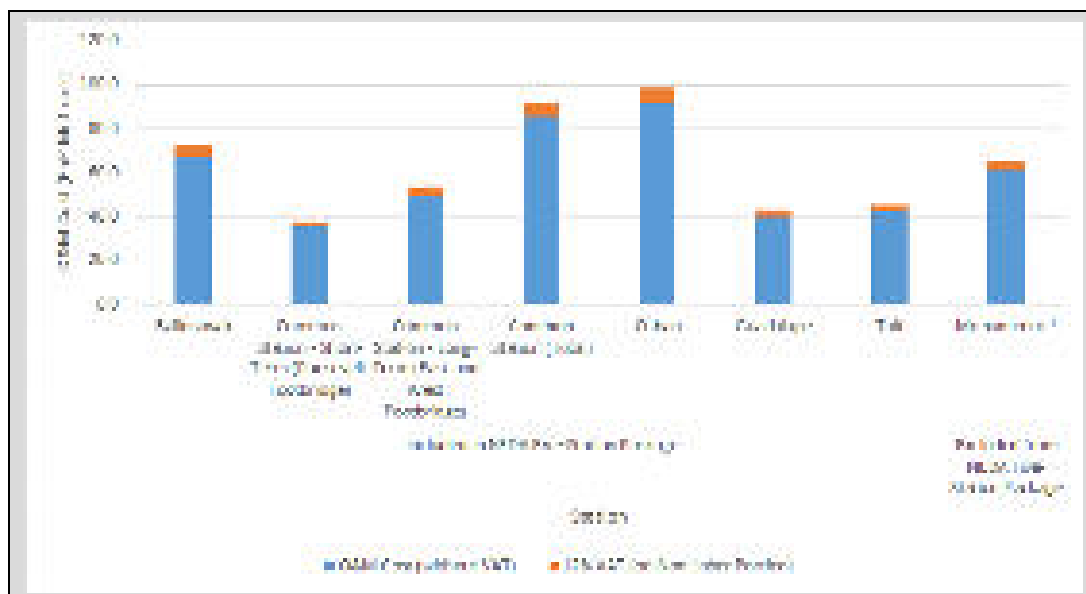


Figure 3.29 Footbridge Enhancements - O&M Costs by Component (2019 Prices)

Table 3.16 shows the O&M costs per length and per area by station. Common Station Long-Term has the highest unit cost at PhP0.077 million per m and PhP0.013 million per m². Common Station Short-Term (Roosevelt Footbridge) has the lowest unit costs a PhP0.034 million per m and PhP0.007 million per m².

Table 3.16 Footbridge Enhancements – O&M Costs per Length/Area by Station (2019 Prices)

Station		New/Enhanced Footbridge Length	New/ Enhanced Footbridge Area	Total O&M Cost	
				Per Length	Per Area
	Unit:	m	m ²	PhP Million	PhP Million
<u>Included in NEDA Five-Station Package</u>					
Balintawak		1,760	7,923	0.042	0.009
Common Station - Short-Term (Roosevelt Footbridge)		1,115	5,575	0.034	0.007
Common Station - Long-Term (East and West Footbridge)		705	4,065	0.077	0.013
Common Station (Combined)		1,820	9,640	0.051	0.010
Cubao		1,445	6,857	0.068	0.014
Guadalupe		790	3,703	0.055	0.012
Taft		975	5,785	0.047	0.008
Total		6,790	33,907	0.052	0.010

Station		New/Enhanced Footbridge Length	New/ Enhanced Footbridge Area	Total O&M Cost	
				Per Length	Per Area
	Unit:	m	m ²	PhP Million	PhP Million
<u>Other Stations (Not Included in NEDA Five-Station Package – For Reference Only)</u>					
	Monumento	1,410	7,050	0.047	0.009
	Total	1,410	7,050	0.047	0.009
<u>Overall Total for All Stations (For Reference Only)</u>					
	Total	8,200	40,957	0.051	0.010

4 Description of Baseline Information

4.1 Project Boundary

The Project is located at the long stretch of EDSA, National Capital Region (NCR), Philippines. The project is comprised of five stations at the cities of Quezon and portion of Malabon, Makati and portion of Mandaluyong, and Pasay.

Table 4.1 Project Boundary and Coverage Landing Schemes

Stations	Territorial Jurisdiction	Description
1. Balintawak	Quezon City and South Caloocan	Balintawak Station is within the territorial jurisdiction of Quezon City covering 3 barangays (Unang Sigaw, Apolonio Samson, and Balingasa). The landing schemes of the project covers several barangays in South Caloocan City such as Barangays 139 and 95.
2. Common Station	Quezon City	Common Station is within the jurisdiction of Quezon City. This station is situated at the intersection of EDSA, North Avenue, and West Avenue. This will cover Barangays Bagong Pag-Asa, Project 6, Veterans Village and Phil-Am.
3. Cubao	Quezon City	Cubao Station is also within the jurisdiction of Quezon City. This station is situated at the intersection of EDSA and Aurora Blvd. The barangays within the landing schemes are Immaculate Concepcion, Eugelio Rodriguez, San Martin De Porres and Socorro.
4. Guadalupe	Makati and Mandaluyong	Guadalupe Station is within the jurisdiction of Makati City covering Barangays Guadalupe Viejo and Guadalupe Nuevo and near Barangay Cembo. The study area of the project covers portion of Mandaluyong City in Barangay Ilaya and Buayang Bato.
5. Taft	Pasay	Taft Station is situated within the territorial jurisdiction of Pasay City and the landing schemes extends to Barangays 83, 97, 98, 118, 119, 70, 146, 148, 150 and 151.

4.2 Physical Environment

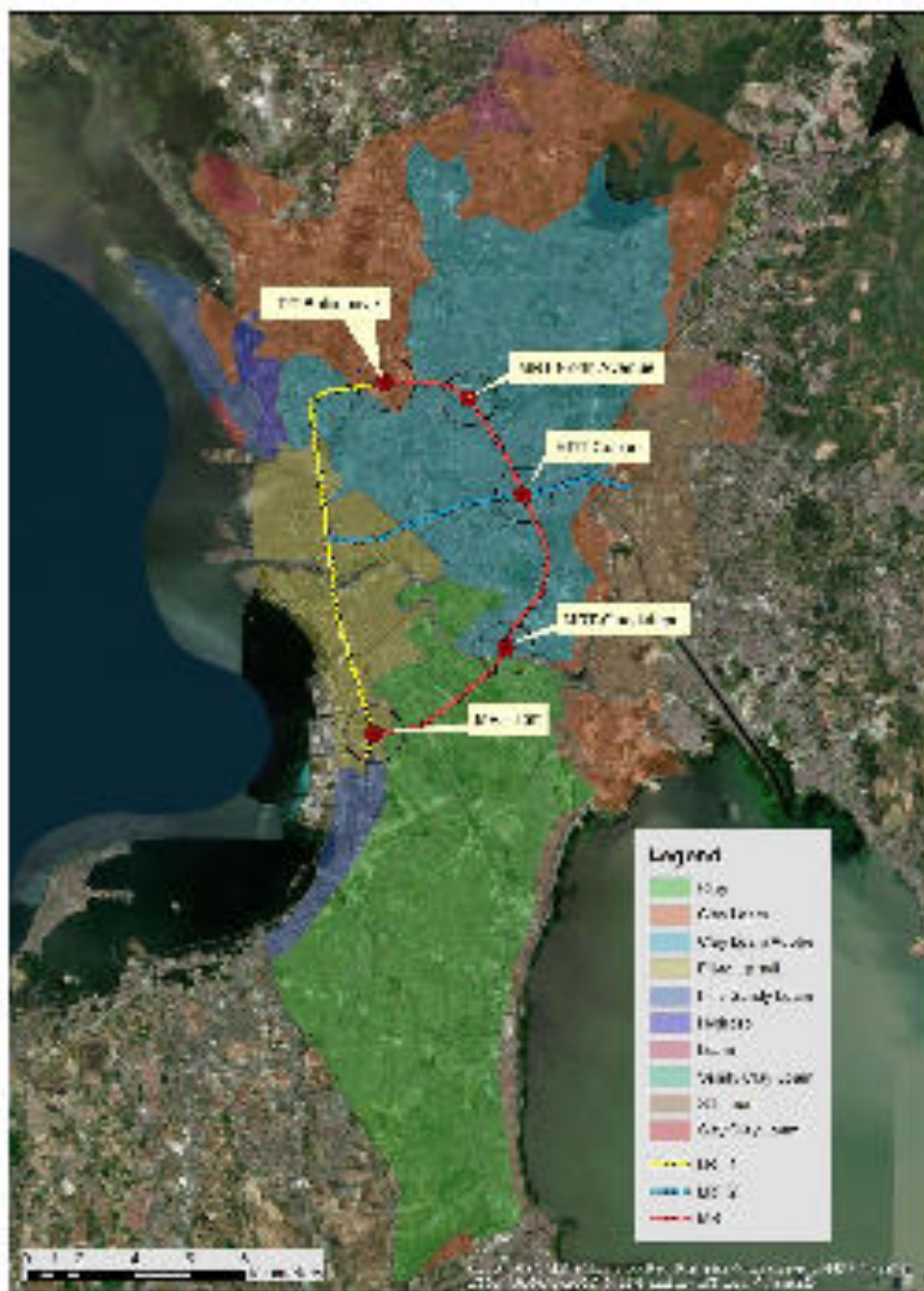
4.2.1 Soil Characteristics

Soil in Caloocan City fall under the Novaliches series. Based on the regional soil classification map (**Figure 4.1**), the Project Area is situated in area with Novaliches Clay Loam Adobe. It is characterised by friable soils in the surface, while shallow places have compact volcanic tuff/adobe rock on its stratum.

The soil type in stations situated in Quezon City, namely Common Station and Cubao Station, is also characterised by Clay Loam Adobe, under Novaliches Loam Series. However, for Balintawak Station, soil type is mostly Clay Loam.

Soil in Guadalupe Station also falls under Clay Loam Adobe. By extending the landing schemes, soil in Makati area is characterised by Clay soil.

Majority of Pasay City, including the Project is consisted of formal tidal flats. This land and soil characteristic has low to moderate permeability and a soil texture of clay to filled-up soil. It contains with more clay than silt and the permeability is said to be low with high swelling capacity.



Source: Arup Envi Mnl; Bureau of Soils and Water Management. Soil Classification dataset.

Note: Circle represents the 1.0 km radius of the Project Sites.

Figure 4.1 Soil Classification Map of Metro Manila

4.2.2 Geomorphology

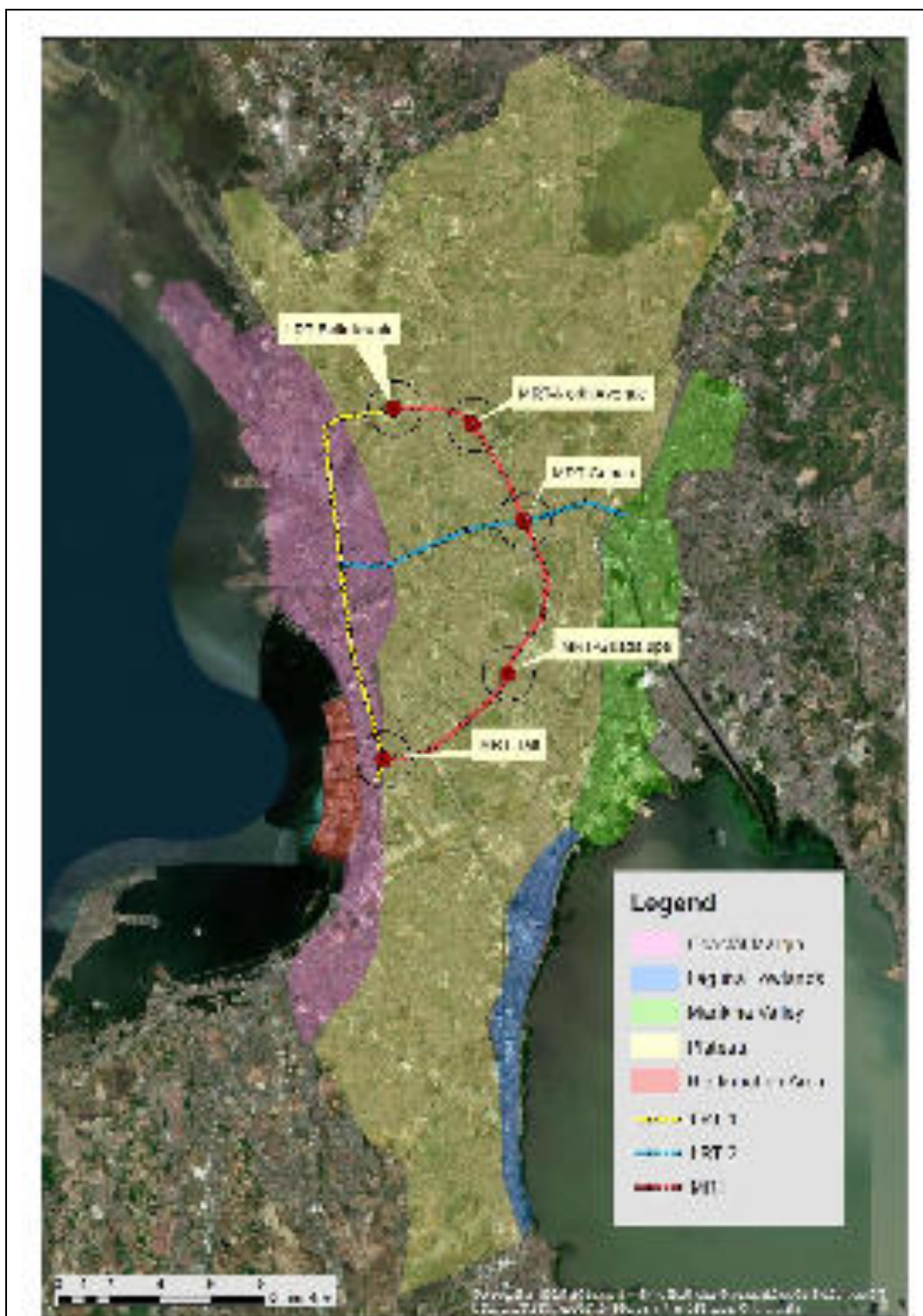
The geological feature of Metro Manila is subdivided into four (4) zones i.e. (1) the Coastal Margin which includes the reclaimed land in Manila Bay - a possible resource for fisheries and development (2) the Guadalupe Plateau - has a solid geographical foundation suitable for urban development activities, (3) the Marikina

Valley - suitable for crop cultivation and (4) the Laguna Lowlands - suitable for agricultural, aquaculture and industrial activity (*DENR-NCR, 2019*).

Based on the DENR-NCR website, areas within the Coastal Margins and Laguna Lowlands are flood-prone areas. These areas are the cities of Manila, Navotas, Malabon and parts of Caloocan. Several reasons for flooding are land subsidence and rising sea levels specifically in Navotas and Malabon City.

For the Project, stations within the jurisdiction of Quezon City (namely Common, Cubao and Balintawak stations) and Makati (Guadalupe Station) are within the classified Central Plateau. The ground elevation of Central Plateau ranges from 20m to 40m, gradually decreasing at the west side and narrowing along the Pasig River. The northwest area ranges from 70m to over 100 (*JICA Report, 2018*). The stations in Quezon City have a predominantly flat terrain ranging from 0-3% while Guadalupe station, which is within a generally flat area, has similar slope level of 0-3%.

Taft Station is within the jurisdiction of Pasay City, respectively. The city is within the Coastal Lowland, which is a flat and low plain that faces the Manila Bay. It has a nearly level slope. The adjacent city of Taft station is Parañaque City which is within the identified flat area.



Source: Arup Env Mnl; Retrieved from <https://ncr.denr.gov.ph/index.php/about-us/regional-profile>. National Capital Region, Retrieved on March 2019

Note: Circle represents the 1.0 km radius of the Project Sites.

Figure 4.2 Geological Characteristics Metro Manila

4.2.3 Geology and Geohazards

Geology

Based on JICA report (2018), Metro Manila in general is underlain by the following lithologic types:

- Quaternary alluvium deposits – composed of unconsolidated stream-deposited sediments that includes sand, silt, and clay.
- Pyroclastic flow deposits or ignimbrites – formed by the lithification of ash flow.
- Tuff and tuffaceous deposits – tuff rocks are comprised of pyroclastic materials that have been ejected from volcano and composed mainly of fragments that is less than 4 mm in diameter; while tuffaceous sediments are considered mass of organic or inorganic solid fragmented material that contain 50% tuff.

Geohazards

The nearest fault line in Metro Manila is the West Valley Fault (**Figure 4.3**). It runs directly throughout the province, which may cause significant damage. This fault line is estimated to move every 400-600 years. The last time the fault moved was in 1658 (*Whymark, 2015*). Among the five (5) stations, Cubao and Guadalupe stations are nearest to the fault line with an approximate distance of 2.7-km and 2.3-km. Though relatively close to the fault line, these stations are situated on an adobe bedrock covered by a thin layer of soil and is classified as within a low risk area which is least likely to be affected by high intensity earthquakes. Other stations are more than 5-km away from the fault line.

Manila and Pasay City, however, where the Taft station is located will experience a more destructive shaking because its foundation are thick sediments that amplify ground shaking,' according to PHIVOLCS Director Renato Solidum.

Based on the published article (Natural and Anthropogenic Hazards in Metro Manila (2015)), liquefaction is more common in areas on soft muddy un-compacted sediments. These can be reclaimed areas near the river mouth. Taft Station and its 1 km radius is within an identified high liquefaction potential area.

Stations in Quezon City (i.e. Cubao, Common Station and Balintawak Station) and Makati-Mandaluyong (i.e. Guadalupe Station) are not within the classified liquefaction hazard zone (**Figure 4.5**).

Tsunami hazard are areas near the coastline. According to the article Natural and Anthropogenic Hazards in Metro Manila (2015), should the Manila Trench move, Metro Manila will most likely experience a tsunami as high as 5.5 m. Among the five stations, Taft Station is the only station prone to this hazard and within the highly prone classification (

Source: Arup Envi Mnl; PHIVOLCS. Tsunami Hazard Map dataset.

Figure 4.6).

Based on the Flood Hazard Map shown in **Figure 4.7**, almost all stations are situated in flood prone areas for 2-to-10-year flood cycle, except for Taft Station which is prone to flood by 50-to-100-year flood cycle. On the other hand, Balintawak Station is not susceptible to flooding.

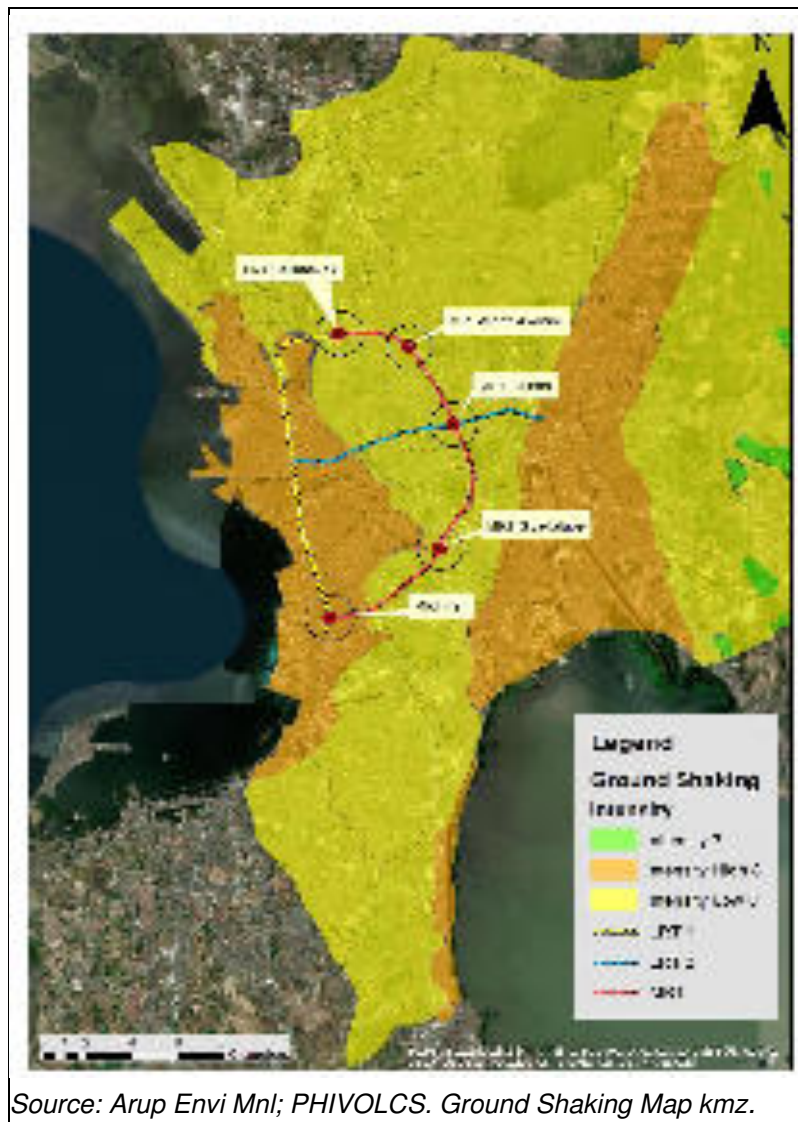


Figure 4.4 Ground Shaking Hazard Map Magnitude 7.2 Earthquake Along West Valley Fault

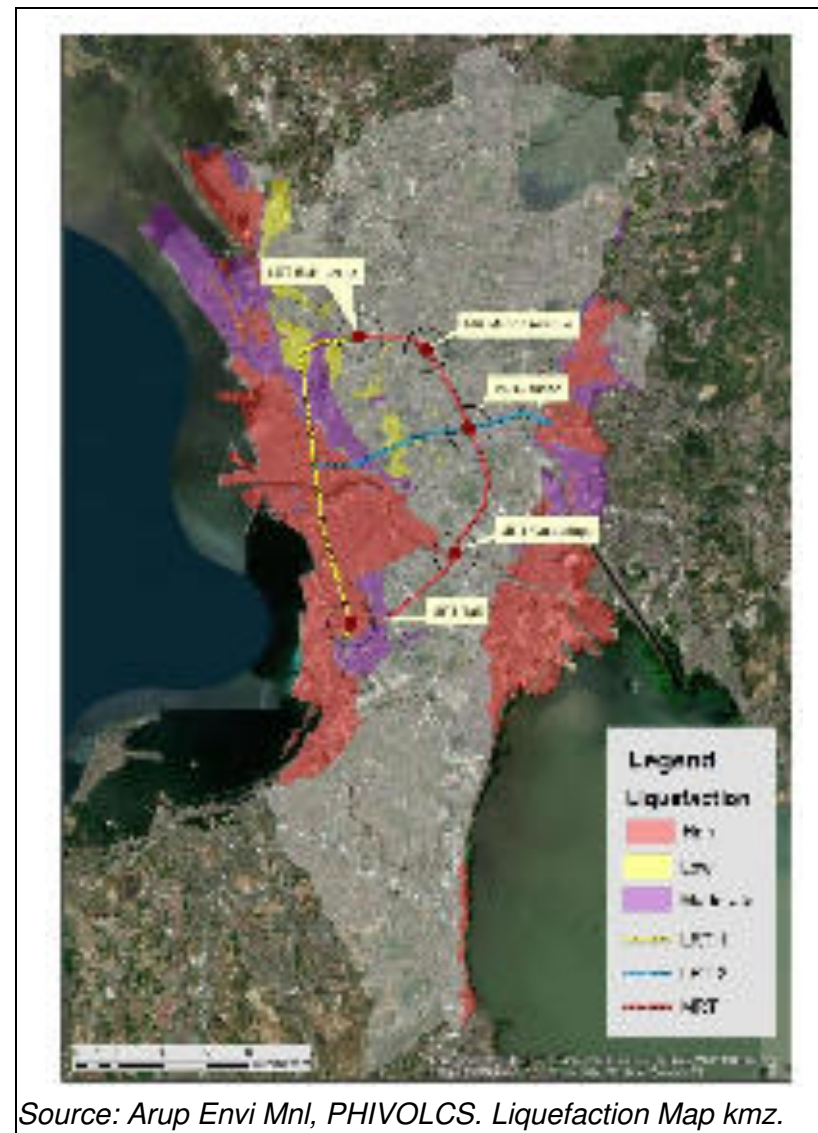
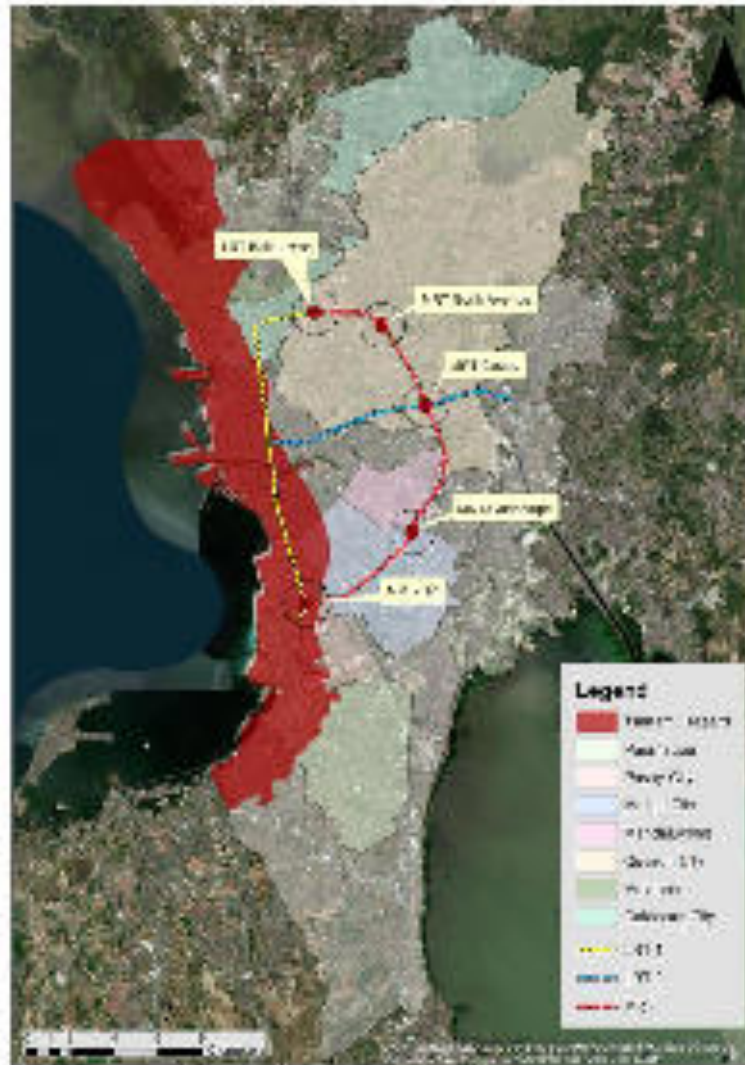
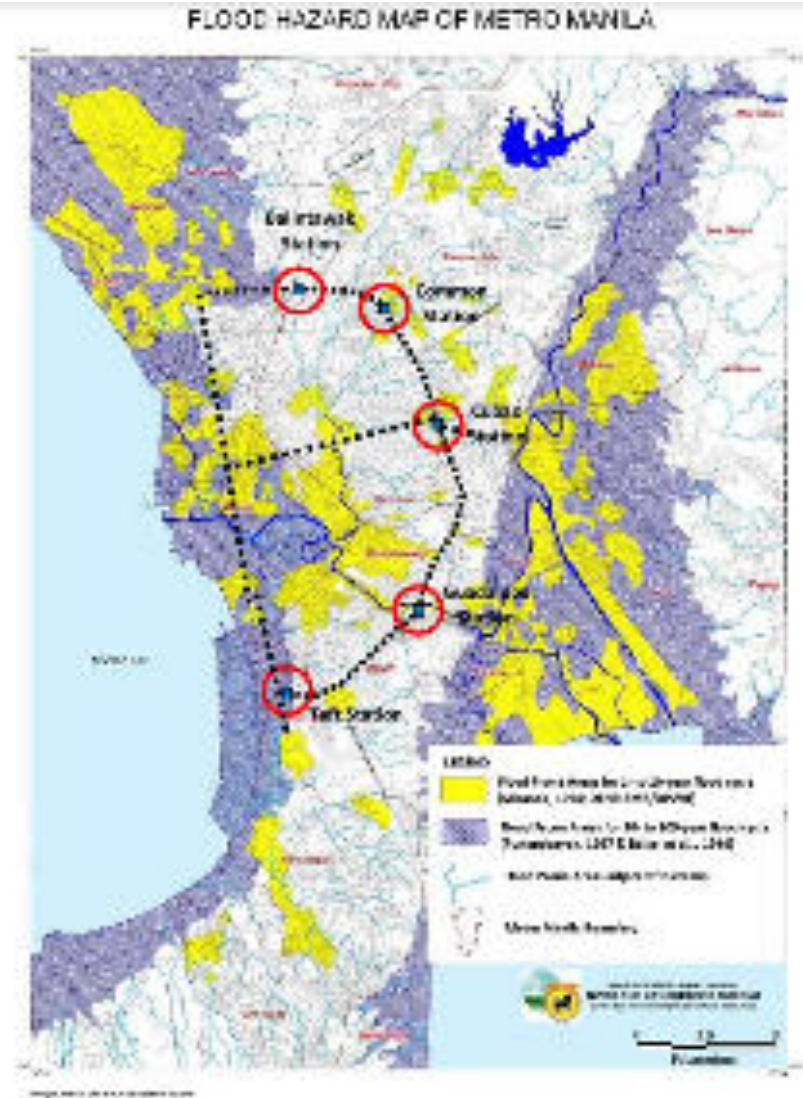


Figure 4.5 Liquefaction Potential Map



Source: Arup Envi Mnl; **PHIVOLCS**. Tsunami Hazard Map dataset.

Figure 4.6 Tsunami Hazard Map



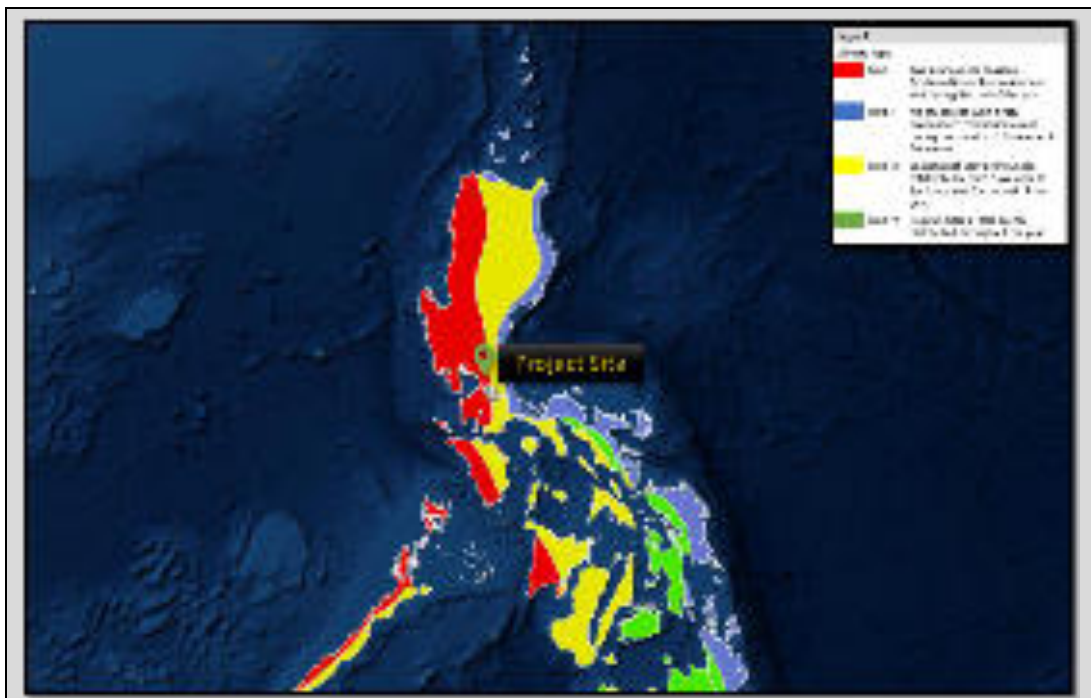
Source: Mines and Geosciences Bureau (2009). Flood Hazard Map

Figure 4.7 Flood Hazard Map

4.2.4 Climate and Meteorology

Precipitation and Temperature

NCR or Metro Manila is under a Type I Climate, based on the PAGASA Modified Corona System of Climate Classification. This climate type is characterised by two pronounced seasons: the dry season occurs from November to April, while the wet season occurs during the rest of the year (**Figure 4.8**). The period of maximum rain occurs during the peak of the southwest monsoon from July to September (*PAGASA, 2015*).



Source: Philippine Geoportal ArcGIS Online- Aerial, PAGASA Modified Corona System of Climate Classification.

Figure 4.8 Climate Map

The meteorological conditions in the Project Site were characterized using data from PAGASA weather stations at Manila Port Area, Ninoy Aquino International Airport (NAIA) in Pasay City, and in Science Garden in Quezon City. From the 30-year average recorded rainfall, the highest precipitation typically occurs from June to September, while the lowest from January to April. These values are consistent with the description of a Type 1 climate category. The annual average precipitation in these areas ranges from 1,767.8 to 2,574.4 mm (**Table 4.2**).

Table 4.2 Climatological Normals at Manila and Pasay City, and Quezon City (1981-2010)

Month	Average Annual Precipitation (mm)		
	Science Garden, Quezon City	Port Area, Manila	NAIA, Pasay City
January	18.5	17.3	6.8
February	14.6	14.2	4.2
March	24.8	15.8	4
April	40.4	23.7	19
May	186.7	147.2	70.4
June	316.5	253.5	265.2
July	493.3	420.5	316.7
August	504.2	432.4	418.4
September	451.2	355.1	255.2
October	296.6	234.8	283.4
November	148.8	121.7	99
December	78.7	67.4	28.6
Annual	2,574.4	2,103.6	1,767.8
<i>Source: PAGASA, 2018</i>			

The annual average temperature from the PAGASA Weather Station ranges from 23.1°C to 32.2°C (**Figure 4.9**). According to PAGASA Climatological Extremes of Quezon City (2017), the highest temperature recorded was 38.5°C, which occurred on 14 May 1987. While the lowest recorded temperature was 14.9°C on 1 March 1963.

A similar trend was observed at the NAIA Station (**Figure 4.10**) with an annual average temperature ranging from 24°C to 31.6 °C. Based on the PAGASA Climatological Extremes of Pasay City, the highest recorded temperature was 38.2°C, which occurred on 18 May 1969. While the lowest recorded temperature was 14.6°C on 1 February 1962.

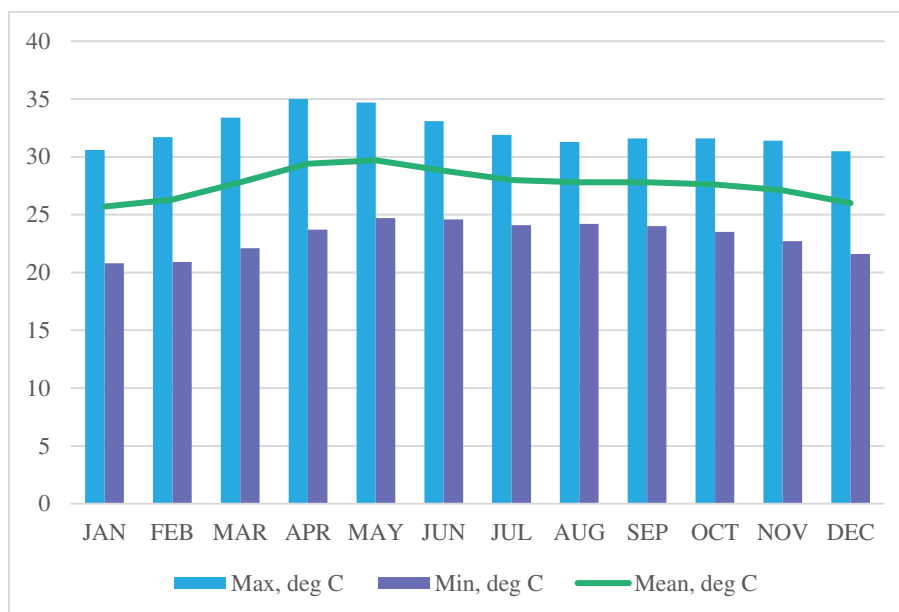


Figure 4.9 Monthly Temperature from the PAGASA Weather Station Climatological Normals in Science Garden from 1981 to 2010

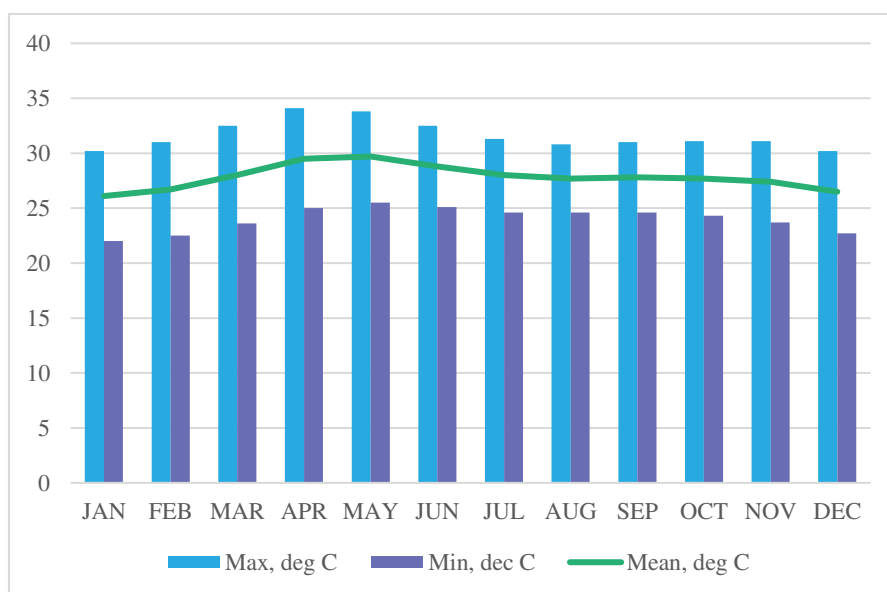


Figure 4.10 Monthly Temperature from the PAGASA Weather Station Climatological Normals in NAIA Station from 1981 to 2010

The relative humidity describes moisture exchange processes of a material or people with their surroundings. It is the most important quantity for specifying a pleasant ambient climate and thus for well-being. Climatological records at the nearest PAGASA weather station in Quezon City shows that average annual mean temperature and dew point are 27.7°C and 23°C, respectively, translating to an annual average relative humidity of 78%. August and September are the most humid months of the year, with 84%, while the month of April is the least humid, with 67% (**Figure 4.11**).

For NAIA Station in Pasay City, average annual mean temperature and dew point are 27.8°C and 23°C, respectively. The annual relative humidity is 76% (**Figure 4.12**).

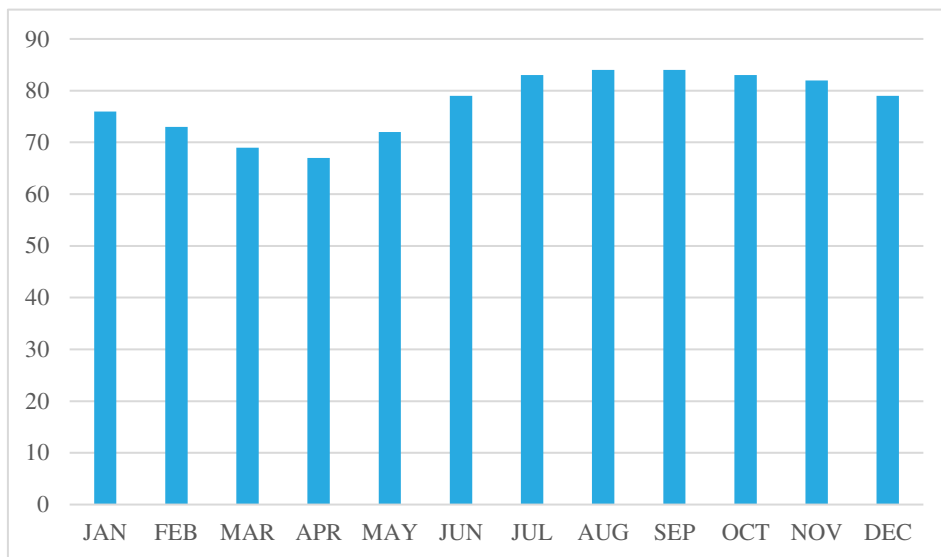


Figure 4.11 Monthly Relative Humidity from the PAGASA Weather Station in Science Garden from 1981 to 2010.

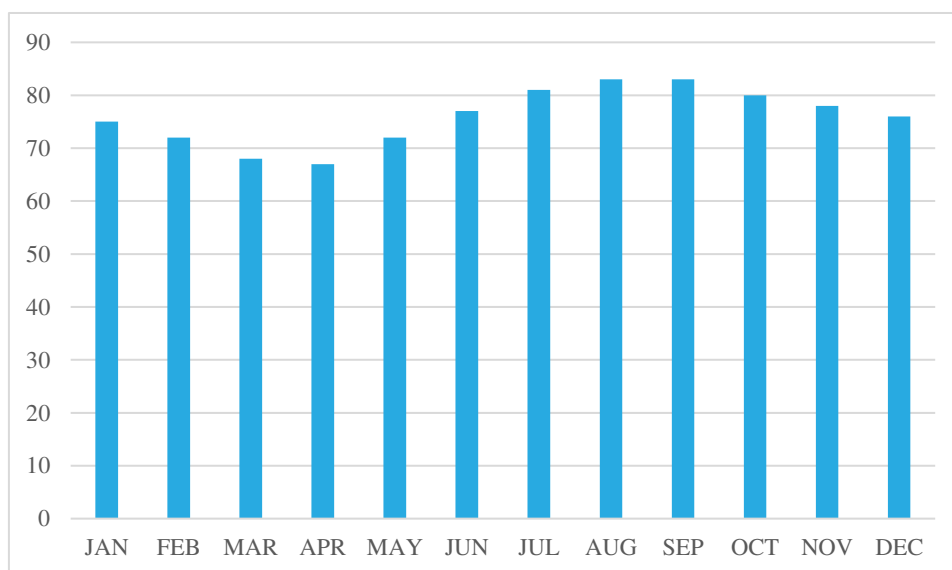


Figure 4.12 Monthly Relative Humidity from the PAGASA Weather Station in Science Garden from 1981 to 2010.

Long-term climatological normals indicate that the average wind speed ranges from 1 m/s to 2 m/s. These wind speed averages are described as light air to light breeze based on the Beaufort Wind Force Scale.

South-westerly winds dominate the region during the months of June to September and shifts to the northerly direction in October to January. The strongest wind recorded has a speed 50 m/s on 3 November 1995.

Climate Change

There are four major impacts associated with climate change, these are temperature *change*, rainfall change, sea level rise and the increase or frequency in extreme events (rainfall and temperature). Occurrence of impacts, felt and experienced in the city, would likely cause hazards, which are duly identified by Department of Science and Technology (DOST) PAGASA. Hazards in various climate change impacts are summarised during the workshop on Vulnerability and Adaptation Assessment in the Preparation for Local Climate Change Action Plan and Updating of Comprehensive Development Plan sponsored by the Department of the Interior and Local Government (DILG) and United Nations (UN) Habitat with the assistance of the DOST-PAGASA and other national agencies.

The Project has low susceptibility to extreme weather-related events such as floods, droughts, storms and landslides since the site is located in an urban area with higher elevation as compared with the cities at its vicinity. Thus, facilities (i.e. elevators, canopy) and materials for construction should be maintained and be able to withstand heat and humidity over a long period of time that the Project will take place. The Preliminary Climate Risk Screening for the Project is in **Appendix A**.

4.2.5 Water Resource

Surface Water and Waterways

Figure 4.13 shows the river map for Metro Manila. The two major rivers nearest to the alignment are the San Juan River and Pasig River.

Caloocan City has a total of 68.9 km length of surface waters, either natural (e.g. creeks and rivers) or constructed to serve for drainages. In South Caloocan, about 5 km of open drains mainly serve the reclamation area (i.e. Kaunlaran Village/ Dagat-Dagatan Development Project), while nearly 11.3 km of natural surface waters courses through different river systems in the northern part of Metropolitan Manila (CPDD, 2016).



Note: Circle represents the 1.0 km radius of the Project Sites.

Figure 4.13 River Map of Metro Manila

Quezon City is drained by several natural waterways, from creeks to rivers. They form part of the river basins covering the city's landscape - the Tullahan-Tenejeros River Basin and San Juan-Pasig River Basin. Below is a list of catchment areas for five river systems in Quezon City:

- San Juan River, which collects surface run-off in 46% of the City's territory has the largest coverage. This includes the south-central area of the city.
- Tullahan River covers the next largest area at 34%, covering most of the north area of the city. This also is the outflow channel of La Mesa Reservoir. About 28 km of creeks act as tributaries to this 12km main waterway.
- Marikina River is third with 15% of the City's territory covered. This includes the east side area of the city. About 9 km of Marikina River serves as the City's natural boundary into which 25 km of creeks and canals directly flow.
- The northwest part of the city with an area about 3% of the City is part of the Meycauayan River basin.
- The southwest periphery of the City west of Mayon Street in La Loma flows down to the drainage network of the adjoining communities in Manila towards Pasig River.

The Pasig River divides the cities of Makati and Mandaluyong and also connects two large bodies of water in Metro Manila: Manila Bay (the country's main port of maritime trade and travel) and Laguna Lake (the largest fresh water lake in the country). San Juan River and Marikina River are the major tributaries of the Pasig River, located 9 km and 19 km upstream of Manila Bay, respectively. The River has a total of 47 tributaries and traverses the cities of Manila, Makati, Mandaluyong, Pasig, Taguig, and the municipality of Taytay in the Province of Rizal. It is approximately 27 km long, with an average width of 91.2m.

The deepest portions (4.5 m) are located between Guadalupe Bridge and C6 Bridge, while the shallowest portion is at the mouth of Manila Bay.

Pasay and Parañaque City are both bounded by Manila Bay in the west. The bay has a catchment area of about 17,000 km² that is made up of about eight river basins, nearest of which to the city is the Parañaque - Las Piñas river basin. This river basin is subsequently made up of three major rivers, the Parañaque, Las Piñas and Zapote Rivers. These river systems essentially serve about 15 km² the principal drainage channel of the area. The geomorphic setting of these low-lying areas and the hydraulic action of the Manila Bay basin and the South China Sea make the area vulnerable to flooding, a condition aggravated by the inadequate capacity and poor maintenance of the drainage facilities.

Water Quality

The Philippine Clean Water Act (CWA) of 2004 designated certain areas called Water Quality Management Areas (WQMA) using appropriate physiographic units such as watershed, river basins or water resources regions. These were identified to regularly monitor the water quality and address should there be any issues specific to the area.

Secondary data from the Environmental Management Bureau-National Capital Region (EMB-NCR) was gathered to present the existing water quality of water bodies nearest to the Project. The tests were conducted during the third quarter of 2018.

Table 4.3 to Table 4.6 presents the water quality results from Adopt a Estero Water Body and from WQMA of Quezon City, Caloocan City, Makati City, and Pasay City, respectively. The stations under Adopt an Estero Water Body are sampled

quarterly, while those from WQMA are monitored quarterly. The sampling stations are shown in **Figure 4.14**.

The tests done during third quarter of 2018, show exceedances under DAO 2016-08 Water Quality Guidelines and Effluent Standards for dissolved oxygen (DO), biological oxygen demand (BOD) and fecal coliform parameters. The low levels of DO indicates pollution in water coming from domestic and industrial discharges. DO measures the free oxygen molecules within the water, thus low levels mean there is not enough oxygen needed for a living organism to survive in the body of water. BOD on the other hand, measures the amount of oxygen consumed by organisms in decomposing organic matter. Having the BOD above the DENR Standards means that the water is polluted. Meanwhile, fecal coliform bacteria are present in large numbers from human wastes (i.e. feces and intestinal tracts of human) and other warm-blooded animals. These parameters justify the amount of domestic and industrial wastewater discharges that the rivers and creeks accumulated in Quezon City.

Ground Water

Groundwater levels in Metro Manila have declined sharply over the decades due to massive withdrawal of water from aquifer, causing great danger in salt water intrusion and unsuitable for human consumption. Recharge to the aquifers comes from rainfall and inflow from the extension of these aquifers. However, these are already over exploited due to uncontrolled pumping and excessive underwater withdrawal, a practice done principally by high-density residential, commercial and industrial establishments. This situation leads to a partial depletion of the aquifers resulting in the lowering of water levels and high pumping costs.

In 22 September 2004, NWRB issued Resolution no. 001-0904, which revokes or suspends all water permits or reduces the authorized volume of extraction of existing deep wells in areas adequately served by Metropolitan Waterworks and Sewerage System (MWSS) except for use in vital services such as hospitals or firefighting only as backup to commercial supply. By 2009, all remaining deep wells have been decommissioned by NWRB.

Table 4.3 Water Quality Monitoring Results, Quezon City (2018, Q3)

Adopted Creeks at Quezon City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Tem p.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
Portion of Tullahan River	Ugong, VZ and Talipapa, Quezon City	Station 1 (Mindanao Ave.)	2.2	13	62	no in-situ data gathered						15	1.60E+08	0.11	0.48
		Station 2 (Maceda Bridge)	2.2	14	50	no in-situ data gathered						15	2.40E+08	0.19	0.45
		Station 3 (Tulay na Bakal)	no in-situ data gathered/ no water samples collected												
Diliman Creek	Pansol, Loyola Heights, Amihan, Quirino 2C, Claro, Quirino 2B, Quirino 2A, Quirino 3A, Bagumbuhay, Milagrosa, Villa Maria Clara, Bayanihan, Masagana, Tagumpay, Mangga, Silangan, East Kamias, West Kamias, E. Rodriguez, Camp Aguinaldo, Kamuning, Pinagkaisahan, Immaculate	TIP	0.0	21	88	0.329	7.14	29.05	0.515	0.2	112	20	9.20E+07	0.22 2	1.08
		Anonas	0.0	51	49	0.388	7.05	28.85	0.605	0.3	117	15	5.40E+08	0.23	1.01
		Nepa Q Mart	0.0	25	51	0.342	7.07	28.99	0.534	0.3	83.5	15	1.10E+08	0.31	0.98
		T. Morato	0.0	24	47	0.337	7.04	29.19	0.526	0.3	80.8	15	2.20E+08	0.31	1.17

Adopted Creeks at Quezon City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Temp.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
	Concepcion, Kaunlaran, San Martin de Porres, Kristong Hari, Obrero, Roxas, Kalusugan, Paligsahan, Laging Handa, Sacred Heart, and South Triangle QC														
Tanque Creek	Brgy. Sta. Cruz, Brgy. Nayong Kanluran, Quezon City		0.0	26	81	no in-situ data gathered						15	2.20E+08	0.21	1.19
Pasong Tamo River	Brgy. Culiati Brgy. Bahay Toro, Quezon City	Station 1 (Visayas)	2.2	11	20	0.321	7.18	30.13	0.493	0.2	30.5	10	3.50E+07	0.21	0.91
		Station 2 (Mindanao)	3.0	10	19	0.322	7.14	29.94	0.496	0.2	32.3	10	5.40E+07	0.21	0.85
		Station 3 (Carmel)	0.0	24	49	0.37	7.12	30.32	0.578	0.3	78.9	15	1.60E+08	0.22	1.08
		Station 4 (Congressional Extn.)	1.1	12	25	0.324	7.16	30.39	0.499	0.2	40.3	10	5.40E+07	0.16	0.98
San Juan River	Balintawak, Del Monte San Antonio, Damar,	Station 1 (SM Sta. Mesa)	1.7	10	9	0.209	7.53	31.48	0.32	0.2	61.5	15	9.20E+06	0.5	0.61

Adopted Creeks at Quezon City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Tem p.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
	Masambong, San Francisco Del Monte, Damayan, Mariblo, Lourdes, Santo Domingo, Talayan, Roxas, Tatalon, Kalusugan, Dona Imelda, Damayang Lagi, Santol	Station 2 (Old Sta. Mesa)	1.0	10	15	0.208	7.6	31.33	0.320	0.2	63.8	10	5.40E+06	0.48	0.61
		Station 3 (Hanging Bridge)	1.0	11	12	0.84	7.46	30.99	0.436	0.2	51.5	15	3.50E+06	0.3	0.85
San Agustin Creek	San Agustin, Quezon City	Station 1 (Jordan)	0.0	32	19	0.37	5.64	28.18	0.566	0.3	86.6	20	5.40E+08	0.88	0.97
		Station 2 (Beth Saida)	0.0	31	19	no in-situ data gathered						25	2.20E+08	0.96	1.15
Mariblo Creek	Bungad, Quezon City	Moore	0.0	114	78	0.436	6.84	29.66	0.681	0.3	169	20	5.40E+09	0.22	0.95
San Juan Rivers WQMA Stations															
Ermitaño	Aurora Blvd., Broadway, Quezon City		0.0	32	41	0.361	6.42	30.04	0.559	0.3	92.27	15	3.94E+08	0.48	1.51
Diliman	Umbel St., Kalusugan, Quezon City		0	25	39	0.413	6.35	30.12	0.642	0.3	101.3 3	18	2.30E+08	0.38	1.74
Kaliraya	Kaliraya St., Tatalon, Quezon City		0.0	29	49	0.377	6.34	29.98	0.585	0.3	87.7	15	3.34E+08	0.4	1.26

Adopted Creeks at Quezon City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Tem p.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
Mariablo	Roosevelt Ave., Sta. Cruz, Quezon City		1.0	24	59	0.387	6.28	29.71	0.602	0.3	97.6	17	9.07E+07	0.41	1.28
Talayan	Araneta, Talayan, Quezon City		0.0	30	28	0.372	6.34	30.08	0.581	0.3	78.73	17	3.45E+08	0.33	1.22
Caroline	M. H. del Pilar St., San Antonio, Quezon City		2.0	18	40	0.368	6.3	29.6	0.57	0.3	82.33	17	7.23E+07	0.44	1.27
Dario	EDSA, Quezon City		0.0	20	48	0.368	6.34	29.34	0.57	0.3	62.4	17	1.40E+08	0.57	1.47
Culiat	EDSA, Culiat, Quezon City		0.0	24	36	0.35	6.26	29.24	0.541	0.2	63.07	18	2.47E+08	0.84	1.44
Malabon-Navotas-Tullahan-Tinajeros River System WQMA Station															
Gulod Station	Gulod Bridge, Novaliches, Quezon City		2.0	14	72	0.262	6.76	29.5	0.41	0.2	207.2	13	2.07E+07	0.43	0.74
Northridge Station	Northridge Park Subd., Brgy. Sta. Monica, Novaliches, Quezon City		3.0	11	13	0.239	6.83	29.43	0.38	0.2	29.13	15	2.50E+07	0.53	0.51
Dahlia Station	Dahlia Ave., Fairview, Quezon City		1.0	25	27	0.33	6.61	29.06	0.51	0.3	66.2	15	1.38E+08	21.31	0.97
Fairview Station	Fairview Bridge, Fairview, Quezon City		3.0	12	26	0.247	6.72	29.09	0.38	0.2	46.3	15	3.47E+07	0.5	0.48

Adopted Creeks at Quezon City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Temp.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
DENR Standards			5	7	80		6.5-9	25.31				75	200	7	0.5
Units			mg/L	mg/L	mg/L			°C					MPN/100mL	mg/L	mg/L

*Red – exceedance in DENR Standards

Table 4.4 Water Quality Monitoring Results, Caloocan City (2018, July-September)

Adopted Creeks at Caloocan City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Station	DO	BOD	TSS	TDS	pH	Temp.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
Casili Creek	Barangay 21, Barangay 33, Barangay 63, Caloocan City	Station 1 (Vibora)	0.0			no in-situ data gathered/ no water samples collected									
		Station 2 (Don Benito)	0.0	105	51	no in-situ data gathered						20	5.40E+09	0.18	2.62
		Station 3 (Casili Bridge)	0.0	84	37	no in-situ data gathered						25	1.10E+09	0.14	2.77
Malabon-Navotas-Tullahan-Tinajeros River System WQMA Station															
North Expressway	N. Expressway Bridge, Sta. QuiteriaExtn., Caloocan City		2.0	13	68	0.282	6.82	30.3	0.44	0.2	78.27	17	2.63E+07	0.31	0.61
DENR Standards			5	7	80		6.5-9	25.31				75	200	7	0.5
Units			mg/L	mg/L	mg/L			°C					MPN/100mL	mg/L	mg/L

*Red – exceedance in DENR Standards

Table 4.5 Water Quality Monitoring Results, Makati City (2018, July-September)

Adopted Creeks at Makati City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Temp.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
Balisampan Creek	Guadalupe Viejo, Makati City	Station 1 (J. P. Rizal)	0.0	24	21	0.551	5.77	28.51	0.86	0.4	87.1	20	5.40E+08	0.46	1.98
		Station 2 (Gumamela)	0.0	25	23	0.515	5.94	28.59	0.805	0.4	106	20	9.20E+08	0.87	179
Narra Creek	San Antonio, Makati City	Station 1 (Ayala)	0.0	46	43	0.532	5.86	29.25	0.832	0.4	159	25	3.50E+08	0.48	2.01
		Station 2 (Filmore)	0.0	52	22	0.592	5.75	28.63	0.925	0.5	139	20	9.20E+08	0.61	1.97
		Station 3 (Araro)	0.0	54	90	0.617	5.81	28.78	0.964	0.5	162	25	2.80E+09	0.66	2.15
MaricabanCreek /Tributary	Magallanes, Makati City and Brgy. 183 Zone 20, Pasay City	St. Alphonsus Station	0.0	26	18	0.453	5.84	29.74	0.708	0.3	37.5	20	1.60E+08	1.01	0.47
Estero De Sta. Clara	Barangay 883,881,875,882,874 Manila and Barangay Kasilawan, Tejeros Makati City	Station 1 (Sandico)	0.0	91	36	0.550	6.01	29.14	0.86	0.4	157	20	2.20E+09	0.97	2.88
		Station 2 (Delpa)	0.0	112	39	0.64	5.92	29.11	0.99	0.5	150	25	5.40E+09	0.62	3.42
		Station 3 (Havana)	0.0	102	32	0.583	5.95	29.82	0.91	0.4	122	20	3.50E+09	1	3.1
Narra	Don Chino Roces Avenue, San Antonio, Makati City		0.0	53	51.67	0.538	6.0	29.7	0.841	0.4	142.3	15	9.43E+08	0.32	2.46
DENR Standards			5	7	80		6.5-9	25.31				75	200	7	0.5

Adopted Creeks at Makati City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Temp.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
Units			mg/L	mg/L	mg/L			°C					MPN/100mL	mg/L	mg/L

*Red – exceedance in DENR Standards

Table 4.6 Water Quality Monitoring Results, Pasay City (2018, July-September)

Adopted Creeks at Pasay City Area			Parameters												
Name of Adopted Creeks	Barangays Covered	Stations	DO	BOD	TSS	TDS	pH	Temp.	Cond	Sal	Turb	Color	Fecal Coli	NO ₃	PO ₄
Estero Tripa de Gallina	Brgy.190, 189 & 188 Pasay City	Station 1 (MIA Rd.)	0.0	25	54	0.476	6.11	29.86	0.740	0.4	133	20	2.80E+08	0.47	1.95
		Station 2 (Tramo)	0.0	20	50	0.359	6.16	29.98	0.561	0.3	113	20	1.10E+08	0.45	1.26
		Station 3 (OCC)	0.0	26	38	0.418	6.2	30.27	0.654	0.3	96.6	15	5.40E+08	0.46	1.39
Las Pinas-Parañaque River System WQMA															
Tramo	Aurora-Tramo Bridge, Aurora Blvd., Pasay City		0.9	23	42.3	0.408	6.0	30.0	0.638	0.3	93.3	18	1.22E+08	0.33	1.62
Tripa A. Cruz	Apelo Cruz, Pasay City		0.0	46	46.0	0.422	6.1	29.9	0.657	0.3	105.5	13	5.40E+08	0.38	1.65
Dilain	C. Jose St., Maricaban, Pasay City		0.3	24	147.7	0.412	6.1	30.0	0.644	0.3	119.5	15	3.43E+08	0.35	2.11
DENR Standards			5	7	80		6.5-9	25.31				75	200	7	0.5
Units			mg/L	mg/L	mg/L			°C					MPN/100mL	mg/L	mg/L

*Red – exceedance in DENR Standards

4.2.6 Disasters

Earthquake and Ground Shaking

There are two major faults within Greater Metro Manila - the East Valley Fault and the West Valley Fault. Among the five (5) stations, Cubao and Guadalupe stations are nearest to the West Valley Fault Line, approximately 2.7 km and 2.3 km away, respectively. Other stations are more than 5km away from the Valley Fault System. Manila and Pasay City, however, where the Taft station is located will experience a more destructive shaking because its foundation are thick sediments that amplify ground shaking,' according to PHIVOLCS Director Renato Solidum.

Flood

Project areas are located in areas susceptible to flooding. Aside from natural factors, the aggravation of this hazard is generally linked to the identified aspects below.

- Infrastructure development leading to the creation of more impervious areas, resulting to higher peak run-offs that usually cause standing floods;
- Inadequate or non-existent / inappropriate drainage system;
- Improper solid waste disposal that leads to the clogging of drainage systems, further lowering the water retaining capacity;
- Heavy siltation of rivers and creeks due to previous floods, indiscriminate dumping of garbage, encroachment of informal settlers and slum dwellers and limited maintenance works; and
- Institutional problems and financial constraints which delay implementation of proper flood control measures

Tropical Cyclones

Generally, the Philippines is susceptible to several storms and typhoons. On average, approximately 20 tropical cyclones pass through the Philippine Area of Responsibility (PAR) each year. As shown in **Figure 4.15**, most disturbances traverse the island of Luzon and Visayas. Metro Manila is within areas typically struck by approximately one tropical cyclone annually based on the PAGASA Tropical Cyclone Frequency (1948-2010). A tropical cyclone is defined as a non-frontal low-pressure system of synoptic scale with a maximum mean wind speed of 62 kph (34 knots) or greater and persisting for at least six hours. In 2015, PAGASA has started to categorise tropical cyclones into five public storm warning signals (PSWS), according to its strength, intensity and impact to the community:

- **PSWS No. 1** - a tropical depression with maximum sustained winds up to 61 kph;
- **PSWS No. 2** - a tropical storm with sustained winds 62 to 88 kph;
- **PSWS No. 3** - a severe tropical storm with maximum wind speed of 89kph to 117 kph;
- **PSWS No. 4** - a typhoon with maximum sustained winds of 118 to 220 kph; and

- **PSWS No. 5** - a Super Typhoon with maximum sustained winds more than 220 kph.

The recorded tropical cyclones that entered the PAR from 1990 to 2013 are summarised in **Table 4.7** showing that the site area experiences typhoons annually. From 1947 to 2014, there were 13 destructive typhoons that hit NCR (*Weather Philippines Foundation Inc., 2015*). One of these was Typhoon *Ondoy*, which cause a widespread and massive wind damage all over Metro Manila with the highest wind at 140 kph (85 mph) for 10-minute sustained wind, and 165 kph (105 mph) for a 1-minute sustained wind. The recorded rainfall volume was 1,123.5 mm almost twice more than the average 440 mm for the same month in 2007 and 2008. And just recently, August 2018, though did not make a landfall in the Philippines, Tropical Storm *Karding* caused heavy downpour and flooding in the city, reaching its peak at 75 kph (45 mph) for 10-mins sustained wind.

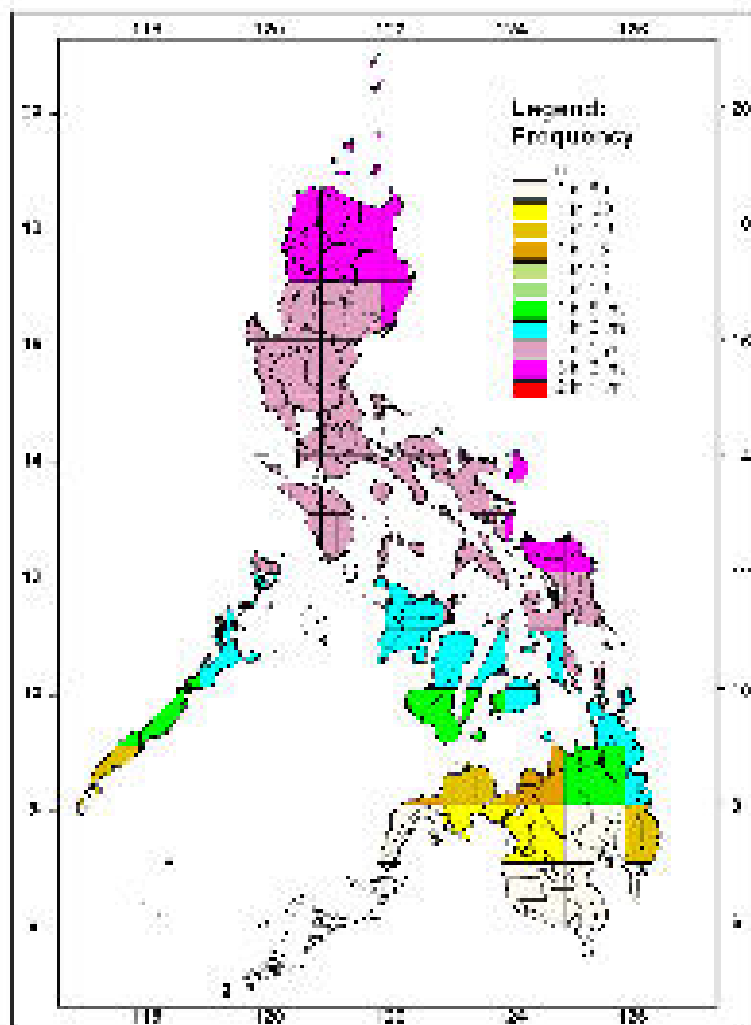


Figure 4.15 Tropical Cyclone Frequency (1948-2010)

Table 4.7 Tropical Cyclone Frequency (1990-2013)

Year	Tropical Depression	Tropical Storm	Typhoon
1990	3	3	14
1991	1	5	13
1992	3	3	9
1993	9	13	10
1994	6	5	14
1995	0	10	6
1996	3	5	9
1997	1	5	8
1998	2	3	6
1999	4	8	4
2000	4	6	8
2001	5	6	6
2002	5	2	6
2003	7	9	9
2004	4	7	14
2005	3	4	10
2006	3	6	11
2007	0	4	9
2008	5	6	10
2009	7	7	8
2010	1	5	5
2011	8	5	6
2012	1	7	9
2013	6	9	10

Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), and Philippine Food Security Information System

4.2.7 Hazards, Vulnerability and Risk Assessments

The Greater Metropolitan Manila Assessment (GMMA) Ready Project identifies at least six major natural hazards that could eventually affect the Greater Metropolitan Manila Area in the future. Hence, cities have started to create disaster risk and local vulnerability and adaptation plans and programs.

The Quezon City Government is part of the Memorandum of Agreement with the Earthquake and Megacities Initiatives (EMI) for the joint undertaking of the “Building a Disaster Resilient Quezon City” Project. Among the outputs of the project are the Hazards, Vulnerability and Risk Assessment (HVRA) Report and the Disaster Risk Reduction & Management Plan (DRRMP).

Hazards such as flood, earthquake and fire are the three most commonly occurring hazards in the city or with greatest threat and impacts in terms of danger to human and physical aspects. Thus, Quezon City has eight operating groups organized by various departments and offices that are delegated as rescue teams. These are: Transportation, Rescue and Engineering, Health and Sanitation, Fire, Police and Security, Relief and Evacuation Rehabilitation and Public Information Groups.

For fire risk, the local government of Quezon City has allocated fire emergency plans including budgets for financial, material and human resources, such as relief and medical services, relocation and provision of temporary shelter to displaced families and repair and rehabilitation of utilities and infrastructures.

Pasay City has several areas that may be vulnerable to geological and hydro-meteorological hazards, particularly liquefaction, storm surges or possibly even small tsunamis at many areas west of Taft Avenue (p. c2-6).

On the other hand, part of the strategies of Pasay City is to continually protect and manage its local to the identified natural and other disaster is to ensure a continuous stream of investment for a disaster resilient community that will be implemented through the city's zoning ordinance and disaster management plan.

Also, the city will allot necessary funds for disaster awareness campaign through essential trainings and equipment. This program aims to continue and strengthen awareness campaigns and focus on preventive measures, not limited to early warning systems and periodic disaster drills (p.C4-50).

For Makati City, several areas are considered vulnerable to geological and hydro-meteorological hazards. Hence, part of the physical development objectives of the city is to assess its vulnerability and identify appropriate type of land use

Some of the land uses and urban design proposals for Makati are securing the areas within the West Valley Fault. This means that there will be neither new buildings nor renovation along the 10-meter easement, removal/demolition of public buildings owned by city government along the valley fault, controlling building densities in areas prone to liquefaction, increasing building height limits for areas prone to flooding and clearing the easements of rivers and creeks.

Climate Risk Management Framework

ADB aims to reduce climate risk to the project performance in the early stages of project development so this will be incorporated in the adaptation measures during design planning. As guided by the Climate Risk Management Framework of ADB, the Project is scored 0, thus identified as low risk based on the Preliminary Climate Risk Screening (**Appendix A**). The project is beneficial in addressing climate risks because of its anticipated significant car-dependency reduction. Thus, the EDSA Greenways project, with an aim of integrating public transport interchange stations and connecting to surrounding areas with efficient, direct and safe pedestrian linkages, is expected to lessen the existing fossil fuels and GHG emissions generated by the transportation sector. Based on a published article of theenergymix.com (2018), dwellers within walkable cities have 20-40% less greenhouse emissions, which is equivalent to a reduction of 2.92 gigatons of carbon by 2050.

The Project has low susceptibility to extreme weather-related events such as floods, droughts, storms and landslides since the site is located in an urban area

with higher elevation as compared with the cities at its vicinity. Thus, facilities (i.e. elevators, canopy) and materials for construction should be maintained and be able to withstand heat and humidity over a long period of time that the Project will take place. The Preliminary Climate Risk Screening for the Project is in **Appendix A**.

4.2.8 Ambient Air Quality

Air quality monitoring is routinely conducted by the DENR-EMB across the Philippines. The nearest DENR-EMB air quality monitoring stations for PM_{2.5} are located at Monumento Caloocan, Mandaluyong City Hall, MRT- Taft Area, Better Living in Parañaque and Makati Park, East Rembo in Makati City, while PM₁₀ station is located at National Printing Office in Quezon City. The PM_{2.5} monitoring stations, as shown in **Figure 4.16**, are not the exact locations of the ambient air stations but are within their respective areas.

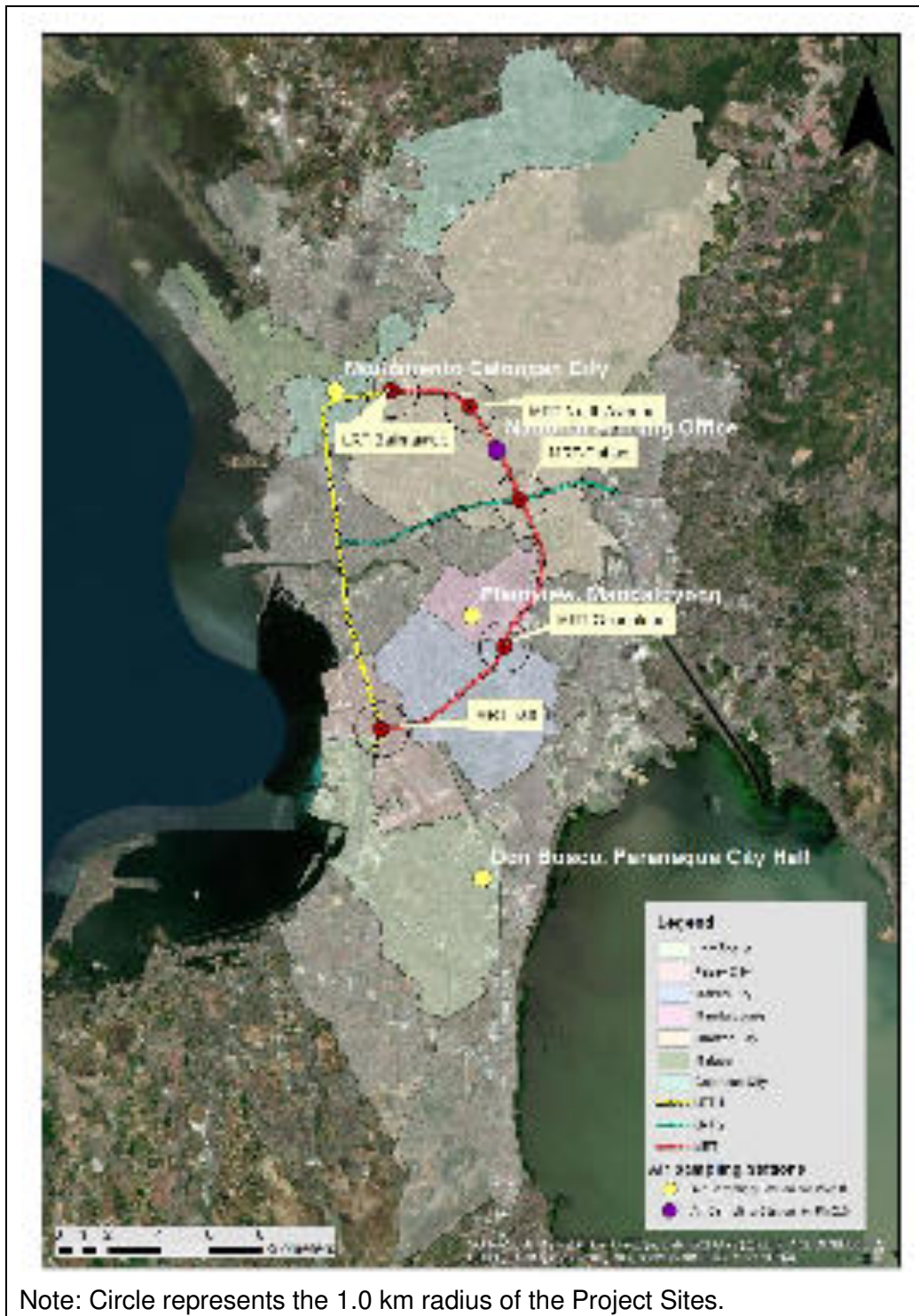


Figure 4.16 Ambient Air Sampling Stations

There were recorded exceedances on the PM_{2.5} National Ambient Air Quality Guideline Value (NAAQGV) of 50 $\mu\text{g}/\text{Nm}^3$ (results were 24-hr average from 1-hr data interval) at the representative ambient air monitoring stations, based on the 2018 Summary of Particulate Matter (PM_{2.5}) Monitoring Report of the Air Quality Monitoring Section (AQMS) of the DENR-EMB NCR (**Figure 4.17**). PM_{2.5}, can cause respiratory and cardiovascular diseases and also contribute to the rise in global temperatures that are associated with the extreme weather events

experienced in different parts of the world. Motor vehicles are the main source of air pollutants in the highly urbanised city where major thoroughfares are located.

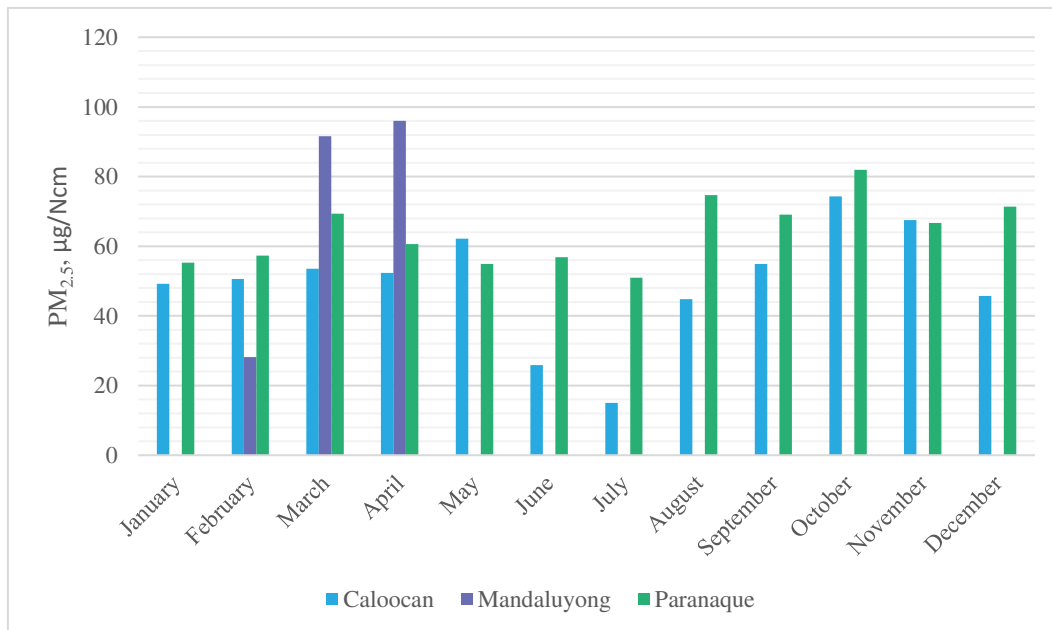
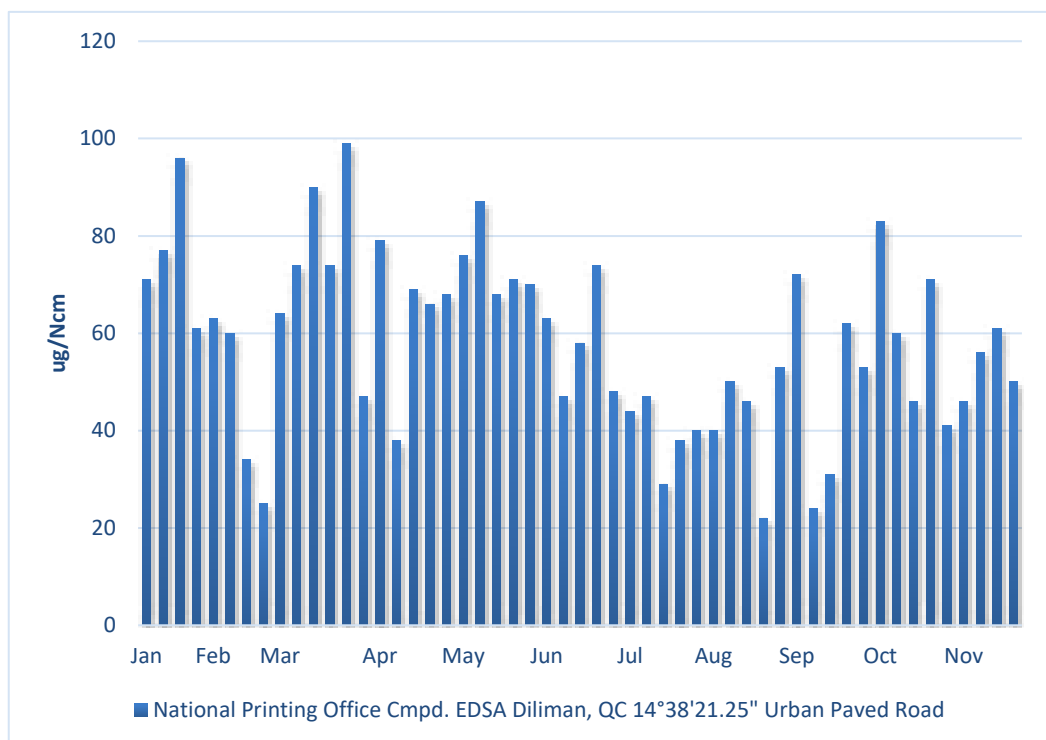


Figure 4.17 Ambient Air Sampling Result – PM2.5, Jan-December 2018

Based on the DENR-EMB-NCR Particulate Matter (PM10) data at the National Printing Office Station located at EDSA Quezon City, the recorded PM10 from January to November 2018 does not exceed the DENR Standards. The results of the ambient air quality monitoring at Quezon City are below the National Ambient Air Quality Guideline Value (NAAQGV) of 150 µg/Ncm, a PM10 guideline over a 24-hr averaging time period (**Figure 4.18**). This data may be lower than expected, but still high concentrations are likely due to EDSA's role as a major thoroughfare and gateway to the north. Hence, mitigating measures will be applied particularly during construction phase to ensure that the project would limit anticipated impacts with the existing PM10 concentration levels. There were no available data for PM₁₀ and TSP for other stations.

The sources of air pollution will be from fugitive dusts and gaseous emissions from the vehicular and equipment usage during the construction of the project. Hence, the use of generator sets during construction are also anticipated to produce an added pollution.



Source: DENR-EMB NCR, Air Quality Monitoring Section (2018); First Quarter Summary of Particulate Matter (PM10) Monitoring Report

Figure 4.18 Ambient Air Sampling Result – PM10, Jan-Nov 2018

4.2.9 Noise Level

Noise sampling was conducted at 10 sampling stations using EXTECH Model SL-4033SD Sound Level Meter compiling the requirements of American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC) Type 2 specifications. Sampling was conducted for 1 hour at 1 second intervals. These sampling were carried out to establish the existing ambient noise levels in the vicinity of the proposed EDSA Greenways Project. This data is limited especially if construction will be done at 24/7, hence additional 24-hr measurements will be done during Detailed Engineering Design (DED) stage.

In general, these monitoring results will represent the noise level in the absence of the Project to note any predominant existing noise source/s. All sampling stations and graphical representation of measured noise are presented in **Appendix C**. The results of the noise measurements were compared to the 2007 Environmental, Health and Safety (EHS) Guidelines of the International Finance Corporation (IFC) for Noise Management (**Table 4.8 to Table 4.10**).

Table 4.8 IFC-EHS Guidelines for Noise Management

Receptors	One Hour LA _{eq} (dBA)	
	Daytime (7:00AM – 10:00PM)	Night time (10:00PM – 7:00AM)
Residential, Institutional, Educational	55	45
Industrial, Commercial	70	70

Source: IFC- EHS Guidelines for Noise Management, 2007

Sensitive receptors will likely receive significant increase in noise level due to the pedestrian construction. This sampling ensures that a broad distribution of noise level survey locations is chosen. These locations were selected as close to neighbouring noise sensitive receptors as practicable without causing undesirable impacts on pedestrian movements and safety.

The noise monitoring within the Project area are compared specifically using the LA_{eq} for the IFC-EHS Guidelines for Noise Management, in Daytime (7:00AM - 10:00PM) and Night time (10:00PM - 7:00AM).

Table 4.9 Ambient Noise Measurement Locations

No.	Locations	Coordinates	Category
1	P. Burgos Street, Guadalupe	14°33'54" N 121°2'45" E	B
2	Nuestra Senora de Gracia Church, Guadalupe	14°33'57" N 121°2'34" E	AA
3	STI Building, Taft	14°32'14" N 121°0'0" E	B
4	Our Lady of Fatima Parish, Taft	14°32'11" N 121°0'6" E	AA
5	Vivaldi Residences, Cubao	14°37'16" N 121°3'1" E	A
6	Acoje Elementary School, Cubao	14°37'3" N 121°3'0" E	AA
7	Manila Central University Hospital, Monumento	14°39'26" N 120°59'11" E	AA
8	Macabagdal Street, Monumento	14°39'19" N 120°59'9" E	A
9	Old Samson Road, Balintawak	14°39'25" N 121°0'5" E	B
10	Bonifacio Elementary School, Balintawak	14°39'30" N 120°59'58" E	AA

For the purpose of establishing ambient air noise quality standards, National Pollution Control Commission (NPCC) has set and classified areas with its corresponding standard

- Class AA- are areas which required quietness, such as areas 100 meters from school sites, nursery schools, hospitals'
- Class A- areas primarily used for residential purposes
- Class B- areas that are zoned or used as heavy industrial area

Most, if not all, recorded noise levels exceeded the maximum allowable noise standards during the day and night for the IFC-EHS Guidelines for Noise Management. The noise basically comes from vehicles along the road, where most of sampling points are located, and commercial noise such as pedestrians, streets sweepers and jeepney barkers. Traffic is normally light to medium during the morning, and medium-heavy during the rest of the day. There are also selected sampling points further away from EDSA terminals to incorporate low noise level data, mostly residential streets and churches. But these even exceeded the maximum allowable noise levels.

These levels collected presented in **Table 4.10** will serve as a reference of baseline information. The proposed limit levels were based on these baseline readings as presented in the Environmental Monitoring Plan (**Table 6.3**). Noise data, including the time periods, and noise meter calibration certificates are also shown in **Appendix C**. These indicative noise levels are limited to 1-hr sampling. Additional 24-hr noise measurement will be conducted at pre-construction during DED stage, upon awarding the Project to the contractor to further monitor noise level, should this be recommended by DOTr and ADB. There will also be different measurements to be conducted by the contractors prior to start of construction. Additional sampling data is required during DED for the updated IEE (DED stage) to enhance assessment of noise and air quality impacts and propose more appropriate mitigation measures.

Table 4.10 Ambient Noise Measurements

No.	Averaging Time ^[1] For IFC	Noise Level, ^[2] LA _{eq} , dB(A)	LA10, dB(A)	LA90, dB(A)	IFC Standard, dB(A)
1	Daytime	62.6	76.9	68.7	70
	Night time	67.0	79.3	73.3	70
2	Daytime	57.8	72.5	59.7	55
	Night time	60.00	70.3	59.5	45
3	Daytime	69.0	82.1	77.3	70
	Night time	75.7	89.2	76.2	70
4	Daytime	63.4	79.8	59.8	55
	Night time	62..3	75.4	63.8	45
5	Daytime	69.8	82.9	75.6	55
	Night time	84.3	85.9	75.2	45
6	Daytime	57.1	68.0	55.5	55
	Night time	84.4	85.9	75.2	45

No.	Averaging Time ^[1] For IFC	Noise Level, ^[2] LA _{eq} , dB(A)	LA10, dB(A)	LA90, dB(A)	IFC Standard, dB(A)
7	Daytime	71.6	84.2	75.7	55
	Night time	68.2	81.2	72.8	45
8	Daytime	62.6	77.7	60.1	55
	Night time	63.9	78.4	67.5	45
9	Daytime	66.7	80.7	69.9	70
	Night time	64.7	78.3	68.2	70
10	Daytime	53.8	76.3	65.3	55
	Night time	86.9	76.8	65.2	45

Note:[1] – Periods covered are shown in **Appendix C**

[2] – Free field noise measurements

4.3 Ecological Environment

4.3.1 Terrestrial Ecosystem

The project area and its vicinity are already highly urbanized. Currently, areas are characterised as commercial land use, with location accessible to residential concentrations. Based on rapid site assessment, vegetation are mostly ornamental plants, a few fruit-bearing trees and flowery shrubs along sidewalks and in spare yards (**Table 4.11**). Some of the predominant green areas near the Project area are discussed in **Figure 4.19**.

Table 4.11 Predominant Green Areas near Project Area

No.	Station	Green Areas
1	Balintawak Station	One open space, with some green areas, found near the Project alignment is the Eternal Gardens Memorial Park. In addition, parks and open spaces that are habitat to numerous species of flora and fauna are Ninoy Aquino Parks and Wildlife and Quezon Memorial Circle (i.e. an artificial habitat), around 4.0 – 5.0 km away from the site area.
2	Common Station	The nearest open space in the area is the Veterans Memorial Golf Club, which is approximately 450m away from the alignment. Ninoy Aquino Parks and Wildlife is around 850m away and Quezon Memorial Circle, around 1.5km away from the site area. These are included in the Green Lung of Quezon City.
3	Cubao Station	In general, the project site may be characterized as a bustling metropolis with minute vegetation. Other open spaces near the area are Camp Aguinaldo Golf Course, which is 1.5km from the Cubao Station, and Bernardo Park, which is 1.2km away. In addition, Ninoy Aquino Parks and Wildlife and Quezon Memorial Circle is around 3.5 km away from the Cubao Station.
4	Guadalupe Station	Some of the predominant green areas in Makati are the Philippine Racing Club in Carmona, Manila Golf Club and residential areas in Forbes Park, Manila South cemetery in Sta. Cruz, and residential areas in the disputed barangays of Post Proper Northside and Post Proper Southside. There are 16 parks in Makati, 4 are private and 12 are government-maintained with a total of 8 hectares. These 12 parks are being monitored by the Parks and Green Division of the Department of Environmental Services of Makati City. The division also maintains four plant nurseries for its tree planting activities which started in 2002. Three kilometers from the Project area is an 18-hole golf course, at Wack-Wack, Mandaluyong, covered in green ornamental grass and cultivated trees.
5	Taft Station	There is no predominant green area adjacent or within project alignment from Taft Station. Based on the 2014-2022 Pasay CLUP, there are very limited opportunities for new parks, open spaces and general assembly areas for the locals of Pasay.



a. Vegetative area near Common Station



b. Vegetative area near Balintawak Station



c. Vegetative Area near Guadalupe Station



d. Vegetative Area near Cubao Station

Figure 4.19 Vegetation near Project Site

4.4 Environmental Critical Areas and Sensitive Receptors

4.4.1 Environmental Critical Areas

Environmentally Critical Areas (ECAs) in the Philippines are environmentally sensitive areas declared through Presidential Proclamation 2146 of 1981, Proclaiming Certain Areas and Types of Projects as Environmentally Critical and within the Scope of the Environmental Impact Statement System Established under Presidential Decree No. 1586. Significant environmental impacts are expected to occur in these areas if certain types/thresholds of proposed projects are located, developed or implemented in them without appropriate management measures. There are 12 ECA categories in Presidential Proclamation 2146. These 12 ECA categories and technical definitions are provided in EMB Memorandum Circular 2014-005 in Annex 30.5.

Host cities of the project sites are not within a declared watershed reserves, wildlife preserves and sanctuaries area nor an area which constitute as habitat for any endangered threatened species. Furthermore, the Project site is not situated within or near the cultural communities and tribes. There are also no presence of critical slopes and prime agricultural lands.

The only nearest declared protected area is the Las Piñas – Parañaque Wetland Park, which is approximately 4km from the Taft Station and situated south of Manila Bay. The said wetland park was legislated as National Protected Area upon the enactment of Republic Act No. 11038 or the Expanded National Integrated Protected Area Act last 22 June 2018. It is known nesting bird sanctuary for migratory birds, which hosts around 41 species with migratory birds from China, Japan and Siberia; and a mangrove forest, which is considered thickest and most diverse among the remaining mangrove areas within Manila Bay.

Guadalupe Station, on the other hand, is near a preservation area. This station is near the Pasig River, in proximity to Guadalupe Viejo and Pioneer creeks. The Pasig River Rehabilitation Commission (PRRC), through Executive Order No. 54 has been created in 1999 to rehabilitate this river and revert it to its pristine condition for recreation, transportation and tourism. In addition, Environmental Preservation Areas (EPA) are being placed along the shores of the Pasig and all its tributaries, stretching 10m from the shores on each side.

Other issues of ECA relates to possibilities of disasters triggered by natural and anthropogenic hazards, such as floods during heavy rains and proximity to West Valley Fault Line are some of the possible risks. Geohazard risks in the Project site are discussed in detail in **Section 4.2.2**.

For ECA classified as potential tourist spots and with unique historic value, Pasay City which is the host city of Taft Station is near the Manila Bay. It is approximately 3-km from the Project Site and is said to be one of the most important water body in the country because of the historical, cultural and economic value. The sunset of the Manila Bay area serves as an aesthetic area and potential tourist spot.

For Balintawak Station, a monument in honour of Andres Bonifacio, near the Balintawak Cloverleaf Park is approximately 430 meters from the station. This is known as the Andres Bonifacio Monument, or popularly called the Balintawak Monument) and is classified as a National Historical Monument by the National

Historical Commission of the Philippines (NHCP). To date, it is considered a famous national monument and a tourist spot in Quezon City.

4.4.2 Sensitive Receptors

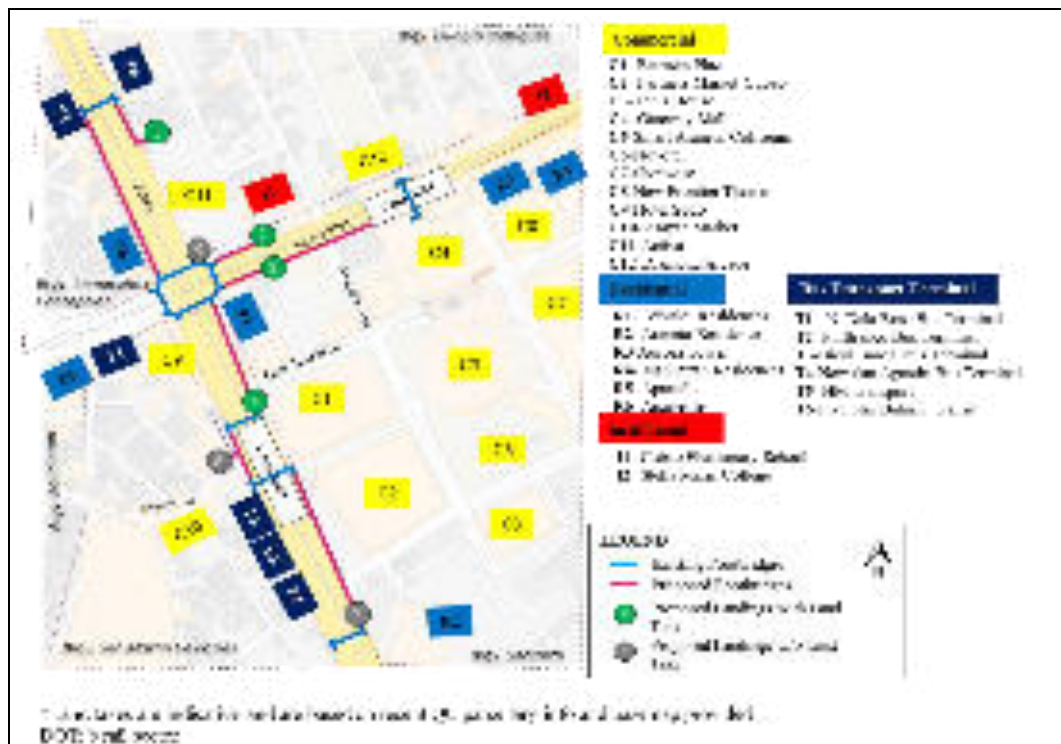
Sensitive receptors include schools, churches, hospitals and other institutions, where the occupants are subject to the adverse effects of the project. Other affected areas are transport terminals, commercial areas and recreation facilities. Most of the areas identified as sensitive receptors can be considered as Direct Impact Areas and Indirect Impact Areas (IIA). DIA can be identified as areas where there will be landing intakes while IIA are outside or nearest areas of the proposed footbridge alignment. Identified sensitive receptors are affected residential and institutional areas, impact barangays, schools and other institutions, where the alignment is located. While other affected areas are commercial areas and transport terminals where most people are temporarily seen, are shown in **Table 4.12** and **Figure 4.20**. These are also located within the Project alignment.

The project may have adverse effects in terms of increase of air pollutants and noise level in the area particularly during construction phase, involuntary resettlement for identified landing intakes, effect on business, increase of waste generation, etc.

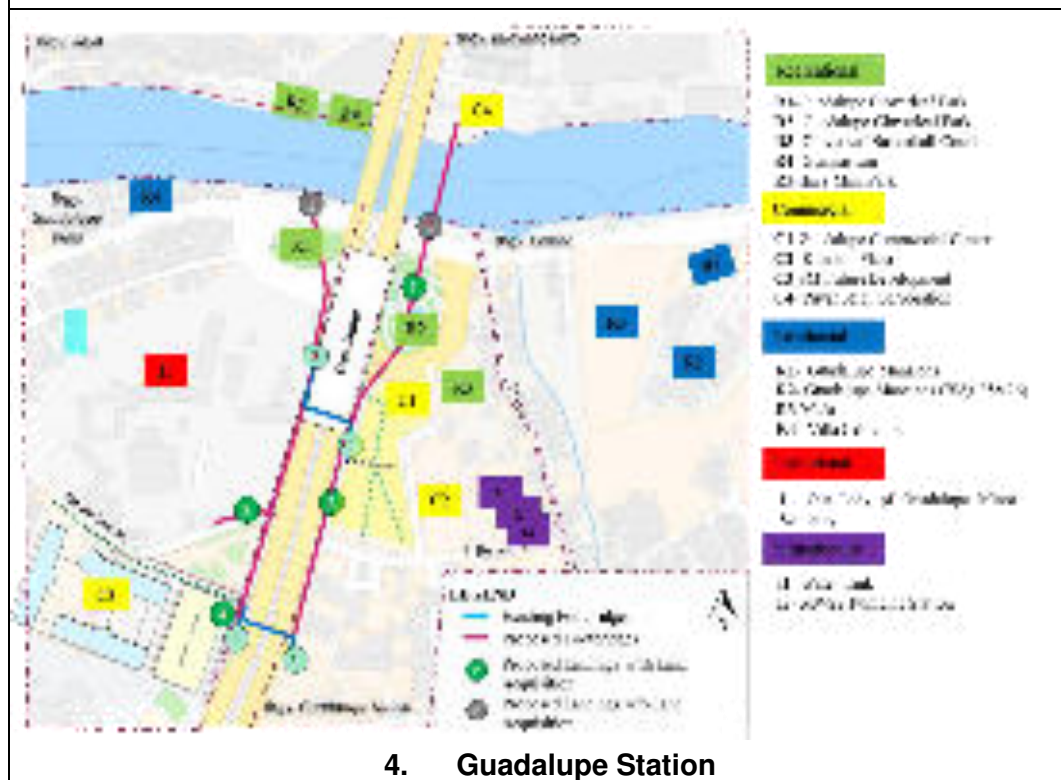
Table 4.12 Affected Areas

No.	Station	Sensitive and Affected Areas
1	Balintawak	Sensitive Receptors: Residential Areas: Brgy. 139, Brgy 95 Institutional Areas: Qualimed Cloverleaf, Bonifacio Memorial Elem. School, Saint Joseph the Worker Parish Affected Areas: Commercial Areas: Balintawak Cloverleaf Market, Ayala Malls Cloverleaf Phase 2, Super 8 Grocery Warehouse, Ayala Malls Cloverleaf, Ever Supermarket, Jualiana Wet & Dry Market, Container Corporation Philippines, Puregold Balintawak Golden ABC, Inc, Mitsubishi Motors Monument: Andres Bonifacio Monument
2	Common	Sensitive Receptors: Institutional Areas: Philippine Medical Association, Veterans Medical Center Affected Areas: Commercial Areas: TriNoma Mall, SM North Main Mall, SM North The Block, Paramount Bldg, Vina Residences and Versaflats, SM Cyber West Avenue, Financial Services, Euro Hotel, North Avenue Surface Parking Transport Terminal: Unified Grand Central Terminal
3	Cubao	Sensitive Receptors: Residential Areas: Vivaldi Residences, Araneta Residence, Aurora Tower, Manhattan Residences, Apartelle

No.	Station	Sensitive and Affected Areas
		<p>Institutional Areas: Cubao Elem. School, Stella Maris College</p> <p>Affected Areas:</p> <p>Commercial Areas: Farmers Plaza, Farmers Market, Cubao, Telus House, Gateway Mall, Smart Araneta Coliseum, Novotel, Shopwise, New Frontier Theater, Hotel Sogo, Arayat Market, Activa, Diamond Arcade</p> <p>Bus Transport Terminal: N. Dela Rosa, Philtranco, Bicol Isarog, New San Agustin, HM, Five Star</p>
4	Guadalupe	<p>Sensitive Receptors:</p> <p>Residential Areas: Guadalupe Mansions, Guadalupe Mansions (Bldg. 26 & 26), Mcda, Villa Celidonia</p> <p>Institutional Areas: Our Lady of Minor Seminary</p> <p>Affected Areas:</p> <p>Recreational Areas: Guadalupe Cloverleaf Park, Guadalupe Cloverleaf Park, Cloverleaf Basketball Court, Gymnasium, Ilaya Mini Park</p> <p>Commercial Areas: Guadalupe Commercial Center, Kimston Plaza, SM Future Development, Puyat Steel Corporation</p> <p>Infrastructure: Water Tank, MWSS Pumping Station</p>
5	Taft	<p>Sensitive Receptors:</p> <p>Institutional Areas: San Roque Parish Church</p> <p>Residential Areas: Apartelle Building, Brgy. 118, 119</p> <p>Affected Areas:</p> <p>Commercial Areas: Metro Point Mall, Kabayan Hotel, Save Square, Manaster Bldg., Mahal Kita Inn, Giselle Plaza, Rotonda Hotel, Messe and Handel Corp</p> <p>Bus Transport Terminals: Philtranco, DLTB, Genesis/Saulog/BSC/HM</p>



3. Cubao Station



4. Guadalupe Station

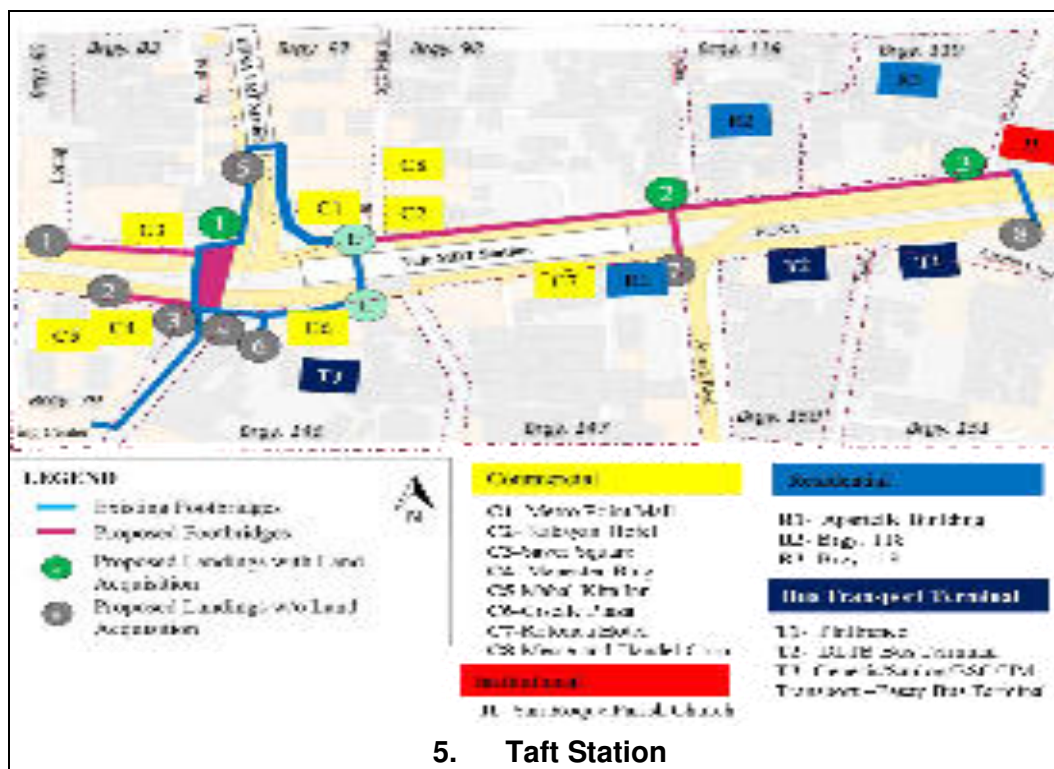


Figure 4.20 Affected Areas for Each Station

The affected barangays for the EDSA Greenways Project Phase 2 are summarized in **Table 4.13**.

Table 4.13 Barangays Covered by the Project Area

Station	Name	Geographic Coverage
1	Balintawak Station	<ul style="list-style-type: none"> • Brgy. 95, Caloocan City • Brgy. 139, Caloocan City • Brgy. Unang Sigaw, Quezon City • Brgy. Apolonio Samson, Quezon City • Brgy. Balingasa, Quezon City
2	Common Station	<ul style="list-style-type: none"> • Brgy. Phil-Am, Quezon City • Brgy. Bagong Pag-Asa, Quezon City • Brgy. Veterans Village, Quezon City • Brgy. Project 6, Quezon City
3	Cubao Station	<ul style="list-style-type: none"> • Brgy. Immaculate Concepcion, Quezon City • Brgy. San Martin de Porres, Quezon City • Brgy. E. Rodriguez, Quezon City • Brgy. Socorro, Quezon City

Station	Name	Geographic Coverage
4	Guadalupe Station	<ul style="list-style-type: none"> • Brgy. Guadalupe Viejo, Makati City • Brgy. Guadalupe Nuevo, Makati City • Brgy. Ilaya, Mandaluyong City • Brgy. Buayang Bato, Mandaluyong City
5	Taft Station	<ul style="list-style-type: none"> • Brgy. 79, Pasay City • Brgy. 83, Pasay City • Brgy. 97, Pasay City • Brgy. 98, Pasay City • Brgy. 118, Pasay City • Brgy. 119, Pasay City • Brgy. 146, Pasay City • Brgy. 147, Pasay City • Brgy. 150, Pasay City • Brgy. 151, Pasay City
All barangays that the alignment will traverse are considered as host and directly affected barangays.		

4.5 Socio-economic Profile

4.5.1 Geography

The only station covered by the Light Rail Transit (LRT) is Balintawak. Balintawak Station will cover Barangays 95 and 139 in Caloocan City and Barangay Unang Sigaw, Apolonio Samson and Balingasa, which are within the jurisdiction of Quezon City.

For the Manila Metro Rail Transit, the stations are Common/ TriNoma, Cubao, Guadalupe and Taft. The barangays for Common Station are Philam, Bagong Pagasa, Bungad, Veterans Village, Santo Cristo and Ramon Magsaysay which are within Quezon City. For Cubao Station, the immediate receptors are barangay Immaculate Concepcion, San Martin de Porres, E. Rodriguez and Socorro in Quezon City. On the other hand, Guadalupe Station will cover barangays in Makati City. These barangays are Guadalupe Viejo and Guadalupe Nuevo. Lastly for Taft Station the barangays affected are Barangay 79, 83, 97, 98, 119, 119, 146, 147, 150 and 151. The said barangays are all within Pasay City.

Other adjacent cities identified are (1) Malabon City which is adjacent to Balintawak Station. (2) Mandaluyong City which is near the Guadalupe Station (3) Parañaque City which adjoins the Taft Station.

4.5.2 Population

Based on the Philippines Statistics Authority's (PSA) 2015 census Quezon City which hosts the Balintawak Station, Common Station and Cubao Station has a total population of 2,936,116, with annual growth rate of 1.17% and population density of 17,099 persons/km². On the other hand, Guadalupe Station which is

within Makati City is the 7th highest population of about 579,433. Lastly Taft Station which is within Pasay City, has a total population of 416,522 (**Table 4.14** to **Table 4.16**).

The 2015 population for the identified adjacent cities are (1) Malabon City has a total population of 365,525 (2) Mandaluyong City tallied 386,276 inhabitants (3) Parañaque City which has 665,822 residents.

In terms of population growth rate, Mandaluyong City was second fastest growing Highly Urbanized City (HUC) in NCR with 3.12 growth rate. Then Parañaque City (3rd fastest growing) with 2.39 growth rate. Makati City (5th fastest growing) has a growth rate of 1.85, Quezon City (11th fastest growing) with 1.17, Pasay City (13th fastest growing) with 1.12 and Malabon City (14th fastest growing) at 0.65.

Table 4.14 Total Population by Age Group and Sex, 2015- Quezon City

Age Group	Both Sexes	Male	Female
All Ages	2,936,116	1,447,351	1,488,765
Under 1	51,480	26,988	24,492
1 - 4	208,844	108,264	100,580
5 - 9	259,425	134,261	125,164
10 - 14	257,923	132,326	125,597
15 - 19	296,534	146,455	150,079
20 - 24	315,065	155,285	159,780
25 - 29	282,540	140,483	142,057
30 - 34	245,160	121,746	123,414
35 - 39	219,197	108,087	111,110
40 - 44	186,574	91,769	94,805
45 - 49	167,291	80,688	86,603
50 - 54	139,871	66,750	73,121
55 - 59	109,824	51,463	58,361
60 - 64	78,969	35,994	42,975
65 - 69	50,381	22,317	28,064
70 - 74	27,941	11,283	16,658
75 - 79	19,289	7,056	12,233
80 years and over	19,808	6,136	13,672
0 - 4	260,324	135,252	125,072
0 - 14	777,672	401,839	375,833
15 - 64	2,041,025	998,720	1,042,305
18 years and over	1,986,924	959,413	1,027,511
60 years and over	196,388	82,786	113,602
65 years and over	117,419	46,792	70,627

Source: Philippine Statistics Authority, 2015 Census of Population.

Table 4.15 Total Population by Age Group and Sex, 2015- Makati City

Age Group	Both Sexes	Male	Female
All Ages	579,433	274,253	305,180
Under 1	10,155	5,185	4,970
1 - 4	36,104	18,512	17,592
5 - 9	43,070	22,069	21,001
10 - 14	43,405	22,165	21,240
15 - 19	47,810	22,428	25,382
20 - 24	58,985	27,016	31,969
25 - 29	63,172	29,412	33,760
30 - 34	54,171	26,128	28,043
35 - 39	46,627	21,906	24,721
40 - 44	38,935	18,222	20,713
45 - 49	35,613	16,474	19,139
50 - 54	30,129	13,903	16,226
55 - 59	24,397	11,173	13,224
60 - 64	18,191	8,147	10,044
65 - 69	11,559	5,192	6,367
70 - 74	6,484	2,633	3,851
75 - 79	4,834	1,687	3,147
80 years and over	5,792	2,001	3,791
0 - 4	46,259	23,697	22,562
0 - 14	132,734	67,931	64,803
15 - 64	418,030	194,809	223,221
18 years and over	419,668	193,340	226,328
60 years and over	46,860	19,660	27,200
65 years and over	28,669	11,513	17,156

Source: Philippine Statistics Authority, 2015 Census of Population.

Table 4.16 Total Population by Age Group and Sex, 2015- Pasay City

Age Group	Both Sexes	Male	Female
All Ages	416,522	206,982	209,540
Under 1	7,327	3,877	3,450
1 - 4	28,711	14,809	13,902
5 - 9	34,606	17,846	16,760
10 - 14	33,218	16,816	16,402

Age Group	Both Sexes	Male	Female
15 - 19	39,815	19,917	19,898
20 - 24	48,729	23,959	24,770
25 - 29	47,597	23,821	23,776
30 - 34	37,556	19,299	18,257
35 - 39	31,528	15,911	15,617
40 - 44	26,059	13,232	12,827
45 - 49	22,595	11,212	11,383
50 - 54	18,718	8,837	9,881
55 - 59	14,134	6,564	7,570
60 - 64	10,572	4,851	5,721
65 - 69	6,790	2,975	3,815
70 - 74	3,780	1,481	2,299
75 - 79	2,672	972	1,700
80 years and over	2,115	603	1,512
0 - 4	36,038	18,686	17,352
0 - 14	103,862	53,348	50,514
15 - 64	297,303	147,603	149,700
18 years and over	290,103	142,251	147,852
60 years and over	25,929	10,882	15,047
65 years and over	15,357	6,031	9,326

Source: Philippine Statistics Authority, 2015 Census of Population.

4.5.3 Educational Profile

As of SY2014-2015, the City of Taguig/Pateros led SY 2014-2015 achievement test results followed by Makati City, which ranked 2nd in other categories. Of other cities, Malabon City ranked 3rd, Parañaque City ranked 4th, while Pasay City, Mandaluyong and Quezon City ranked 7th, 8th and 15th respectively.

Table 4.17 Academic Performance in Public and Private Elementary Schools, Metro Manila Cities/Municipality: SY 2012-2013 to SY 2014-2015

City	Elementary					
	SY 2012-2013		SY 2013-2014		SY 2014-2015	
	Rank	Rate	Rank	Rate	Rank	Rate
Directly Affected						
Quezon City	11	57.00	15	55.29	15	50.13
Makati	2	64.76	2	68.00	5	64.06

City	Elementary					
	SY 2012-2013		SY 2013-2014		SY 2014-2015	
	Rank	Rate	Rank	Rate	Rank	Rate
Pasay	6	56.58	14	57.09	16	49.86
Adjacent City						
Malabon City	4	64.78	4	66.08	3	64.79
Mandaluyong City	15	54.51	10	60.84	8	60.88
Parañaque City	1	70.56	1	69.16	4	64.52

Source: Schools Division Office

Quezon City is the education epicenter to leading universities and institutions, including well-known universities in the city include Ateneo de Manila University and University of the Philippines, Diliman. It has a high literacy rate of 99% based on the 2016 Quezon City's League of Cities presentation. Based on **Table 4.18**, the literacy percentage of Quezon City is 82, where 48.7% is male and 51.3% female. While **Table 4.19** shows the disaggregated data for household population aged 5 to 24 years old who were currently attending school by age group and sex.

Table 4.18 Literacy of the Household Population 10 Years Old and Over by Age Group and Sex, 2015 – Quezon City

Age Group	Household Population 10 years old and over			Literate		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Total	2,400,247	1,168,433	1,231,814	2,395,105	1,165,693	1,229,412
10 - 14	257,701	132,193	125,508	256,693	131,572	125,121
15 - 19	292,431	144,566	147,865	291,680	144,104	147,576
20 - 24	312,041	153,339	158,702	311,389	152,936	158,453
25 - 29	280,556	139,114	141,442	280,090	138,839	141,251
30 - 34	243,471	120,588	122,883	243,092	120,375	122,717
35 - 39	217,864	107,206	110,658	217,554	107,036	110,518
40 - 44	185,493	91,097	94,396	185,258	90,977	94,281

45 - 49	166,416	80,169	86,247	166,172	80,045	86,127
50 - 54	139,326	66,435	72,891	139,123	66,342	72,781
55 - 59	109,510	51,278	58,232	109,353	51,215	58,138
60 - 64	78,765	35,906	42,859	78,599	35,846	42,753
65 years old and over	116,673	46,542	70,131	116,102	46,406	69,696

Source: Philippine Statistics Authority, 2015 Census of Population

Table 4.19 Household Population 5 to 24 Years Old Who Were Currently Attending School by Age Group and Sex, 2015

Age Group	Household Population 5 to 24 Years Old			Household Population 5 to 24 Years Old Who Were Currently Attending School		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Total	1,121,439	564,272	557,167	750,391	383,200	367,191
5 - 9	259,266	134,174	125,092	242,624	125,241	117,383
10 - 14	257,701	132,193	125,508	250,224	127,865	122,359
15 - 19	292,431	144,566	147,865	204,003	101,311	102,692
20 - 24	312,041	153,339	158,702	53,540	28,783	24,757

Source: Philippine Statistics Authority, 2015 Census of Population.

Pasay City's literacy rates increased both at both levels and was higher for secondary (92.11% to 93.63%) than elementary levels (91.39% to 92.86%). At present, there are 62 pre-schools, 51 elementary schools, 28 high schools and 7 colleges/universities in the City. Based on **Table 4.21**, the literacy percentage in Pasay City is 82, where 49.1% is comprised of male and 50.9% female.

Table 4.20 Educational Institutions, 2013

	Public	Private
1. Pre-School	19	43
2. Elementary	19	32
3. High School	7	21
3. Special Schools	3	
4. College/University	1	6

Source: Pasay City CDP 2014-2019

Table 4.21 Literacy of the Household Population 10 Years Old and Over by Age Group and Sex, 2015 - Pasay City

Age Group	Household Population 10 Years or Older			Literate		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Total	341,880	167,841	174,039	341,537	167,632	173,905

Age Group	Household Population 10 Years or Older			Literate		
	Both Sexes	Male	Female	Both Sexes	Male	Female
10 - 14	33,177	16,788	16,389	33,111	16,737	16,374
15 - 19	39,581	19,773	19,808	39,528	19,734	19,794
20 - 24	48,206	23,601	24,605	48,155	23,570	24,585
25 - 29	46,754	23,256	23,498	46,701	23,226	23,475
30 - 34	37,270	19,096	18,174	37,234	19,066	18,168
35 - 39	31,159	15,625	15,534	31,146	15,617	15,529
40 - 44	25,255	12,556	12,699	25,232	12,544	12,688
45 - 49	22,285	10,985	11,300	22,270	10,980	11,290
50 - 54	18,354	8,775	9,579	18,345	8,773	9,572
55 - 59	14,087	6,539	7,548	14,081	6,539	7,542
60 - 64	10,553	4,839	5,714	10,548	4,838	5,710
65 years old and over	15,199	6,008	9,191	15,186	6,008	9,178

In Makati, the teacher student ratio is within standard ratio of 1:35 for elementary and 1:45 for secondary. A 1:40 teacher-student ratio was achieved in both the 1st and 2nd semesters based on the city's CLUP. Based on **Table 4.22**, the literacy percentage in Pasay City is 84.5, where 46.6% is comprised of male and 53.4% female.

Table 4.22 Literacy of the Household Population 10 Years Old and Over by Age Group and Sex, 2015 - Makati City

Age Group	Household Population 10 Years or Older			Literate		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Total	490,104	228,487	261,617	489,487	228,160	261,327

10 - 14	43,405	22,165	21,240	43,292	22,106	21,186
15 - 19	47,810	22,428	25,382	47,718	22,370	25,348
20 - 24	58,985	27,016	31,969	58,899	26,967	31,932
25 - 29	63,172	29,412	33,760	63,105	29,369	33,736
30 - 34	54,171	26,128	28,043	54,130	26,103	28,027
35 - 39	46,627	21,906	24,721	46,599	21,888	24,711
40 - 44	38,935	18,222	20,713	38,915	18,212	20,703
45 - 49	35,613	16,474	19,139	35,574	16,454	19,120
50 - 54	30,129	13,903	16,226	30,092	13,889	16,203
55 - 59	24,397	11,173	13,224	24,373	11,164	13,209
60 - 64	18,191	8,147	10,044	18,178	8,139	10,039
65 years old and over	28,669	11,513	17,156	28,612	11,499	17,113

The schools that will be directly affected by the Project alignment are listed in **Table 4.12**. The students will mostly be affected in terms of their daily train and pedestrian access, to and from schools during the construction. Once operationally, the Project will provide a safe and convenient access facility.

4.5.4 Health Profile

Health Facilities

About 56.06% or 5,606 beds are in Quezon City local government hospitals, while 43.94% or 4,394 beds are in private hospitals. Based on the city's ecological profile there are 1,168 various health and wellness facilities such as medical clinics (93), Lying-in Clinic/Birthing Home/ Maternity Clinics (176) optical clinics (76), dental clinics (153), dental laboratory (18), dermatology clinics (66), skin care clinics (89), diagnostic centers (46), dialysis centers/clinics (9), veterinary (110), psychological clinic (12), surgical clinic (2), psychiatric rehabilitation centers (6), medical laboratory (3), therapeutic clinics (20), medical health care services (31), x-ray diagnostic clinics (22), combined various health and wellness facilities (236).

Based on Pasay City's Comprehensive Development Plan (CDP), the city's health services are delivered through four (4) hospitals and fourteen (14) health centers.

Of the four (4) hospitals, two (2) are government-owned with a combined bed capacity of 300 and two (2) are privately-owned with a combined bed capacity of 350.

For Makati City, public health facilities include hospitals (including the Acute Care Center), 27 centers/social hygiene clinic and four (4) public lying-in, Private health facilities, on the other hand, include three 73 medical clinics and 82 dental clinics (Makati City CLUP, 2013-2023).

Mortality and Morbidity

NCR's mortality rate for 2015 was at 5.79 per 1,000 population. According to PSA (2016), ischaemic heart diseases were the leading cause of death (of 44,472 people or 13.3% of the total). Other identified causes of death include cerebrovascular diseases and neoplasms. For females, the neoplasm or "cancer" is the leading cause of death in 2016. Other causes of death are ischaemic heart diseases and pneumonia.

NCR is 2nd in terms of number of deaths of residents in Luzon with 76,839 deaths or 13.2% of all deaths in 2016. Also, a greater number of male deaths occurred with 44,455 or 7.6% compared to female deaths of only 32,384 or 5.6% of the total.

Table 4.23 Number and Percent Distribution of Deaths by Sex: 2016

	Number				Percent		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Sex Ratio
Philippines	592,183	334,678	247,505	100.0	57.5	42.5	135.2
NCR	76,839	44,455	32,384	13.2	7.6	5.6	137.3

Source: Retrieved from

<https://psa.gov.ph/sites/default/files/attachments/crd/specialrelease/2016%20Death%20Statistical%20Tables.pdf> on April 2019

Based on PSA (2018), infant deaths are deaths that occurred before reaching age 1. At the regional level, 3,687 infant deaths were registered in NCR for the year 2016. Registered male infant deaths were higher than female. NCR registered the 2nd high number of infant deaths in the country (at 3,687 deaths or 16.9% of the total).

Table 4.24 Number and Percent Distribution of Infant Death: 2016

	Number				Percent	
	Both Sexes	Male	Female	Both Sexes	Male	Female
Philippines	21,874	12,566	9,308	100.0	57.4	42.5
NCR	3,687	2,126	1,561	16.9	9.7	7.1

Source: Retrieved from

<https://psa.gov.ph/sites/default/files/attachments/crd/specialrelease/2016%20Death%20Statistical%20Tables.pdf> on April 2019

The PSA defines maternal death as "death of a woman, while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the

pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes”.

The Philippines recorded a total of 1,483 registered maternal deaths in 2016. NCR has the 3rd highest number of maternal deaths with 159 or 10.7% of the total.

Table 4.25 Number and Percent Distribution of Maternal Death: 2016

	Number	Percent
Philippines	1,483	100.0
NCR	159	10.7

Source: Retrieved from

<https://psa.gov.ph/sites/default/files/attachments/crd/specialrelease/2016%20Death%20Statistical%20Tables.pdf> on April 2019

Hospitals affected by the alignment are listed in **Table 4.12**. Patients’ access going to these clinics and hospitals will be affected during construction, but once the pedestrian is fully operational, this will also be an advantage for easier and safe access from rail stations and other public terminals.

Traffic Accidents Profile

Based on Metro Manila Development Authority – Traffic Engineering Center (MMDA - TEC) Metro Manila Accident Reporting and Analysis System (MMARAS) 2018 Annual Report, Quezon City and Makati City are the two (2) cities with highest road crash incident. Based on the report, the identified contributory factors for road crash are (1) presence of Central Business District (CBD) in the area with high social and economic activity (2) has a bigger land area compared to other cities (3) there are presence of major networks namely EDSA, C5 and Commonwealth Avenue.

Table 4.26. Classification by District/City (per case basis)

City	Classification by District/City (per case basis)			
	Damage to Property	Fatal	Non Fatal Injury	Grand Total
Directly Affected				
Quezon City	33515	105	5347	38967
Makati	10591	11	780	11382
Pasay	4913	13	890	5816
Adjacent City				
Malabon City	712	7	451	1170
Mandaluyong City	5945	8	682	6635

City	Classification by District/City (per case basis)			
	Damage to Property	Fatal	Non Fatal Injury	Grand Total
Parañaque City	4405	47	1017	5469

Source: Metro Manila Development Authority – Traffic Engineering Center (MMDA - TEC) Metro Manila (2018).
Accident Reporting and Analysis System (MMARAS)

The top five (5) type of collision with highest number of fatalities are (1) Hit Pedestrian with 141 recorded number of fatalities (2) Self-Accident with 54 fatalities (3) Side Swipe 28 (4) Hit Object, 26 fatalities (5) Rear End, 25 recorded number of fatalities.

4.5.5 Utilities

Power Supply

Manila Electric Company (MERALCO) is the main power utility provider for NCR. Provided below is the customer served by MERALCO in the region.

Table 4.27 Customers Served

Customer Classification	Captive Connection	Customer	Sales (MWh)
Residential	5,295,458		11,116,664
Commercial	472,322		12,535,211
Industrial	9,570		5,253,633
Others	4,495		188,221
Total	5,781,845		29,093,729

Source: Retrieved from https://www.doe.gov.ph/sites/default/files/pdf/electric_power/ddp_2016-2025.pdf on April 2019

Water Supply

Metro Manila's main sources of water are the Angat, Ipo, and La Mesa Dams (Manila Water, 2019). Two concessionaires of the Metropolitan Waterworks and Sewerage System (MWSS) exist - the Maynilad Water Services, Inc (MWSI) and Manila Water Company, Inc. (MWCI).

Manila Water is the water utility provider in Mandaluyong, Marikina, Pasig, Pateros, San Juan, Taguig, Makati, and parts of Quezon City and Manila. It also serves Antipolo City and the Rizal towns of Angono, Baras, Binagonan, Cainta, Cardona, Jala-Jala, Morong, Pililla, Rodriguez, Tanay, Taytay, and San Mateo, (MWSS, 2019.)

It has seven (7) business areas in Balara, Cubao, Makati, Marikina, Pasig, San Juan-Mandaluyong, and Taguig-Pateros–Rizal. Both Manila Water and Maynilad are servicing the project areas. Manila Water covers part of Makati and Quezon City while Maynilad is servicing Pasay City and portions of Makati and Quezon City.

Maynilad manages and operates the water and wastewater services in the cities of Manila (except San Andres), Pasay, Parañaque, Caloocan, Muntinlupa, Las Pinas, Valenzuela, and parts of Makati and Quezon City, including the municipalities of Navotas and Malabon. Maynilad also covers Cavite City, and its municipalities of Bacoor, Imus, Kawit, Noveleta, and Rosario (MWSS, 2019).

It has twelve (12) business areas that are further divided into zones, sub-zones and District Metering Areas. (Maynilad, 2019). Both Manila Water and Maynilad are servicing the project areas. Manila Water covers part of Makati and Quezon City while Maynilad is servicing Pasay City and portions of Makati and Quezon City.

Communications

Main telecommunication providers are PLDT, Multimedia, Globe and, Smart. The available internet providers are PLDT, Smart and Globe.

Solid Waste Management System

NCR has generated the biggest volume of wastes. In 2016, the generated waste of the region is 9,212.92 tons per day. Solid wastes are mostly from residential, commercial, industrial and institutional sources. Common types of waste include kitchen scraps, paper and cardboards, glass bottles (**Table 4.28**). Biodegradable wastes are mostly food waste and yard waste. Recyclable wastes are mostly plastic packaging, metals, leather and rubber. Different LGUs put together some projects, such as wastes reduction, segregation, reuse, recycling, collection and disposal, to address solid waste generation in relation to the Republic Act No. 9003. RA 9003, commonly referred as the “Ecological Solid Waste Management Act of 2000, aims to address the growing problem on solid wastes in the country (Philippine Senate Government Publication, 2017).

Table 4.28 Waste Generation 2012-2016 (Tons per Day)

	2012	2013	2014	2015	2016
NCR	8,601.60	8,754.43	8,907.26	9,060.09	9,212.92

Source: Retrieved from

https://www.senate.gov.ph/publications/SEPO/AAG_Philippine%20Solid%20Wastes_Nov2017.pdf. Retrieved on April 2019

Solid Waste Management

Waste Reduction. Based on RA 9003, it is necessary that reduction or waste should be undertaken at source as well as recovery of recyclable materials. Segregation and collection of solid waste generated is at barangay level and the collection of non-recyclable and special wastes is by the city.

Collection. The Local Government Units are responsible for collection, transportation and disposal of solid wastes. Currently, some LGUs administer their

own collection system or employing a private contractor. For instance, in Quezon City, the LGU employs a Package Clean-Up Collection System through a private contractor wherein their main responsibility is to administer and carry out the actual collection, cleaning and disposal of solid wastes from different sources. Although for some barangays, garbage collection is managed through their own trucks.

Waste Disposal. Based on RA 9003, LGUs are required to establish controlled disposal facilities or Sanitary Landfills. In Quezon City, sanitary landfill is in Barangay Payatas, which has three (3) integrated solid waste management facility components: (i) materials recovery and processing facility; (ii) engineered sanitary landfill for the disposal of residual wastes; and (iii) maintenance and post closure care of the Payatas Controlled Disposal Facility.

Key Issues on Utilities

The presence of major utilities has been observed during site inspection along EDSA and respective stations. These above ground power cable poles, underground drainage pipe, water supply pipes and Philippine Long Distance Telephone (PLDT) cables would present constraints to construction of the footbridge foundation, deck and overhead cover as well as landings (i.e. stairs and lift).

Many low hanging cables were observed (some less than 8m above the ground), obstructing pedestrians on the footbridge. In addition, some hanging cables and cable trays also protruded beyond the curb line by approximate 0.7m. It was also observed that there are constraints on the utility pole relocation (e.g. between high voltage cables and low voltage cables at Balintawak) and setting out of the footbridge. Hence, arrangement of utility poles needs to be planned carefully.

The underground drainage pipes, on the other hand, run close to the curb line of the existing footpaths. While, the MWSS pipes, PLDT cables and electric cables are also located in the curb along EDSA. Hence, drain pipes shall be diverted first, prior to commencement of the footbridge foundation works to avoid obstruction of pile construction. Also, these utilities shall be protected with care and closely monitored during execution of construction works

4.5.6 Transportation

With the desired characteristic in making the city a place to live, work and play, the Project will promote an easy access to motor vehicle terminals, rail networks, institutions and city's growth centers. Little by little, the Project will lead to an easy, well linked and balanced access to different facilities and institutions, creating attractive city scape with cleaner and pleasant environment. The Project promotes safe usage and proximity to all available public transport coupled with the lesser number of ride transfers, thus encouraging walking instead of daily commutes especially to near routes.

Currently, the available modes of transportation in Metro Manila are public and private vehicles, buses, jeepneys, utility vehicles, tricycles and taxis and rail transport.

For Quezon City transportation private transportation comprises the majority of trips at 82.49% while public utility vehicles (i.e., buses, jeepneys and taxis) comprise 13.72% and industrial/commercial vehicles (i.e. trucks, vans) at 3.79%. (Ecological Profile of Quezon City. p.32), respectively.

Transportation in Pasay City include mass rail transport, buses, jeepneys, UV/GT express, tricycles, and pedicabs. Often, competition occurs between modes, e.g. *jeepneys* compete with buses, UV express compete with jeepneys, GT express compete with buses, and tricycles with pedicabs. (Pasay CDP, pp.C3-67).

Internal and external linkages in Makati City include roads, transit, mobility and walkability through pedestrian network and bikeway. Also, there is a plan/ presence of ferry system which will link the city through river terminals.

4.5.7 Existing Condition in EDSA

Since EDSA is a primary road, it is expected that heavy vehicular traffic occurs throughout the day, especially during peak hours. The volume and speed of vehicles in the area made it unsafe for pedestrians to cross the road at-grade – thus zebra crossings were subsequently removed, and pedestrians were forced to use elevated footbridges. Also, along this highway, formal bus, jeepney or UV Express stops exist, but are not adhered to by drivers/operators, as PUB and PUJ load and unload at non-designated locations. Pavement markings, which delineate a relatively wide area at EDSA, are usually used for loading of PUB (and PUJ) as well as street vendors at night. In addition, tricycles are also visible in the area, although Ordinance No. 90-6 from the MMDA prohibited them along these roads and are confined to tertiary roads and subdivisions.

In terms of road safety accidents, the MMDA-TEC data shows that EDSA is considered as one of the three key roads on Metro Manila which has the highest recorded road crash incident. There are 17,276 recorded number of road crash accidents in EDSA for the year 2018. The recorded damage to property along EDSA is at 16,086, 21 fatal incidents and 1,169 non-fatal injury. Cities with the most number of road accidents in EDSA are Quezon City, Makati, Mandaluyong, Pasay, Caloocan and San Juan. The identified accident-prone areas in EDSA are Timog Ave – Kamias Road, Aurora Boulevard, Ortigas, Quezon Avenue and Shaw Blvd - SM Megamall.

4.5.8 Source of Income

The majority (or 68.2%) of families in the NCR rely on salaries and wages as their main sources of income.

The employment rate is gradually improving every year. About 78% are employed workers and 20% are self-employed. The laborers and unskilled workers comprised the largest group, which is at 21.9%. The private and government employees are estimated at 18.9% and service workers and market workers are estimated at 15.5%.

About 19.1% of the population rely on other sources such as cash receipts from local and abroad, pension retirement, dividends and investments, house rental, interest income. Only 12.7% rely on entrepreneurial activities.

Small-scale entrepreneurial activities are mostly unregistered and unregulated. These are the informal sectors such as the hawkers, vendors, *kasambahay* and other household help, small storeowners, jeepney / tricycle drivers, etc.

4.6 Social and Cultural Resources

4.6.1 Poverty Reduction

The poverty threshold is the minimum income required to meet the basic non-food needs such as clothing, housing, transportation, health and education expenses. As of 2015, a family of five in the Philippines needed a minimum income of PhP 6,329.00 every month to meet the basic needs of their family and a minimum earning of P9.064.00 every month to meet both basic food and non-food needs.

The poverty incidence in NCR is estimated at 3.9% in 2015. An increase of about 33,799 was recorded from 2012 to 2015. The poverty incidence recorded in 2015 was at 494,630. Women generally bear the greater impact of poverty which lead them to take on work in the informal sector. On top of this, they usually bear most of the burden of unpaid care work. (2013, PCW).

Table 4.29 Thresholds, Philippines & NCR, 2006, 2009, 2012 & 2015

Statistics	2006	2009	2012	2015	Increase (Decrease)		
					2006-2009	2009-2012	2012-2015
Monthly Poverty Threshold							
Philippines	5,566	7,030	7,890	9,064	26.3%	12.2%	14.9%
NCR	6,541	8,011	8,477	10,420	22.5%	5.8%	22.9%

Source: Philippine Statistics Authority (PSA), Quezon City Ecological Profile, 2015

Based on the Initial Poverty and Social Analysis (IPSA), the project is aligned with the Country Partnership Strategy 2011–2016 and will support inclusive growth. The EDSA Greenways Project aims to benefit the poor and increase their chances to participate in economic, social and educational activities. Majority of the public transport and pedestrian users are poor and marginalised groups. They are the key beneficiaries of the Project's goal of providing safe and efficient linkages along one of the busiest transport nodes in Metro Manila, EDSA. The Project will provide highly-prioritised access with security and safety features for the elderly, youth and women. IPSA in **Appendix A** shows the complete condition of social analysis specially the poor, women and resettlement.

4.6.2 Involuntary Resettlement

The following activities will result to involuntary resettlement impacts as qualified under scope of impacts: (i) construction of elevated walkways or viaducts will require landings for escalators/stairs/ elevators as well as land for the support columns; (ii) clearing of the ROW will be necessary to maximize use for the overall project; and (iii) construction along existing operating roads shall require temporary land takes / occupation.

The impacts are:

- (i) permanent loss of land, largely from public and private lands (corporate and individuals),

- (ii) permanent damage to community infrastructures and trees,
- (iii) temporary loss of access to business establishments during construction works,
- (iv) physical displacement of ambulant vendors to alternative selling sites and displacement of 1 homeless individual,
- (v) disruption of city services due to required relocation of electric posts.

The EDSA Greenway Project is deemed to be Category B as civil works will utilize the existing right of way as much as possible thus minimizing the need for land acquisition. Four Resettlement Plans (RP) have been prepared for each station in order to ensure that livelihoods and standards of living of affected persons are improved or at least restored to pre-project levels and that the standards of living of the displaced poor and other vulnerable groups are improved, not merely restored, by providing adequate housing, security of land tenure and steady income and livelihood sources. The objectives will be realized in accordance with the appropriate and applicable Philippine laws, policies and/or guidelines and the ADB Safeguards Policy Statement (2009).

The involuntary resettlement safeguard covers physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) as a result of (i) involuntary land acquisition, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers them whether such losses and involuntary restrictions are full or partial, permanent or temporary. ADB-supported projects are considered significant if 200 or more persons will experience major impacts, which are defined as (i) being physically displaced from housing, or (ii) losing 10% or more of their productive assets (income generating). The level of detail and comprehensiveness of the resettlement plan are commensurate with the significance of the potential impacts and risks.

There are 2-7 landing sites anticipated for acquisition at each station. The areas are briefly approximated in **Section 3.3.4** and may still vary throughout the study. Civil works for the project are planned or anticipated to commence in July 2020. Once the loan is approved by ADB, updated RPs will be prepared based on the results of the Parcellary Survey, Independent Property Appraiser's assessment, and validation conducted by DOTr (**Table 4.30**). Civil works shall not commence until all RP activities have been satisfactorily completed, agreed rehabilitation assistance is in place, and that the site is free of all encumbrances.

Table 4.30 Resettlement Schedule

Activities	Schedule
Preparation of Draft RPs	4th Qtr 2019
DOTr concurrence of draft RP; ADB approval of draft RP	4th Qtr 2019
RP updating / DED	2nd Qtr 2020
Submission to and ADB concurrence of updated RP	2nd Qtr 2020
Payment of compensation	2nd Qtr 2020
Implementation of income restoration program	
Internal monitoring (submission of quarterly monitoring reports)	2nd Qtr 2020 to project completion
Commencement of civil works	3rd Qtr 2020 to project completion

At FS stage, only land acquisition and temporary impacts on land have preliminarily been identified along with affected structures as these largely relate to construction

along existing operating roads where temporary land takes / occupation are envisaged. Temporary use of land during construction will strategically be located to minimize impacts and shall be addressed in the Environmental Management Plan (EMP).

For temporary impacts due to construction, APs shall be entitled to (i) Restoration of land within 3 months of completion of use; (ii) Compensation for affected non-land assets at full replacement cost; and (iii) Cash payment for rent of the affected land at prevailing rental rates in the location of the property until the property is restored. With respect to severance impacts / barrier effect during construction disrupting lateral movement (access), the project will provide for crossings and continued access.

Contractors, per EMP, will be responsible for the arrangement and payment of land rent, restoration of land and compensation for non-land assets. Contractors will also be responsible for restoration of land and compensation for non-land assets.

All other impacts beyond temporary impacts have been addressed in the RPs.

4.6.3 Gender Policies and Issues

Gender Policies

The Philippines has existing national gender mainstreaming mandates being implemented by various government agencies. The infrastructure and transport sectors are governed by these policies.

Republic Act 9710 (RA 9710) or the Magna Carta of Women mandates government agencies to adopt gender mainstreaming as a strategy to promote women's human rights and eliminate gender discrimination in their systems, structures, policies, programs, processes, and procedures. Furthermore RA 7192, also known as the Women in Development and Nation Building Act, directs government units to integrate Gender and Development (GAD) perspective in development planning processes and various stages of the project cycle and to allocate five percent (5%) to thirty percent (30%) GAD budget for their GAD plans and activities. In order to effectively pursue this, the Philippine Commission on Women requires the agencies and LGUs to ensure that the following essential elements are implemented: (a) GAD Planning and Budgeting; (b) GAD Focal Point System; (c) Sex-Disaggregated Database; and (d) Conduct of Gender Audit.

In addition, the Philippine Plan for Gender-Responsive Development (PPGD), 1995-2025, which was signed in 1995 through Executive Order 273, translates the Beijing Platform for Action into policies and strategies and programs and projects towards women's empowerment and gender equality. EO 273 directed all government entities to ensure the full implementation of the Plan's policies/strategies and programs/projects and institutionalize GAD initiatives through integrating GAD concerns in their planning, programming and budgeting processes.

Chapter 15 of the PPGD spells out the Gender and Development Plan for infrastructure development. It states that, "the plan shall pursue the integration of women in all phases of infrastructure development through the encouragement of women's participation and recognition of their actual and potential contributions."

The specific gender goals and objectives of PPGD for infrastructure development are to:

- Promote and increase participation of women in policy formulation, decision-making, planning, implementation, operation and maintenance activities in the infrastructure sector;
- Consider and integrate the specific needs of women in infrastructure development; and
- Develop and expand information generation and dissemination within the sector to encourage greater participation and provide a database for policy formulation and decision-making particularly as it affects women.

To standardize GAD planning, implementation, and monitoring of government units, the National Economic and Development Authority (NEDA) formulated the Harmonized Gender and Development Guidelines (HGDG) for Project Development, Implementation, Monitoring and Evaluation, in collaboration with the National Commission on the Role of Women (now known as the Philippine Commission on Women) and the Official Development Assistance-Gender and Development (ODA-GAD) Network in 2004, with funding support from the United Nations Development Program (UNDP) and the Asian Development Bank (ADB). The HGDG is a common set of analytical concept and tools for integrating gender concerns into development programs and projects. Utilisation of this harmonised tool furthers ADB TA outcome of improving effectiveness of ODA by ensuring quality at entry of projects through alignment of the Government's practices with development partners' safeguard policies in the areas of gender (*ADB TA Report, 2005*).

In the NEDA HGDG, target gender equality results for the infrastructure sector are listed, to wit:

- More time for rest, productive, or reproductive activities due to shorter travel time to and from the market, basic service facilities, or sources of water and fuel;
- Improved women's access to safe and affordable public transport services and infrastructure;
- Greater inputs of women to the design and operation of the infrastructure;
- Increased capacity of women and their organizations to influence decisions about the design, operation, and maintenance of public services and facilities;
- Increased employment of women at all levels (actual construction, technical, and management) in infrastructure projects or services;
- Increased number of women employed in non-traditional occupations; and
- Improved capacity of infrastructure agencies to plan, design, implement, and monitor programs and projects that address gender issues and the concerns of different groups of woman users or women resettled involuntarily.

In accordance to these regulations, the DOTr, as part of the executive department responsible for the maintenance and expansion of viable, efficient, and dependable transportation systems as effective instruments for national recovery and economic progress, and its attached agencies institutionalized GAD in its plans, programs, and budget in 1995. To strengthen its commitment to gender equality, it issued Department Order No. 2012-05, Mainstreaming Gender and Development (GAD) in the Transportation Sector (Policies, Plans, Programs/Activities/Projects) and Strengthening the GAD Focal Points in the DOTr - Central Office, its Project Offices, Regional and Sectoral Offices and Attached Agencies and Corporations. The Department Order aims to (1) institutionalize and mainstream GAD in its National Transportation Plan and its Annual and Medium-Term Programs, Activities, and Projects; (2) integrate the HGDG for Projects Development, Implementation, Monitoring, and Evaluation into the Department's Plans and Programs/Activities/Projects; and (3) establish and operationalize a GAD National Task Force.

In August 2018, DOTr issued Department order No. 2018-018, Revised Implementing Rules on the GAD Guidelines for DOTr Central Office. The Order aims to: (1) provide guidelines and procedures for the establishment , strengthening, and institutionalization of the DOTr's GAD Focal Point System (GFPS); (2) define the roles and responsibilities, composition and structure of the GFPS to enable it to function as a mechanism, for catalysing and accelerating gender mainstreaming in the agency towards the promotion of Gender Equality and Women's Empowerment; (3) institutionalise and mainstream GAD in the National Transportation Plan and in the Annual and Medium-Term programs, activities and projects; (4) implement a Development Study/Social Impact Analysis, and GAD Checklist for Infrastructure Projects; and (5) ensure that the GAD programs, activities, and projects of the DOTr Central Office, Regional Offices, Attached Agency and Corporation are in accordance with the HGDG for Project Development, Implementation, Monitoring and Evaluation.

In August 2011, the Department of Public Works and Highways (DPWH) issued Department Order No. 48: Guidelines for Mainstreaming Gender Equality Actions in Road Infrastructure Projects. The Order prescribed guidelines and procedures in mainstreaming gender equality actions in all phases of road infrastructure projects and prescribe the mechanics for monitoring gender equality actions in DPWH. Furthermore, it states that gender equality actions are to be executed at the planning, design, pre-construction, construction and maintenance stage and all be guided by the Toolkit for Making Road Infrastructure Projects Gender Responsive.

DPWH's policies are cited as part of legal mandates and policies guiding the implementation of EDSA Greenways project, in addition to that of DOTr's and in the absence of a comprehensive instructional manual on GAD and specific policy on gender audit of projects and programs of DoTr. Coordination between the two agencies are required for the success of this project. The 1987 Revised Administrative Code of the Philippines provides that planning, design, construction, and maintenance of infrastructure facilities is under the purview of DPWH.

Pursuant to Section 7 of RA 6685 and in accordance with the Magna Carta of Women (MCW), relevant labor and social legislations and international standard on decent work and gender equality, DPWH issued Department Order No. 130 Series of 2016. *"The DPWH, concerned local government unit/s and Contractors/Subcontractors shall purposively employ women, to comprise at least*

20% of total workforce in skilled or unskilled positions, in various phases and stages of construction/civil work, from planning, design, pre-construction and construction and maintenance for each particular project, to facilitate the implementation of this provision, the aforementioned entities are hereby enjoined to closely coordinate with the Philippine Commission on Women (PCW), the Department of Education (DepEd), the Commission on Higher Education (CHED) and the Technical Education and Skills Development Authority (TESDA) on training provision and the maintenance of a sex-aggregated list of trained and qualified students on non-traditional skills as prescribed in 1.8, Section 16 of the Implementing Rules and Regulations (IRR) of the MCW. Close coordination with local officials of barangays where a project is being implemented is also advised as a means of recruiting sufficient number of Females for available positions. The DPWH, concerned local government unit/s and Contractors/Subcontractors are also enjoined to develop their own programs to intensify women's participation in construction/civil work and to support the contractors in meeting the 20% Female labor requirement. They shall likewise ensure that necessary protective measures and mechanisms, such as RAs 7877 - Anti-Sexual Harassment Policy, 10151 Employment of Night Workers; are set in place to make the working environment Friendly to both women and men."

In the MCW, a separate chapter is dedicated to the rights and empowerment of marginalized sectors' specific needs. Marginalized refers to the basic, disadvantaged, or vulnerable groups or persons who are mostly living in poverty and have little or no access to resources, services, and the justice system. For the purposes of this project, this includes segments of population that may be affected such as the urban poor, workers in the informal economy, children, senior citizens, and PWDs. There are numerous mandates and legislation that cover the protection of these said groups.

RA 7277, otherwise known as Magna Carta for Disabled Persons, as amended by RA 10070, pursuant to Batasang Pambansa 344 or the Accessibility Law, provides for a barrier free environment and ensuring access in buildings and establishments and to public transport facilities. To support this, DOTr released Department Order No. 2014-13: Policies on Transport Accessibility. The Order provides for minimum requirements and standards to make public transportation facilities and utilities accessible to PWDs.

For the elderly, Republic Act (RA) 9257 (Expanded Senior Citizens Act of 2003) and RA 9994 (Expanded Senior Citizens Act of 2010) ensure the protection of Senior Citizens. Section 5f of the law mandates that DOTr develops a program to assist senior citizens to fully gain access in the use of public transport facilities.

These laws and regulations were crafted to address gender and disability issues and concerns in governance, including transport and infrastructure. Many of these concerns and issues spring from the assumption that transport infrastructure and services will equally benefit men and women without taking into account differences in social and economic position and presumed roles they play which affect their mobility, access, and transport needs and utilization. This is particularly noted in the ADB Transport Gender Tool Kit in its discussion of gender differences in travel patterns, use of transport modes, time use and time poverty, access to resources for travel, mobility and safety, and access to and use of transport in rural versus urban areas.

In addition, ADB has a policy to adopt mainstreaming as a key strategy in promoting gender equity. Specifically, “gender issues will be actively promoted in ADB’s loan and TA operations. ADB will promote the mainstreaming of gender considerations in projects at all stages of the project cycle from identification through post evaluation” (*ADB, 2004*).

It is therefore essential for transport infrastructure projects/ programs and services to conduct a comprehensive gender analysis to determine the ways these projects and services may affect men and women and the measures to be undertaken to make it more inclusive not only to women but to other sectors such as PWDs, senior citizens, children, LGBT, and Indigenous Peoples (IPs).

Gender Issues

Women play a key role in development. They comprise half of the labor force and the primary provider of care work. Through the years, participation of Filipino women in the labor force and employment are generally lower than those of men because these women usually bear most of the burden of unpaid care and reproductive work, which prevents them from participating in the economic activity in the same manner or extent as men. According to Philippine Statistics Authority (PSA) Gender Statistics, labor force participation (LFP) gap from 2010 to 2016 between men and women falls between 28.0 to 28.5, except in 2015, where LFP gap was 27.2.

Meanwhile, numerous studies show that women constitute a large portion of the country’s informal sector. These women usually bear most of the burden of unpaid care work and being in the informal work gives them more flexibility in doing paid work, while fulfilling their reproductive responsibilities (*PCW, 2013*).

These women’s triple roles or the multiple tasks and roles that women perform, are found in production, reproduction, and community work. Productive roles are activities performed by both men and women that produce goods and services for consumption or trade. Reproductive roles are usually unpaid work, which involves childbearing, caring, and other domestic tasks that ensure family’s well-being and mostly performed by women. Community work are, most of the time, voluntary work for women while men find themselves more involved in political affairs (*Moser, 1993*). When women are expected to perform these roles simultaneously, they become what we call women’s multiple burden. The features of this burden may differ across classes. Women from the middle class and are employed in the formal sector may have the means to hire someone, who are usually women too, to help them carry out their reproductive tasks but the burden to oversee that these tasks are performed and completed are still primarily upon the women and these tasks are oftentimes invisible and undervalued. The multiple burden may be more glaring for poor women.

Health and well-being are major concerns in care work. Civil works have impacts on the over-all health of the affected community. Ambient air pollution causes respiratory symptoms and allergic diseases in children. Once these children contract these diseases, it is presumed to be the mother’s responsibility to take the child to the hospital, ensure that medicines are bought, and the child recovers quickly to be able to go back to school. Thus, health problems brought about by the project construction to the surrounding community is generally a women’s concern because of the gender division of labor (GDOL) or the delegation of tasks between men and women on the basis of their sex.

GDOL has impacts on women's and men's travel patterns, modes of transport access, and utilization of transport infrastructure and services. Women's reproductive tasks shape and influence their daily mobility. Women have complex travel patterns unlike men who usually just get from point A to point B to get to their purpose of travel. Women on the other hand, cover more locations as part of their multiple roles (taking the kids to school or doctor/dentist, marketing, buying school supplies, etc.) but shorter distances. This is referred to as "trip chaining" (*ADB Gender Tool Kit: Transport, 2013*).

Cultural and social factors can/may restrict women's mobility and travel patterns. The combination of social constraints and low economic resources may result in a low female access to private and intermediary means of transport (*Babinard, 2011*). Most project planning on transport and pedestrian facility is based on men's travel patterns in spite of significant gender differences, that are relevant to transport operations, management and decision making (*European Parliament, 2006*).

Transport modes between men and women may differ due to unequal access to modes of transportation. In the Philippines for example, and Transportation Office (LTO) data will show that in 2018, the number of new male drivers is triple the number of new female drivers (886,337 new female drivers with license and 2,786,316 new male drivers with license). Table below shows that more men can potentially get from one point to another point by driving than women.

Table 4.30 Number of Male and Female with Driver's License in NCR from 2014-2018.

Year	Female		Male	
	New	Renewal	New	Renewal
2014	527,508	371,408	1,855,756	2,459,680
2015	617,104	395,283	2,049,144	2,564,515
2016	628,366	446,752	2,033,553	2,767,061
2017	709,508	525,510	2,365,895	3,026,636
2018	886,337	575,727	2,786,316	3,188,351

Results from the 2015 MMUTIS (*Shibata, 2018*) showed that only 3% of women respondents in the National Capital Region had driver's licenses as compared to 23% of men respondents. Shibata also showed that respondents from the 2015 MMUTIS prefer to use the jeepney (87%), followed by walking, tricycle, LRT/MRT, and then the bus. However, it showed that women passenger rates are higher in tricycle, pedicab, filcab, UV express, while men are seen to use motorcycles and cars.

In addition, personal safety and security are major considerations in women's mobility. Gender inequality perpetuated by social norms render women and girls more vulnerable within and outside their homes. The threat of harassment in the streets may affect and/or limit their mobility. SWS 2016 Safe Cities Quezon City Baseline Study Results indicated that 3 in 5 women have experienced sexual harassment (SH) at least once in their life time. Eighty Percent (80%) of women,

18 to 24 years old, have experienced SH at least once in their life and over 34% of women experience the worst forms of SH such as, flashing, public masturbation, and groping. One (1) in 7 women experienced SH at least once in the past year and 70% of this come from a complete stranger. Furthermore, 58% experience on the streets, major roads, and *eskinitas* (inner streets) with majority of physical SH happening in public transport. Seventy percent (70%) of SH incidence is experienced during the day (6AM to before 6PM).

Among the 15 world's largest capitals, Manila ranked as 7th worst in terms of women feeling safe to travel alone at night, as well as women having been groped or experienced any other form of physical harassment whenever they use public transport in the 2014 survey conducted by Thomson Reuters Foundation in collaboration with YouGov on Most Dangerous Transport Systems for Women². News reports showed that 58% of incidents of sexual harassment transpire on the streets. A Social Weather Station (SWS) 2016 survey also reported that 1 in 7 of women experience sexual harassment at least once every week in Quezon City. Furthermore, 88% of Filipino women, aged 18-24 years old, have experienced sexual harassment.

Harassment case is also present in the context of civil works. Incidence of harassment committed by employees/staff in civil works have been reported globally. A \$265 million World Bank infrastructure project in Uganda was cancelled after evidence of misconduct by a government contractor, including sexual harassment of female workers and road workers having sexual relations with underage girls, has been found. (Berger, 2018) In March 2009, a construction worker in Quezon City was also arrested to catcalling a woman on the street and charged with direct violation of the Quezon City's Anti-Catcalling Ordinance, passed into law in 2016 (ABS-CBN News, 2019).

Given these issues, transport projects may not necessarily benefit women and vulnerable groups if their needs are not considered in the project planning and design. Improved transport infrastructure such as pedestrian improvements may only benefit women to facilitate their access to employment, markets, education, health services, and child care, if these issues are addressed. It is vital that meaningful consultations among stakeholders, including women and vulnerable groups in the city and barangay level are conducted.

The Initial Poverty and Social Analysis Checklist is shown in **Appendix A**.

4.6.4 Vulnerable Groups

Children/ Youth

In 2015, Quezon City has 2,851 youth from 6-17 years old. 1,956 are the recorded males and 895 are females. Based on the Ecological Profile of the city, the 2015 data is lower in the previous years. The decrease is said to be attributed to the advocacy of the city pertaining to children.

²The Thomson Reuters Foundation conducted a survey into women's safety on transport in 15 of the world's largest capitals, as defined by the United Nations, and New York, the most populous city in the United States in 2014. The survey involved questioning 6,555 women and experts in the 16 cities. The survey was carried out in collaboration with a major UK polling company, YouGov. Source: <http://news.trust.org//spotlight/most-dangerous-transport-systems-for-women/>

For Pasay City, the Social Welfare Programs and services includes programs on welfare of children and youth. The type of stakeholders is identified as Children in Need for Special Protection, Children in Conflict with the Law and Youth in Need of Special Protection.

On the other hand, part of social welfare protection for the youth of Makati City is the child-protection ordinance approved last 2017. City Ordinance 2017-098, or The Child Protection Ordinance of the City of Makati prescribes curfew hours from 10 pm to 4am for children below 18 years old including over 18 years old but cannot fully take care of themselves. The ordinance aims to protect children from neglect, abuse and other forms of violence which may have a negative impact on their development.

Laws and ordinances on addressing the concerns and issues of children and youth are in place. These should be integrated in all information dissemination activities the project implementers are conducting. Most of the time, consultations also exclude these segments of the population. Tapping children and youth groups in the affected cities and barangays in involving the younger population will ensure their representation in project preparation, implementation, and monitoring.

Persons with Disability (PWD)

The type of disability is divided into nine types namely: mental, orthopedically handicapped, hearing, speech, visual disability, psychosocial, chronic illness, learning and multiple.

On a national level, PWDs is supported by the government through programs. For instance, the Department of Trade and Industry (DTI) formulated PWD Economic Empowerment Program to provide interventions on enterprise level assistance and policy advocacy.

On a local level, LGUs support the PWDs by creating specific social welfare offices, whose priorities are to support the PWDs. For instance, Quezon City, the LGU created a committee called the Disabled Persons Affairs Committee (DPAC) thru City Ordinance No. SP-158, S-94. It was formed in recognition of the need to involve disabled persons in the active formulation of policies specifically for disabled persons.

As of 2015, there are 29,366 registered PWDs in Quezon City. Males outnumbered females for about 698 differently abled persons. Recorded males differently abled are 15,032 while registered differently abled females are 14,334.

For Pasay City, as of 2018 the recorded number of PWDs of barangays 75 to 75-109, 114-115, 119, 131, 144, 161, 164, 177 184 and 187 is at 358. Out of the 358, 214 are male and 144 are females.

In all the data gathering activities conducted for this assessment, it can be concluded that Metro Manila pedestrian facilities do not meet the users' needs. Participants in the stakeholder's meetings and FGDs have expressed the inaccessibility of existing footbridges and pedestrian facilities to pedestrians, particularly the PWDs. The design of the footbridges' steps is too narrow and too steep, while in other cases, existing footbridges are too high to cross. In other cases, elevators are present but not working.

In most cases, PWDs are perceived to be only wheelchair users. In designing and planning for inclusive infrastructure and facilities, it is very crucial to take into consideration needs of other PWDs apart from those with mobility difficulty and physical impairments to address the needs of other PWDs.

Existing laws on PWDs such as RA 7277, otherwise known as Magna Carta for Disabled Persons, as amended by RA 10070, pursuant to Batasang Pambansa 344 and Department Orders can serve as a guide in project implementation.

Senior Citizens

The elderly population has also given priority by LGUs in terms of protection and special attention. The projects for elderly are especially designed to interact with their peers, articulate their needs, express their interests and participate in developmental undertakings.

Based on PSA data (2015), the total number of senior citizens in Metro Manila is about 851,214 comprising the 11.3% of the total population of the region.

Under Section 4 of RA 994 or the Expanded Senior Citizens Act of 2010, senior citizens are privileged to avail the following

- Free medical and dental services, diagnostic and laboratory services in all government facilities;
- 20% discounts for medicines, hotels, restaurants, recreation centers, concert halls, cinema houses, theatres, medical/dental services, diagnostic and laboratory fees in private facilities, domestic air, sea, travel and public transportation.
- 5% discount in basic necessities and prime commodities, etc.

5 Environment Impact and Mitigation Measures

5.1 Methodology

This chapter assesses the impacts on the physical, biological and socio-economic environment of the proposed project and the recommended mitigating measures to reduce environmental impacts and risks. The process starts with the identification and screening of potential impacts during different phases of the project (pre-construction, construction and operation phases). The following project components and activities that will have substantial interaction with the environment were identified:

Project Components and Activities for each Project Phase

Project Phase	Project Components and Activities
Pre-construction	Design of elevated walkway
	Relocation of utilities
	Clearing of vegetation
	Land acquisition and resettlement
Construction	Mobilization of equipment and personnel
	Land clearing and resettlement
	Construction of elevated walkway
	Operation of equipment
	Transportation of construction materials
	Traffic management
Operation	Demobilization of construction site
	Maintenance works
	Maintenance of vegetation

The identification of potential impacts requires the identification of the components of physical, biological and socio-economic environment that are at risk from the proposed construction of elevated pedestrian walkway. A modified Leopold matrix, involving interactions between valued environmental components and project activities are proposed. Valued environmental components (VECs) are defined as fundamental elements of the physical, biological or socio-economic environment, including the air, water, soil, vegetation, and land use that may be affected by a proposed project. The VECs for the proposed project are the following:

Summary of VECs for the Proposed Project

Environment	Valued Environmental Components
Physical	Disturbance of soil
	Surface water quality
	Air quality, noise
Biological	Flora
	Fauna
Socio-economic	Affected land and structures
	Public infrastructure
	Public transport
	Walkability
	Sound environment

Environment	Valued Environmental Components
	Aesthetics
	Employment and income
	Community and occupational health and safety

The assessment of potential environmental impacts requires the definition of the effects associated with the state highway upgrading in terms of intensity, duration, and scope as follow:

- i. **Intensity of the effect:** The intensity of the effect refers to the level of disruption to the component. Three levels have been defined:
 - a. Low: Little change in the characteristics of the component. Difficult to quantify.
 - b. Average: Change in certain characteristics of the component. The change may be quantifiable.
 - c. High: Change in all or in the main characteristics of the component. The change is quantifiable.
- ii. **Duration of the effect:** Duration means the time dimension of the effect. The terms permanent, temporary and short are used to describe the period of time:
 - a. Short-lived: the effect disappears promptly.
 - b. Temporary: the effect is felt during one project activity or, at most, throughout implementation of the project.
 - c. Permanent: the effect has repercussions for the life of the infrastructure.
- iii. **Scope of the effect:** The scope describes the spatial dimension of the effect caused by an action in the environment. It refers to the distance or area covered by the disruption. The terms regional, local and limited are used to describe the scope:
 - a. Limited: the scope is limited when the action affects only one environmental element located near the project.
 - b. Local: the scope is local when the action affects the study area.
 - c. Regional: the scope is regional when the action affects areas beyond the study area
- iv. **Assessment of the potential effect:** These three parameters are incorporated into a multicriteria matrix, making it possible to place the potential effect into one of three major categories:
 - a. Major (MAJ): signifies an effect that is permanent and that affects the integrity, diversity and sustainability of the element. Such an effect substantially or irretrievably alters the quality of the environment.
 - b. Medium (MED): signifies a perceptible, temporary and/or low return effect that has little impact on the environmental component and is not irreversible. Such an effect is short-lived and/or limited in scope.
 - c. Minor (MIN): signifies that the effect is non-existent or virtually non-existent, that it does not affect the environmental component in any observable or quantifiable way and that it is related to a randomly occurring natural effect. As a rule, this would be a short-lived effect, limited in scope.

Mitigation measures were identified to reduce the significant adverse impacts including residual effects. The analysis of impacts as shown in Table 5.1 revealed the following:

- a) During the pre-construction phase, major potential negative impacts include possible disruption of services due to relocation of utilities, involuntary resettlement and possible cutting or relocation of trees, traffic disturbance, and displacement of informal business sector.
- b) During construction phase, major potential impacts include occupational health and safety risks, health and safety risks to the public, and impacts on poor women, children, and PWDs.
- c) No anticipated major impacts are anticipated during operation phase of the project.

The construction will include civil works along each city's main thoroughfare, thus there should be awareness on traffic and hazard conditions along the area. Traffic management such as temporary alternative routes along with safety measures should be recommended. Other mitigation measures, such as control of air, water and noise pollution, as well as proper waste management should be implemented. These and all other mitigation measures for environmental and social aspects will be elaborated in the EMP.

5.2 Potential Beneficial Impacts

The overall goal of the Project is to enhance pedestrian mobility, access and safety around key rail stations along EDSA with targeted pedestrian infrastructure enhancements including, but not limited to, covered, elevated walkways leading to/from the stations and nearby land uses. Potential enhancement of pedestrian access has wider benefits for Metro Manila area including:

- Reducing walk times and improving the pedestrian experience for existing public transport users to keep them from driving or using road-based modes;
- Widening the catchment area of rail stations to better connect nearby land uses with the mass urban public transport system of Manila;
- Improving pedestrian safety and comfort, while at the same time reducing conflicts on the street level between pedestrians and motor vehicles;
- Facilitating modal shift from vehicles to walking and public transport (to the extent that capacity of the rail stations allows), thereby reducing negative impacts from driving (including carbon and noise emissions) as well as potentially reducing congestion on EDSA and other key roads; and
- Generating wider economic benefits for local businesses as well as the greater region through congestion reduction and increased footfall (pedestrian activity) to nearby land uses and development.

Targeted pedestrian enhancements will also seek to achieve the following objectives at the local station-level:

- Safer environment to access the transport network and nearby communities;

- Security from negative elements and hazards;
- Protection from the elements (rain / hot direct sunlight);
- Efficient movement for pedestrians including sufficient capacity, reduced walking distance and/or time, more gradual slopes/stairs;
- Convenient and attractive interchange with and among public transport modes (focusing on rail and bus) to encourage greater public transport use to reduce congestion;
- Provision of mobility assistance for level changes (lift/ travellers); and
- Facilities for all types of users, taking into account gender and mobility needs.

5.3 Potential Adverse Impacts and Mitigation Plans

Potential impacts on the environment and socio-economic during the design, construction and operation and maintenance phases are identified in the following sections, and mitigation plans have been proposed, if necessary.

Design Phase

Utility

There are telephone and electric poles located within the alignments of the Project. It is likely to interrupt the telecommunication and electricity service due to the relocation of poles and wires without proper communication and management with the service providers/agencies.

Therefore, the inventory of the affected utilities will be prepared during the design phase prior to the construction phase. If there are identified affected business during the relocation of utility poles, consultation and liaison with the identified stakeholders and service providers/agencies will be conducted. Sufficient time for information disclosure on possible service disruption during relocation of poles and wires will be allocated to minimize major possible interruptions to residents and businesses. If needed, provision of water deliveries to affected communities will be planned and, necessary permits will be secured prior to the Project construction.

It was observed that there are cables hanging below the fixed 8m above ground height and cable trays extend beyond the curb line by approximate 0.7m. To avoid utility poles and cables clashing with the elevated walkway deck, overhead cover and landings, as well as to avoid obstruction of pile construction, utility poles shall be relocated, and cables shall be raised.

As a piling rig should be not less than 12m high for pile construction, cables shall be raised first before foundation works get start.

As-built information for the utilities has been requested to verify the condition if any clashes and subsequent diversion planning if required. Further liaisons with utility undertakers, e.g. DPWH and MMDA for drainage pipes, Meralco for electricity cables, PLDT for telecom cables MWSS for water pipes are required. Also, consent shall be obtained from utility undertakers' priority to diversion of underground utilities or relocation of utility poles.

For diversion of electricity cables and PLDT cables will be undertaken by Meralco and PLDT respectively. The diversion works shall be paid by the Client. For diversion of drainage pipes and water pipes will be carried out by the Contractor of EDSA Greenway Project with the license by DPWH, MMDA and MWSS.

There are also observed drainage pipe under the sidewalk, close to the curb line of EDSA and along respective stations, in which the drainage pipe has been laid in the curbside lane of EDSA. While, there are also observe MWSS pipes, PLDT cables and MMDA TEC cables at these curbs along EDSA.

To avoid underground utilities clashing with foundations for footbridge and landing, as well as to avoid obstruction of pile construction, underground utilities shall be diverted.

During foundation construction, minor underground utilities, e.g. MWSS pipes and PLDT cables shall be protected with care. These utilities shall be closely monitoring during execution of construction works.

Utility poles realignment and cables lifting works will be carried out by Meralco and PLDT completed within the allowed time (about 6 months). The implementation timeline is also discussed in **Section 3.4.1**.

Civil Works, Land Acquisition and Existing Properties and Infrastructure

Certain areas of land are required for the civil works and the stockpiling area for construction materials (i.e. sand and brick aggregates), which will partially fall within some private land lots. Thus, portions of land should be acquired from private owners. Land acquisition may be required to obtain the ROW, which may trigger involuntary resettlements.

To minimize the land acquisition, the civil works shall utilize the existing ROW. Purchase or lease of land will be considered should there be temporary and permanent land intake envisaged. An agreement should be settled between DOTr and the land owner. Identification and estimation of private property take and the relevant stakeholders who own the land is critical. Detailed resettlement plans and negotiation with stakeholders are also required.

There are some buildings over 20 stories tall along either side of EDSA (i.e. in Common Station and Balintawak Station). Even protrusions from buildings have been observed into the footpath. Building protrusions present constraints during construction of footbridge and landings.

The footbridge alignment is envisioned to pass through retaining walls in between the schools, driveways, shopfronts, property access driveways and even popular malls. Hence, proposed footbridge foundation should avoid sitting directly on top of or positioning too close to the retaining walls and span over the driveway and shopfronts. Temporary modification of existing driveways and structures can also be proposed to minimize disruptions. Further liaisons with property owners are required, while impacts on the retaining structure need further assessment based on as-built information once available.

Based on the site observation, street lightings, sign gantry and traffic signs have been identified along EDSA and other roads and highways at respective stations. Field findings show that the street lighting extend beyond the curb line of footpath, while sign gantry constraints the profile and soffit level of the footbridge deck. It

appears to clash with proposed footbridge structures. The street lightings and signages are envisaged to be removed and reinstalled under the soffit of proposed footbridge deck, while the traffic sign arrangement in temporary case and permanent case need to be planned carefully. but subject to DPWH and MMDA agreements.

Also, some of the landings that have been proposed are close to building basements, underground structures and embankments that may impact the foundation of the elevated walkway. Hence, proposed footbridge foundations should avoid sitting directly on top of or too close to the basements, underground structures and embankment to minimize disruptions. These sited landings, as discussed in **Section 3.3.4** Potential Land Acquisition at Landing, need further assessment based on as-built information of building basements once available.

To improve the existing footbridge network, replacement at key locations has been proposed. Replacement of such crossings must occur simultaneously with the new elevated walkway along EDSA. That means it must be demolished first before footbridge construction. Knocking down existing footbridges would induce temporary impacts on pedestrian flow to cross EDSA.

Further liaison with MMDA on modification, replacement and demolition works of the existing footbridge is required. Also, consent shall be obtained from MMDA priority to modify or replace the existing footbridge structures.

In addition, some planters and trees appear to clash with the proposed footbridge alignment. Hence, those planted trees are envisioned to be removed and transplanted. Further liaison with the park owner on tree removal and footbridge construction works inside the parks are required. Also, consent shall be obtained from the park owner priority to commencement of tree removal and footbridge construction works. Though some of these plants are not ecological important species, an inventory of trees and application for tree cutting/ balling permit should be done, if necessary. The pedestrian improvements will work around and incorporate existing trees if found present in the area.

Traffic

The Project will be located along main thoroughfare, residential area and commercial area, where there are crowds of people and traffic. Potential traffic and hazard driving conditions are anticipated along the area. EDSA with 3-5 lanes carries significant traffic volumes in the peak. To maintain adequate traffic flow, working space is restricted. Hence, planning of works area and temporary traffic management scheme to facilitate the construction works of proposed footbridges shall be a challenge. Also, this limited works area constrains the use of construction plants and construction method for the proposed footbridges.

To accommodate works area of the main footbridge, road width along EDSA must be temporarily reallocated during construction. In view of the construction, temporary PUV stops should also be designated and prepared for should the existing ones be affected. To avoid potential traffic and hazard driving conditions, proper traffic management measures will be considered. Based on the traffic flow study, temporary alternative routing is considered necessary to avoid heavy traffic and risks in the area. Traffic management plan/ guidelines and training will be prepared to improve the potential traffic and hazard driving condition. Temporary Traffic Management (TTM) will be implemented on the first 2 months of the construction time line. The implementation timeline is also discussed in **Section**

3.4.1. Traffic performance during construction for each station is discussed in the following section. Furthermore, the traffic performance calculation are presented in **Appendix I**.

Traffic Performance during Construction

During construction, a work area of 7.5m (including 1.5m for a temporary footpath) is typically required. As the existing EDSA footpath would also be included in the required 7.5m for this works area, the additional width would be obtained by: (i) reducing the carriageway by one lane temporarily during construction; and (ii) by temporarily reducing the remaining lanes down to a minimum width of 2.8m during construction as per MMDA discussions. Traffic impacts during construction and after completion are based on the volume-capacity ratio (or V/C ratio). The V/C ratio is referenced from Hong Kong's Transportation Planning and Design Manual (TPDM) to gauge traffic performance, where capacity differs based on width of the lanes and other factors. Use of V/C performance was already adopted in cases in the Philippines including the Davao City Coastal Bypass Road & Tagum City Flyover, which is a DPWH Project. Any traffic performance at or above 1.2 V/C is considered unacceptable during construction or after construction.

Balintawak Station

At present, EDSA has 5-6 lanes, with the narrowest section found on northbound EDSA, just near the Mariano Bridge with three (3) lanes (Location A9). Current V/C ratios range from 0.04-0.86 in the AM and PM Peaks.

Balintawak A9 and A10 will require a narrow works area due to no temporary footpath will be provided during construction. A narrower temporary footpath of 1.0m is provided on A5 and A6 segments, and 1.2m on A11, so the works area is below 7.5m. Besides, A narrower works area of 4.5m is proposed at A9, A10, A11 and B3 due to narrower carriageway.

The results of the traffic analysis along EDSA during the construction period is shown in **Figure 5.1** and along A. Bonifacio Ave. in **Figure 5.3**. During construction, a works area of 7.5m (including 1.5m for a temporary footpath) is required – this could be obtained from reallocating roadway and the footpath. However, in cases where the resulting number of lanes (in either Scenario 1 or 2) is below the MMDA mandated minimum width of 2.8m during construction or the V/C exceeds 1.2m, then modifications to the works area or temporary footpath, or other special treatment may be necessary.

Reduction of these road segments by one (1) lanes results in higher V/C, but V/C is typically below 1.2, which is the acceptable threshold (except for two locations A9 and A10 discussed below).

Thus, in conclusion, traffic will perform adequately during construction so long as one lane is reallocated for the works area and special measures undertaken at specific locations.

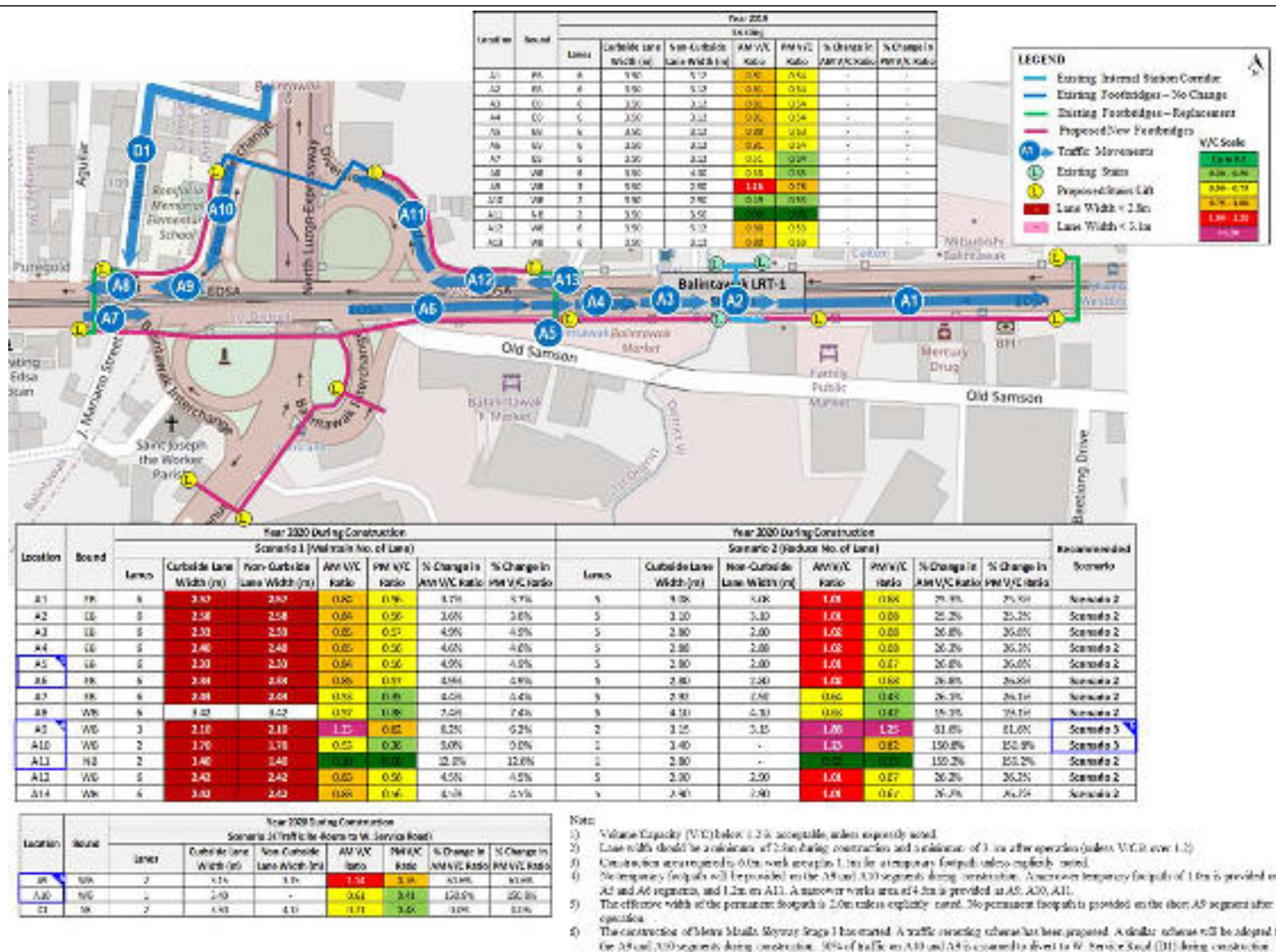


Figure 5.1 Traffic Performance during Year 2020 (Construction) – Balintawak Station (along EDSA)

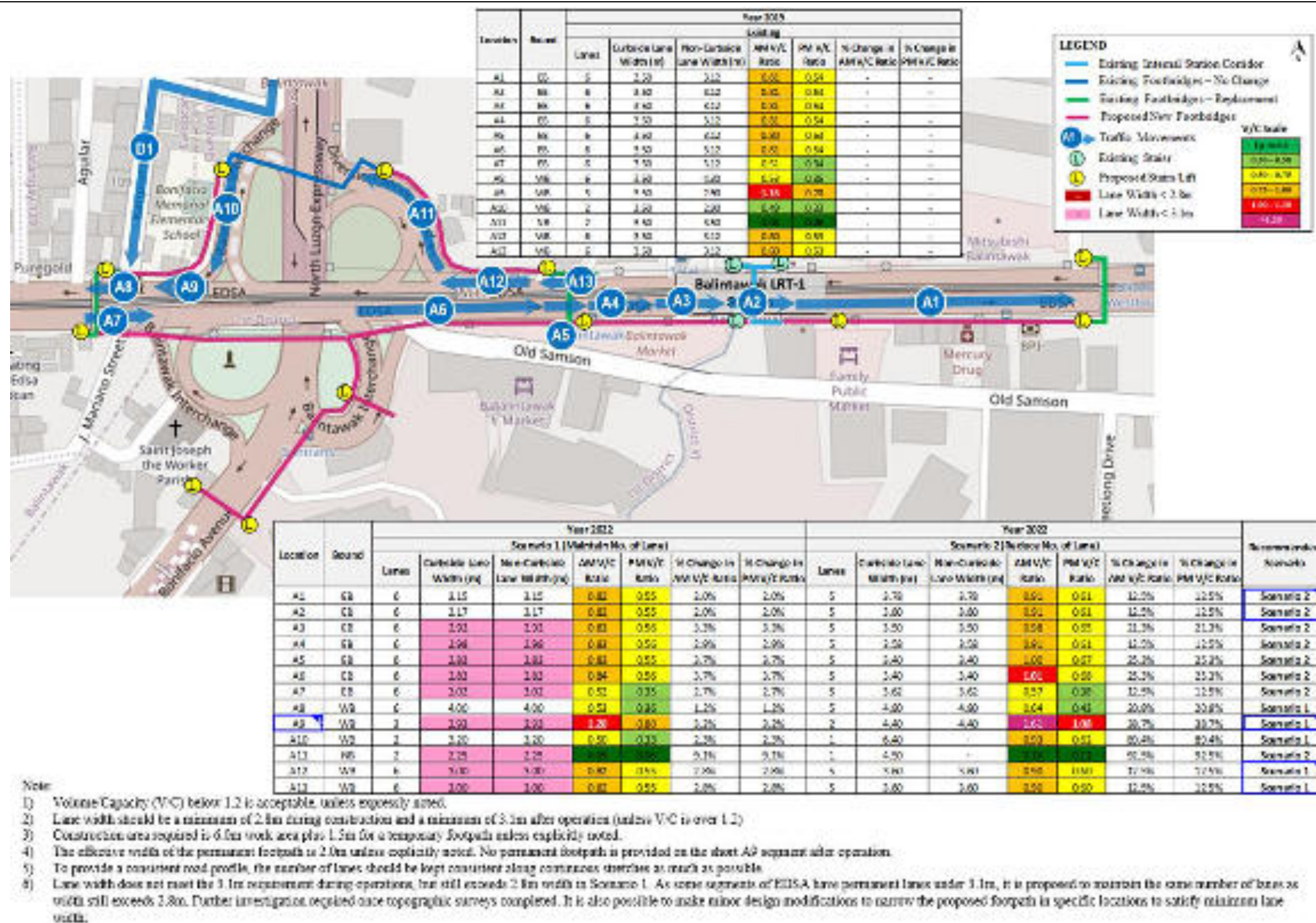


Figure 5.2 Traffic Performance during Year 2022 (after Implementation) – Balintawak Station (along EDSA)

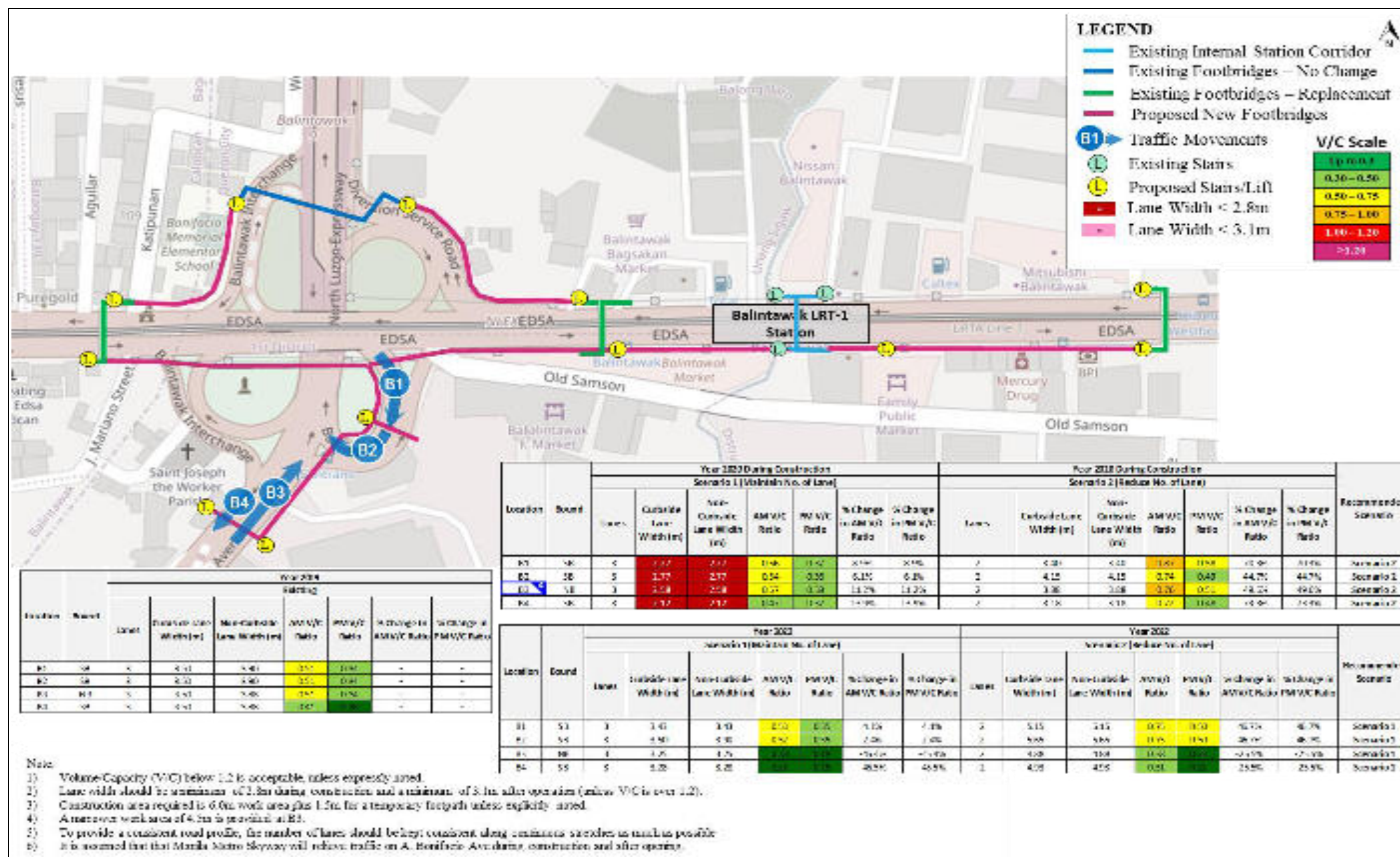


Figure 5.3 Traffic Performance during Year 2020 (Construction) and Year 2022 (after Implementation) – Balintawak Station (along A. Bonifacio Ave.)

Common Station (Long-Term)

The results of the traffic analysis during the construction period is shown in **Figure 5.4**. At present, lane configurations on EDSA, North Ave, West Ave and Mindanao Ave range from 2-6 lanes. Currently V/C ratios range from 0.18-0.48 in the AM and PM Peaks.

During construction to the east of Common Station, several projects may also be concurrently being undertaken – the North Ave. / Mindanao Ave. Flyover and the North Ave. / Mindanao Ave. Underpass. This situation would represent the “worst case” scenario where other projects are on-going, and each needs their own works area for construction. The flyover and underpass projects would impact the inner-most lanes, while the footbridge on North Avenue would impact the outer-most lanes (due to the portal structure).

The flyover and underpass projects would alter the current North Avenue and Mindanao Avenue configurations and leave them with 2-3 lanes in each direction. Meanwhile, the footbridge construction would require a works area of 7.5m (including 1.5m for the temporary footpath). Given these requirements, the Greenway construction must be well coordinated with that of the flyover and underpass.

West of Common Station – at the junction of EDSA, North Avenue, and West Avenue, a works area of 7.5m (including 1.5m for a temporary footpath for some segment) for the footbridge is required. Segment A2 will require a narrower works area due to a narrower temporary footpath of 1.0m.

The required width for the works area could be obtained from reallocating both portions of the roadway and the footpath. In cases where the resulting number of lanes (in either Scenario 1 or 2) is below the MMDA mandated minimum width of 2.8m during construction or the V/C exceeds 1.2m, then modifications to the works area or temporary footpath, or other special treatment may be necessary.

For the Common Station analysis, half of the road segments can maintain the same number of lanes as currently during construction – with resulting lanes being narrower, but still able to meet the 2.8m minimum width and V/C less than 1.2. These include Sections A1, A2, A3, and A4, concentrated to the west of Common Station.

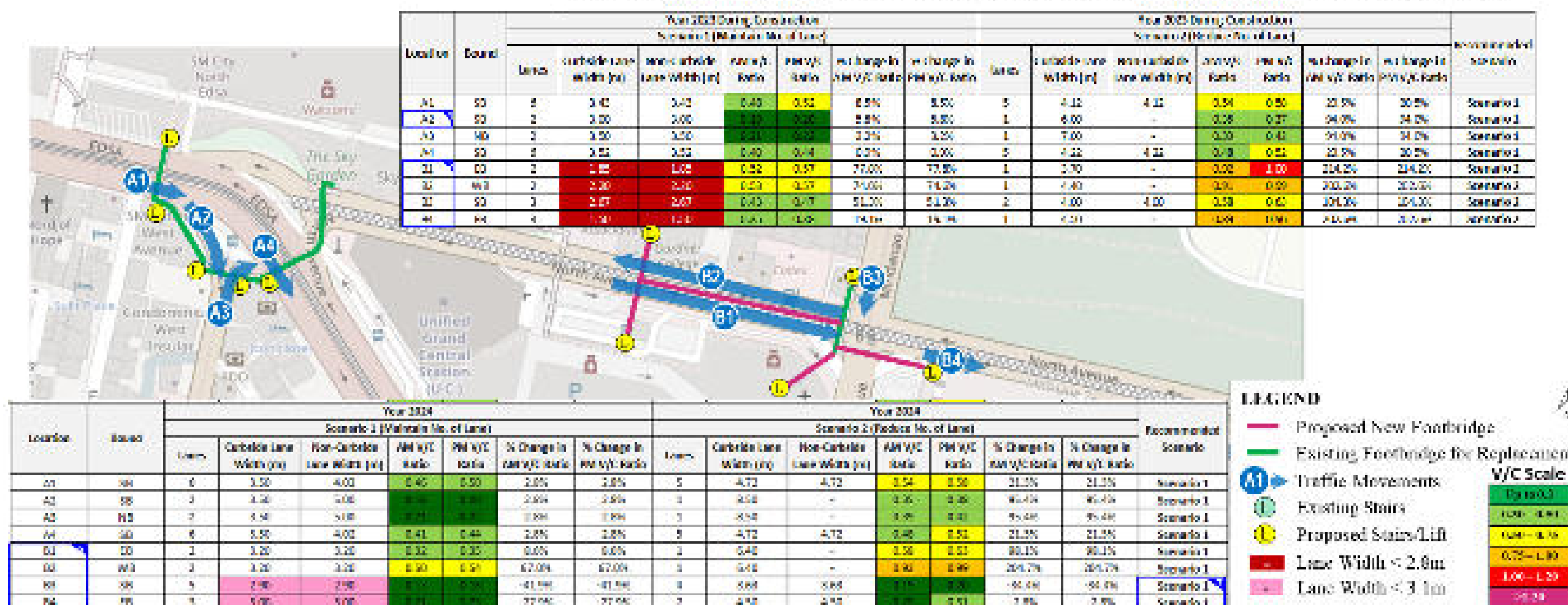
Four sections will require reduction of one to two lanes during construction (all around the Mindanao/North Avenue junction and along North Avenue). Despite this reduction, lane widths are still wider than 2.8m and have V/C well below 1.2.

Thus, no major traffic issues are envisioned during construction – so long as the Greenway construction is well integrated with that of the interfacing projects along North Avenue.

Location	Bound	Year 2019					
		Existing					
		Lanes	Carriageway Width (m)	Non-Carriageway Lane Width (m)	AM V/C Ratio	PM V/C Ratio	% Change in AM V/C Ratio
A1	S2	5	3.32	4.02	0.44	0.48	-
A2	S4	2	3.4	4.35	0.44	0.44	-
A3	N3	2	3.32	3.00	0.52	0.52	-
A4	S4	5	3.4	4.07	0.42	0.44	-
B1	E2	3	3.32	4.00	0.33	0.33	-
B2	N3	3	3.32	4.00	0.33	0.34	-
B4	S4	4	3.4	4.44	0.33	0.34	-
B4	E2	3	3.32	4.00	0.33	0.33	-

Note:

- 1) Volume/Capacity (V/C) below 1.2 is acceptable, unless expressly noted.
- 2) Lane width should be a minimum of 2.8m during construction and a minimum of 3.1m after operation (unless V/C is over 1.2), unless expressly noted.
- 3) Construction area required is a 6.0m work area plus 1.5m for a temporary footpath unless expressly noted.
- 4) A temporary footpath of 1.0m is provided at A2 during construction.
- 5) During the footbridge construction, it is assumed that the North Ave. / Mindanao Ave. Underpass and North Ave. / Mindanao Ave. Flyover are concurrently being constructed. Construction of these projects would affect the width of the inner lanes, while the footbridge construction would affect the outer lanes due to the portal configuration of the 8m bridge. Based on the most recent drawings for the Underpass and Flyover, two lanes will be retained in sections B1 and B2, and three lanes in sections B3 and B4.
- 6) After construction of the footbridge and the noted flyover and underpass, two lanes will be retained on B1 and B2, five lanes on B3 and three lanes on B4, respectively. This is thus assumed to be the base case for the after construction period in 2024. 35% of expected traffic assumed to use the flyover and underpass depending on direction.
- 7) Lane width does not meet the 3.1m requirement during operations in Scenario 1, but still exceeds 2.8m width. As some segments of ED&A have permanent lanes under 3.1m, it is proposed to maintain the same number of lanes in this section as width still exceeds 2.8m. Further investigation required once topographic surveys completed. It is also possible to make minor design modifications to remove the proposed footpath in specific locations to satisfy minimum lane width.
- 8) To provide a consistent road profile, the number of lanes should be kept consistent along continuous stretches as much as possible.



Cubao Station

Traffic performance is broken up by three segments: (i) EDSA Footbridge (shown in **Figure 5.5** (for the at-grade portion of EDSA) and **Figure 5.6** (for the underpass section of EDSA)); (ii) Aurora Footbridge (shown in **Figure 5.7**); and (iii) the EDSA/Aurora Footbridge (shown in **Figure 5.8**).

Cubao Station: EDSA Footbridge

This portion of EDSA has both an at-grade and an underpass section. The at-grade portion of EDSA currently has three lanes in each direction along this stretch, with V/C ranging from 0.54-0.94 in the AM and PM Peaks. The underpass section has three lanes in each direction, with V/C ranging from 0.4-0.76 in the AM and PM peaks. Currently, the split in traffic between the at-grade and underpass section is 50/50 (that is half of the traffic operates on the at-grade portion and half on the underpass section in both directions).

During construction, a typical works area of 7.5m (including 1.5m for a temporary footpath) would be required along the at-grade portion. However, retaining the same number of lanes in this segment is not feasible as the resulting lane width is below 2.8m for all but one segment. Therefore, all sections of at-grade EDSA affected by construction in the graphic would be reduced by one lane. Assuming that additional traffic is diverted to the underpass (assuming 70% instead of 50% currently), the resulting at-grade V/C would be under 1.2m, therefore traffic could perform adequately during construction, even with the loss of one lane in these sections. With additional vehicles during construction, the underpass will also experience reduced performance, although with three lanes, performance will still be under V/C of 1.2.

Special treatments would be required including narrowing the temporary footpath from 1.5m to 0.9 m along southbound EDSA from the Monte de Piedad Footbridge to Cubao MRT-3 Station, as well as on northbound EDSA from the Gen. McArthur Footbridge to Cubao MRT-3 Station.

Cubao Station: Aurora Footbridge

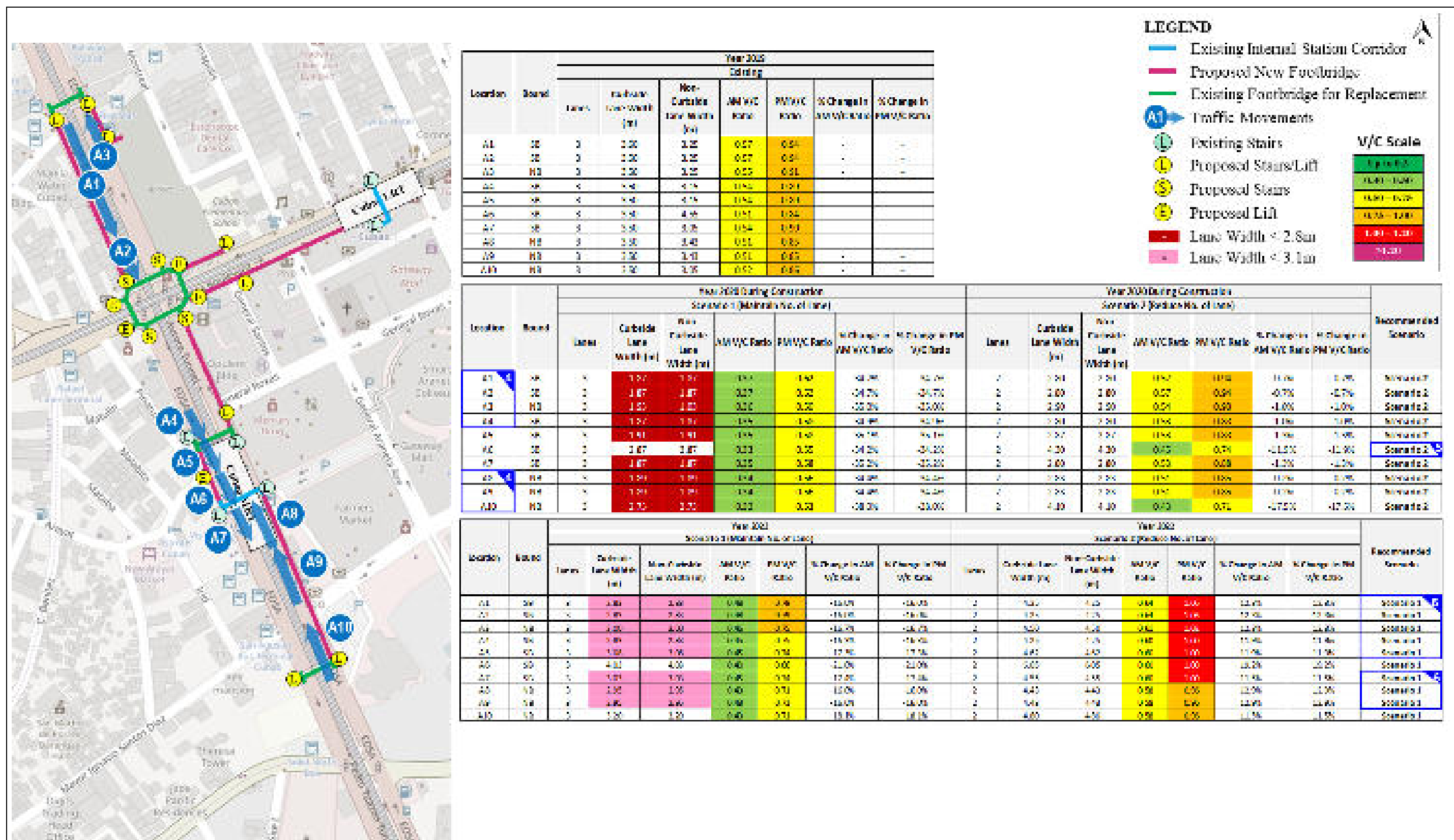
The results of the traffic analysis during the construction period is shown in **Figure 5.7**. At present, the EDSA and Aurora Blvd. have 2-3 lanes by direction. Currently, V/C ratios range from 0.19-0.85 in the AM and PM Peaks. Segment B2 and B3 will require a narrower works area due to a narrower temporary footpath of 1.0m.

Like the north-south EDSA portion, maintaining the same number of lanes is not possible as resulting width would be well below 2.8m for most segments. Therefore, reduction of one lane is proposed – in such cases V/C is still well below 1.2, which indicates traffic would still perform adequately even during construction.

The eastbound portion of Aurora Blvd. (B7) between Gen. Araneta and Cubao LRT-2 Station is a special case, as reducing the road profile by one lane still cannot provide wide enough lanes (as per the figure, the resulting lane width is 2.48m). A special temporary contraflow lane is proposed using one lane of the westbound Aurora Blvd., to provide a second lane (both of which meet the 2.8m width requirement). Traffic on Aurora Blvd. in both directions (including with one contraflow lane using a westbound lane) can still perform at V/C below 1.2 and is considered to perform adequately.

Cubao Station: EDSA/Aurora Junction Footbridge

The results of the traffic analysis during the construction period is shown in **Figure 5.8**. A narrow temporarily footpath of 1.0m is provided near the north legs of EDSA/Aurora Footbridge on northbound and eastbound EDSA (including Segment C1 and C2). To meet the minimum width requirement of 2.8m during construction, one lane will be taken from southbound EDSA (near the north leg of the EDSA/Aurora Footbridge) and westbound Aurora Blvd (near the west leg of the EDSA/Aurora Footbridge) during construction. Resulting V/C ranges from 0.16-0.80 in the peak, which is still below the 1.2 V/C threshold and considered acceptable.



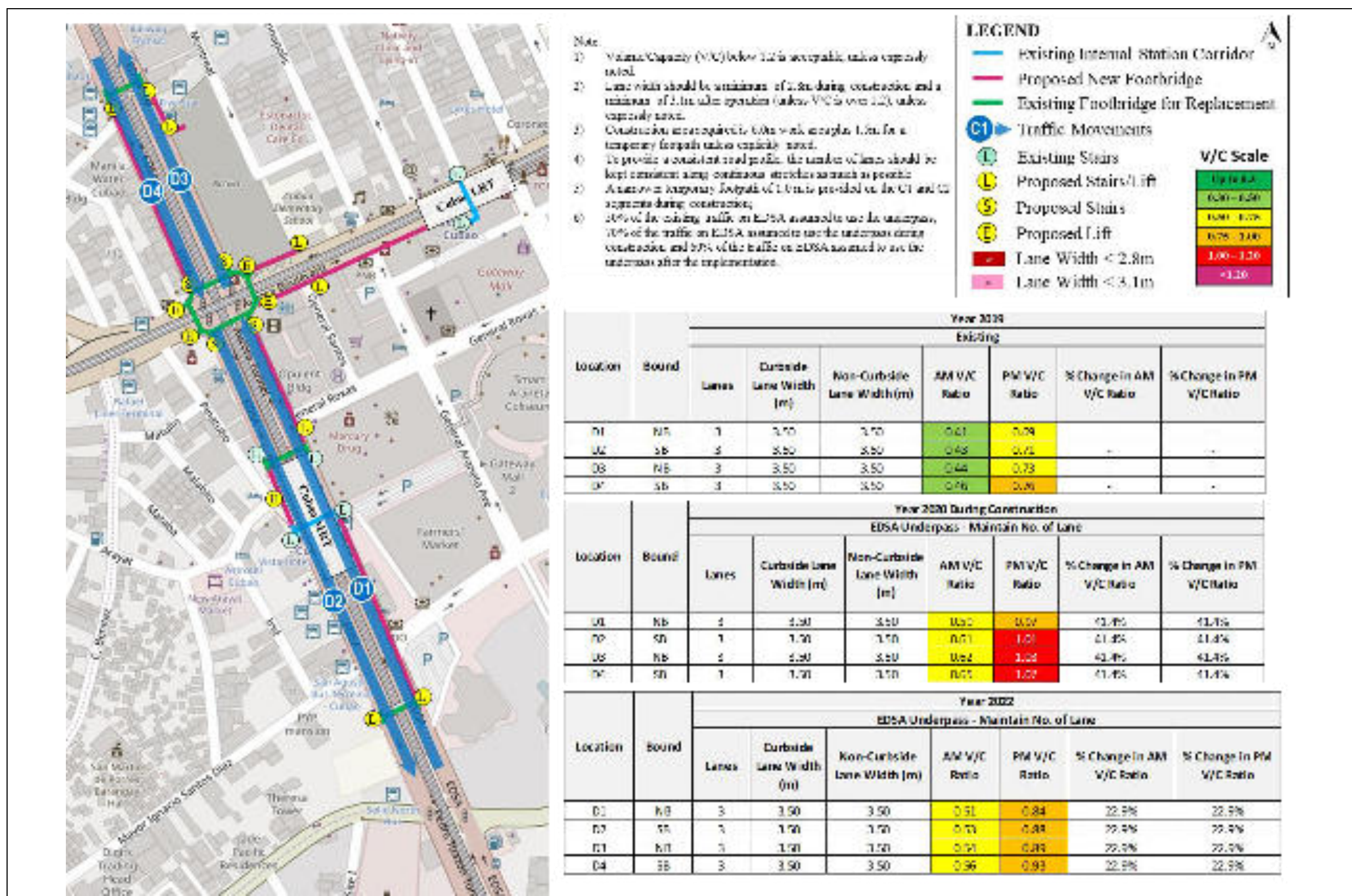


Figure 5.6 Traffic Performance during Year 2020 (Construction) and Year 2022 (after Implementation) – Cubao Station (for EDSA Underpass)

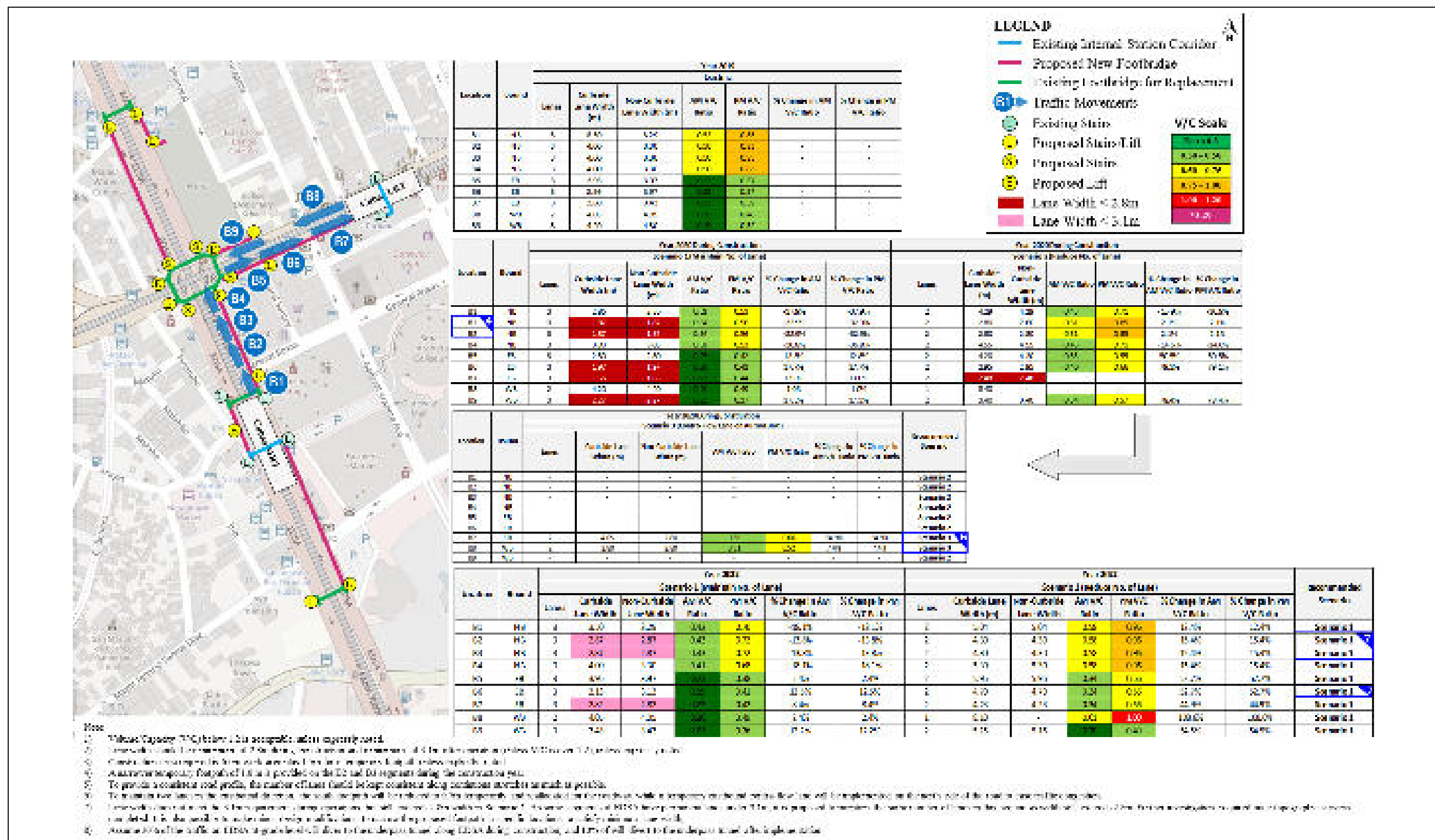


Figure 5.7 Traffic Performance during Year 2020 (Construction) and Year 2022 (after Implementation) – Cubao Station (along Aurora Blvd.)

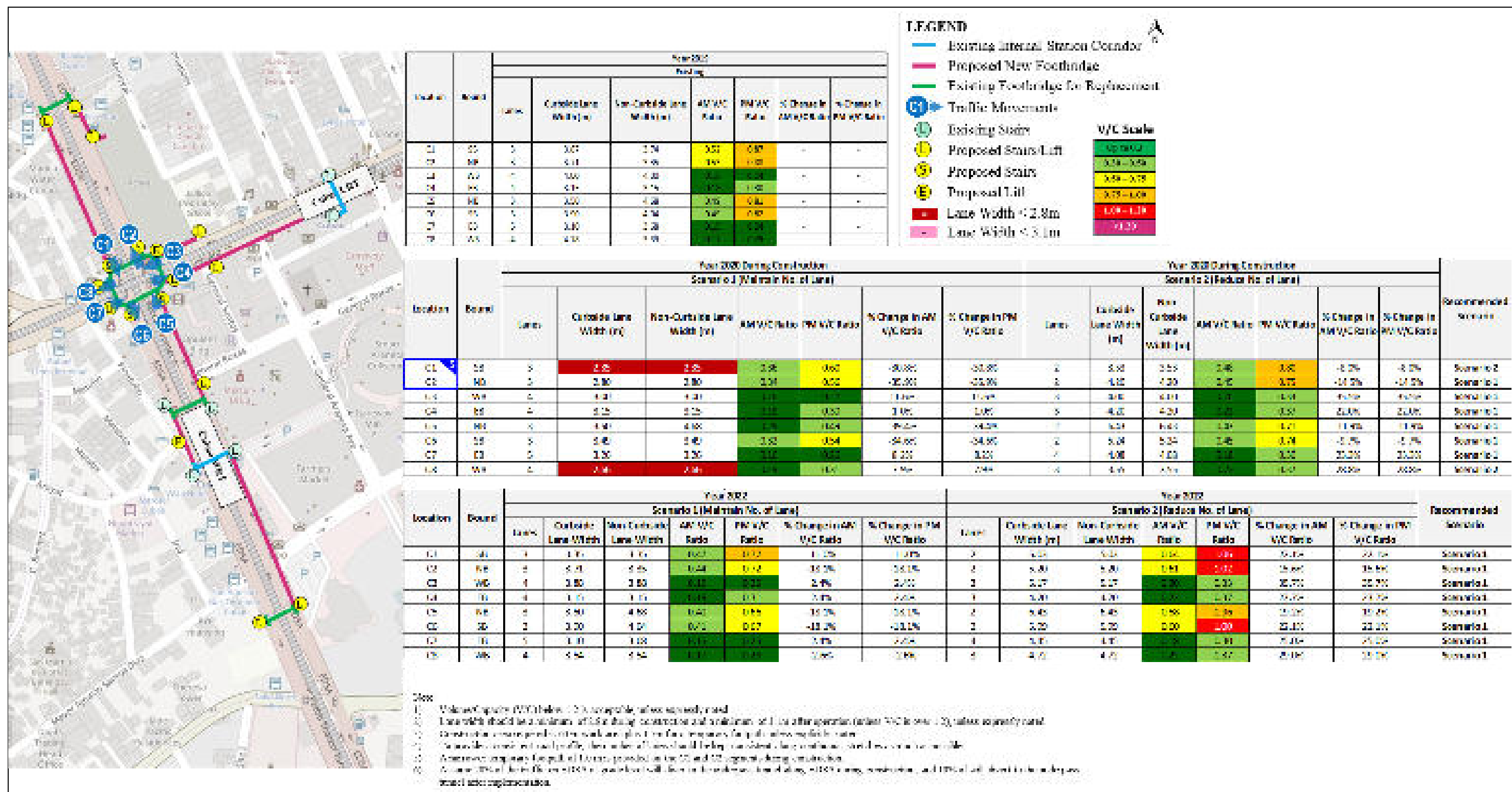


Figure 5.8 Traffic Performance during Year 2020 (Construction) and Year 2022 (after Implementation) – Cubao Station (around EDSA/Aurora Junction)

Guadalupe Station

Guadalupe is divided into two portions for the traffic analysis: (i) South of Guadalupe MRT-3 Station (from the station to Guadalupe Footbridge along EDSA) as shown in **Figure 5.9**; and (ii) North of Guadalupe MRT-3 Station (from the station to the Pasig River) as shown in **Figure 5.10**.

South of Guadalupe MRT-3 Station

The results of the traffic analysis during the construction period is shown in **Figure 5.9**. At present, the EDSA lane configuration has 5 lanes. Currently V/C ratios range from 0.18-0.92 in the AM and PM Peaks.

During construction, a works area of 7.5m (including 1.5m for a temporary footpath) would be typically be required. However, given the narrow profile through Guadalupe, maintaining the same number of lanes during construction is not feasible in all but two sections, as resulting lane width would be below 2.8m. Thus, the proposed arrangement would require the reduction of one traffic lane – resulting V/C is typically between 1.00-1.15, which is still below the 1.2 threshold. A consistent road profile is proposed here (even though some segments could have 5 lanes) to reduce weaving. Segment A1 and A2 will require a narrower works area as no temporary sidewalk is proposed during construction.

North of Guadalupe MRT-3 Station

Figure 5.10 shows the results of the traffic analysis during the construction period. At present, the EDSA lane configuration has 4-5 lanes and J.P. Rizal Street has 2 lanes per direction. The V/C ratios range from 0.11 – 1.06 in the AM and PM Peaks.

Construction along EDSA would still allow the same number of lanes (4-5) to be maintained in the northbound EDSA direction. Other sections along J.P. Rizal Street and along southbound EDSA leading to the MRT-3 Station would require reduction of one lane to 2.80-3.10. Special treatments would be necessary, for instance a narrower temporary footpath of 0.5m or the elimination of the temporary footpath under the footbridge along southbound EDSA from the MRT-3 Station (including B3, B4, B5 and B7 segments).

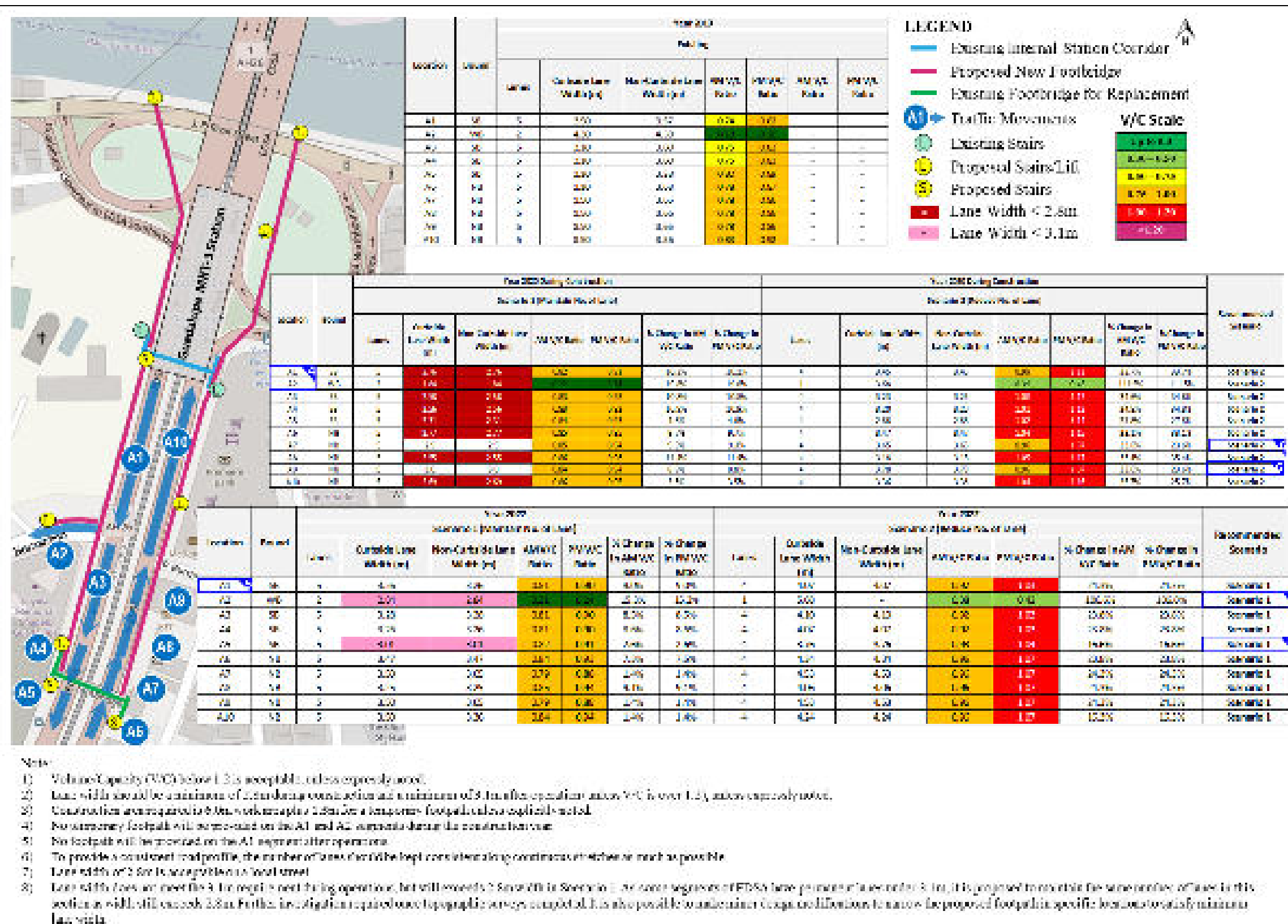


Figure 5.9 Traffic Performance during Year 2020 (Construction) and Year 2022 (after Implementation) – Guadalupe Station (South of Guadalupe MRT-3 Station)

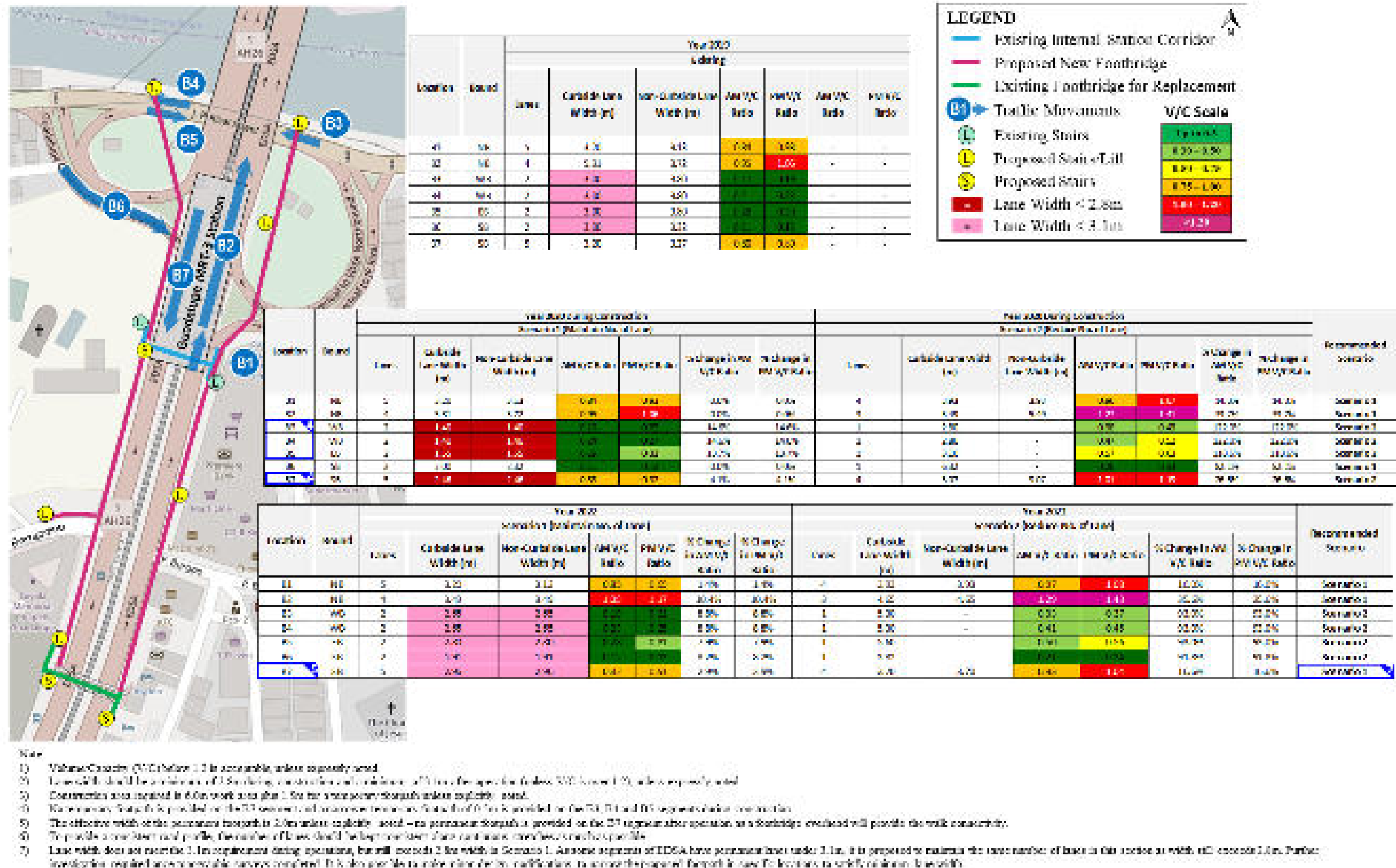


Figure 5.10 Traffic Performance during Year 2020 (Construction) and Year 2022 (after Implementation) – Guadalupe Station (Guadalupe MRT-3 Station North)

Taft Station

The existing lane configuration and traffic performance around the EDSA and Taft Avenue junction is shown below (please refer to **Figure 5.11** for specific location).

Table 5.31 Lane Configuration and Traffic Performance (Year 2019) – Taft

Location	Street/Road	Direction	Lanes	Curbside Lane Width (m)	Non-Curbside Lane Width (m)	AM V/C Ratio	PM V/C Ratio
A1	EDSA	WB	5	3.10	3.23	0.72	0.85
A2	EDSA	WB	5	3.10	3.23	0.72	0.85
A3	EDSA	WB	5	3.10	3.23	0.72	0.85
A4	EDSA	WB	5	3.10	3.23	0.72	0.85
A5	Taft Ave.	SB	3	3.50	4.00	0.51	0.59
A6	Taft Ave.	NB	2	3.45	3.55	0.75	0.88
A7	Taft Ave.	NB	3	3.45	4.03	0.49	0.57
A8	EDSA	WB	5	3.50	3.00	0.51	0.59
A9	EDSA	WB	5	3.20	3.20	0.51	0.59
A10	EDSA	EB	4	3.50	3.00	0.58	0.68
A11	EDSA	EB	5	3.50	3.68	0.43	0.50
A12	EDSA	NB	3	3.50	4.00	0.10	0.11
A13	EDSA	EB	4	4.50	3.93	0.76	0.89
A14	EDSA	EB	4	4.50	3.93	0.76	0.89
A15	EDSA	WB	3	3.50	3.50	0.60	0.71
A16	EDSA	WB	3	3.50	3.50	0.60	0.71
A17	EDSA	WB	4	4.50	3.93	0.41	0.48
Performance during Construction at A6 on Taft Avenue Northbound							
A6	Taft Ave.	NB	1	3.55	-	1.50	1.76

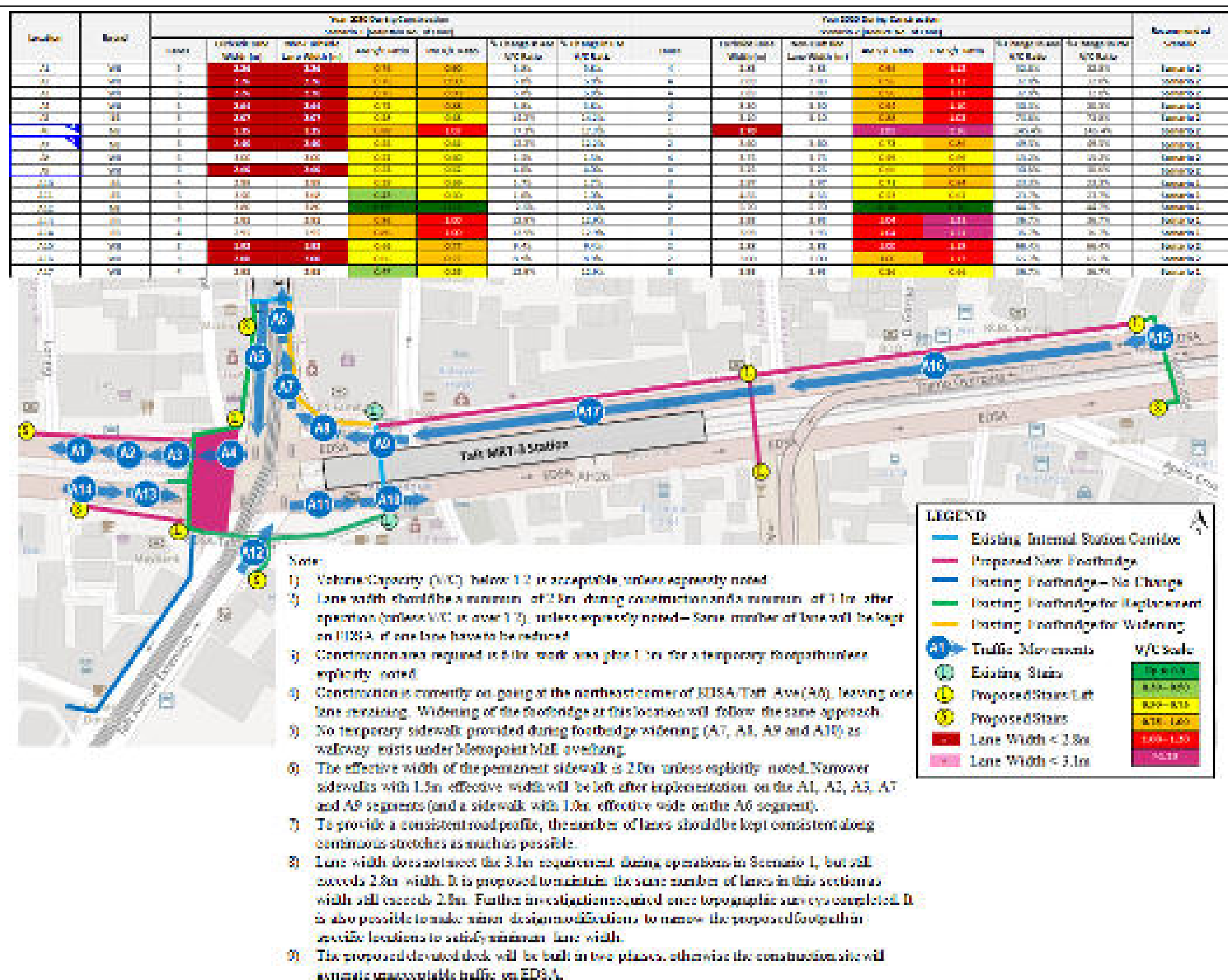
The results of the traffic analysis during the construction period is shown in **Figure 5.11**. At present, the EDSA lane configuration has 4-5 lanes and Taft Avenue Extension has 2-3 lanes. Currently V/C ranges from 0.10-0.89 in the AM and PM Peaks.

During construction, a works area of 7.5m (including 1.5m for a temporary footpath) would be required typically. Several sections can retain the same number of lanes during construction, although the remaining lanes would be narrowed. This includes sections along northbound EDSA thru the Taft junction (including A12, A13, and A14). Segments east of the Taft junction (including A10 and A11) have a frontage road that may be used for construction instead of reallocating EDSA travel lanes and thus no temporary footpath is provided given the wide existing frontage area. Segments along the Taft junction (including A6, A7, A8, A9 and A10) will require a narrower works area as no temporary sidewalk is required.

Other segments require the temporary removal of one lane of traffic (thus Scenario 2 is recommended) to provide the minimal 2.8m lane width and adequate V/C below 1.2.

Section A6 (northbound Taft Ave. at the southeast corner of the LRT-1 Station), is a special case during construction. Removal of one lane would still result in a sub-standard lane width of 2.7m and V/C well over 1.2 – however road construction is

Lastly, during construction of the elevated deck, activities in the middle of the road for support columns must be phased so as not to coincide with construction activities at the northwest and southwest corners of the junction – otherwise severe traffic congestion would be generated. Thus, the construction timeline for Taft Station has been extended by six months.



Traffic Performance after Completion

Balintawak Station

After implementation along EDSA, to maintain a consistent lane profile and to prevent weaving and bottlenecks, permanent reduction of lanes along southbound EDSA is proposed (from 6 to 5 lanes) as shown in **Figure 5.2** and **Figure 5.3**. This is due to the fact that if the same number of lanes were retained (for instance near the Balintawak LRT-1 Station), lanes would be under 3.1m, which would typically be considered sub-standard.

One segment of note is the A9 segment, which only has three lanes currently. Closure of any of these lanes would result in V/C nearing 1.2. As the upstream and downstream roads all have six lanes (i.e., Sections A6 and A8), it is proposed to allow lane widths of 2.93m for this special constraint point. Thus in this case, although the proposed lane width fails to meet the 3.1m requirement, it still exceeds the construction width of 2.8m and is considered acceptable at this stage. Further investigation will be undertaken once topographic surveys are completed in the area for DED. Furthermore, design modifications may be required in specific locations to help maintain minimum lane width (for instance, designing the footbridge with spaces/notches to allow the utility poles to sit within the footbridge envelope and thus save width that can be reallocated to the road).

For all proposed road segments, even those with special treatments, V/C performs below the 1.2 threshold, with all but one road section meeting the 3.1m minimum width after footbridge implementation.

Common Station (Long-Term)

Traffic performance after completion is shown in **Figure 5.4**. After footbridge implementation and the assumed completion of the flyover and the underpass projects on North Avenue and at the North Ave. / Mindanao Ave. junction, the remaining North Avenue and Mindanao Ave. configurations will have between 2-5 lanes in each direction. Under this configuration, the same number of traffic lanes could be retained and still perform at an acceptable LOS below 1.2 (as 35% of traffic is assumed to use the underpass or flyover instead of the at-grade portion of North Avenue depending on direction). Therefore, no major traffic issues are envisioned after completion.

Cubao Station: North-South EDSA

Traffic performance after completion is shown in shown in **Figure 5.5** (for the at-grade portion of EDSA) and in **Figure 5.6** (for the underpass section). After completion, the same number of at-grade lanes will be retained as today (thus 3 lanes along EDSA). Some of these locations would have lane widths below 3.1m, but above 2.8m in the permanent case. As some segments of EDSA have permanent lanes below 3.1m, it is proposed to maintain the same number of lanes in this section if the width still exceed the minimum construction lane width of 2.8m. Further investigation will be undertaken once topographic surveys are completed in the area for DED. Furthermore, design modifications may be required in specific locations to help maintain minimum lane width (for instance, designing the footbridge with spaces/notches to allow the utility poles to sit within the footbridge envelope and thus save width that can be reallocated to the road).

If this is not permitted and a lane must be taken, sections perform between 1.0-1.2 V/C.

We further assume that the underpass portion of EDSA in this segment would handle additional traffic (assumed to be 60% of the EDSA volume instead of 50% currently and 70% during construction). Even with additional traffic, the three lanes of the underpass in each direction will function adequately with LOS of between 0.51-0.93 V/C in the AM and PM Peaks, respectively.

Cubao Station: Aurora Footbridge

Traffic performance after completion is shown in shown in **Figure 5.7**. After completion, the same number of lanes will be retained as today (thus 3 lanes along). As some segments of EDSA have permanent lanes below 3.1m, it is proposed to maintain the same number of lanes in this section if the width still exceeds the minimum construction lane width of 2.8m. Further investigation will be undertaken once topographic surveys are completed in the area for DED. Furthermore, design modifications may be required in specific locations to help maintain minimum lane width (for instance, designing the footbridge with spaces/notches to allow the utility poles to sit within the footbridge envelope and thus save width that can be reallocated to the road).

Cubao Station: EDSA/ Aurora Footbridge

Traffic performance after completion is shown in shown in **Figure 5.8**. After completion, the same number of lanes will be operated as today with V/C ratios below 0.77.

South of Guadalupe MRT-3 Station

Traffic performance after completion is shown in **Figure 5.9**. The same number of lanes will be retained along EDSA as the resulting lane width would exceed the 3.1m minimum at all locations except two. For these two locations, the resulting lane width (if the same number of lanes is retained) will be between 2.84-3.01m. As some segments of EDSA have permanent lanes below 3.1m, it is proposed to maintain the same number of lanes in this section if the width still exceeds the minimum construction lane width of 2.8m. Furthermore, design modifications may be required in specific locations to help maintain minimum lane width (for instance, designing the footbridge with spaces/notches to allow the utility poles to sit within the footbridge envelope and thus save width that can be reallocated to the road).

North of Guadalupe MRT-3 Station

Figure 5.10 shows the traffic performance after completion. No permanent footpath would be provided on southbound EDSA beneath Guadalupe MRT-3 Station (Segment B7) after completion. One lane would be taken from each northbound and southbound J.P. Rizal St. (Segment B3, B4 and B5), thus 1 lane per direction would be proposed. Along northbound EDSA near the MRT-3 Station, the same number of lanes could be retained with V/C below 1.2.

Taft Station

Traffic performance after completion is shown in **Figure 5.12**. After implementation of the footbridge network, the same number of lanes can be retained as previously, although they will be reduced in width and footpath width may be narrower than ideal (1.5m effective width versus typical 2.0m). Several segments would have

permanent widths between 2.8m-3.1m. As some segments of EDSA have permanent lanes below 3.1m, it is proposed to maintain the same number of lanes in this section if the width still exceeds the minimum construction lane width of 2.8m. Furthermore, design modifications may be required in specific locations to help maintain minimum lane width (for instance, designing the footbridge with spaces/notches to allow the utility poles to sit within the footbridge envelope and thus save width that can be reallocated to the road).

If this is not permitted and a lane must be taken, most sections can still perform adequately in the future.

Traffic Analysis Findings

Although up to one lane may be taken temporarily during construction, road segments perform adequately – under the 1.2 V/C threshold – although some diversion schemes and alternate works area configurations would be required. In the permanent case after footbridge implementation, sections can retain either the same number of lanes or reduce their profile by one lane and still function adequately and under 1.2 V/C. In some cases, permanent lane width may be between 2.8m-3.1m. Although this is not ideal, some segments of EDSA have permanent lanes below 3.1m – thus in these specific cases, it may be possible to adopt narrower permanent lanes between 2.8m-3.1m to reduce weaving and maintain a more consistent lane profile. Thus, design modifications may be required in specific locations to help maintain minimum lane width (for instance, designing the footbridge with spaces/notches to allow the utility poles to sit within the footbridge envelope and thus save width that can be reallocated to the road).

Balintawak Station

The result of the initial traffic analysis shows that during construction and after implementation, traffic will perform adequately. Special design treatments would be needed to handle constrained and congested locations in the northwest corner of the Cloverleaf Interchange – adopting the traffic diversion plan for the Skyway-3 would help to alleviate congestion concerns (**Figure 5.13**). Traffic diversion plan at NLEX Balintawak was implemented last February 2019 for the construction of Skyway Stage 3 in EDSA Balintawak Cloverleaf. It aims to ensure smooth flow of traffic by implementing traffic rerouting scheme in for road users such as private vehicle cars, vans, PUJs and trucks. Although, additional topographic surveys will help to clarify these issues, the design specifics and conclude traffic analysis. Furthermore, some sections will require narrower temporary footpaths (or closure of the footpath) to accommodate the construction works area.

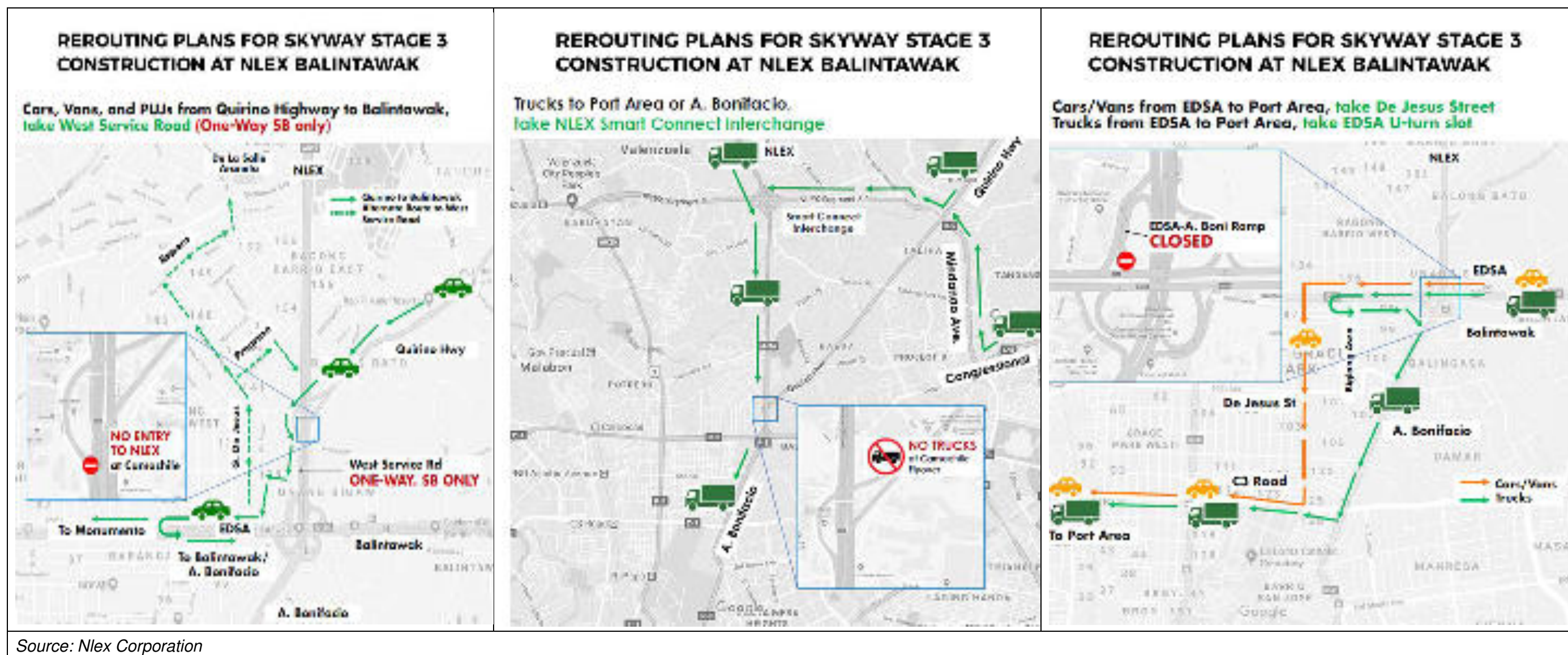


Figure 5.13 Traffic Re-Routing Plan for Skyway Stage 3 Construction at NLEX Balintawak

Common Station (Long-Term)

The result of the traffic analysis finds that during construction and after implementation, traffic will perform adequately.

Cubao Station

The result of traffic analysis finds that during construction and after implementation, traffic around the three main footbridge sections will perform adequately. Special design treatments have been proposed including a contraflow lane on westbound Aurora during construction, as well as constrained sections where the minimum lane width that can be provided may range from 2.8m-3.1m wide. Additional topographic surveys will help to clarify these issues and the design specifics.

Guadalupe Station

The results of the traffic analysis find that during construction and after implementation, traffic along EDSA and Rizal will perform adequately. Special design treatments have been proposed including removing the temporary and permanent footpath along southbound EDSA south of the MRT-3 Station, as well as narrowing the temporary footpath during construction on specific sections. Additional topographic surveys will help to clarify these issues and the design specifics.

Taft Station

During construction half of the key road segments will require the reduction of one travel lane, except for segments along northbound EDSA east of the Taft junction due to the wide frontage road that can be used for construction. Traffic will perform adequately so long as the construction of the elevated deck is phased (those work on the northwest and southwest corners is not conducted at the same time as the column work in the median). After implementation of the footbridge, traffic will perform adequately as the same number of lanes would be retained – although they would be narrowed. Additional topographic surveys will help to clarify these issues and the design specifics. Traffic is thus expected to perform adequately during construction and after implementation, with specific treatments required to meet the V/C threshold.

In summary, traffic is expected to operate adequately during construction and after, so long as special treatments and considerations are made at specific tight and constrained locations. Additional topographic surveys will help to clarify these issues and the design specifics.

Involuntary Resettlement

For temporary impacts due to construction, APs shall be entitled to (i) Restoration of land within 3 months of completion of use; (ii) Compensation for affected non-land assets at full replacement cost; and (iii) Cash payment for rent of the affected land at prevailing rental rates in the location of the property until the property is restored. With respect to severance impacts / barrier effect during construction disrupting lateral movement (access), the project will provide for crossings and continued access.

Contractors, per EMP, will be responsible for the arrangement and payment of land rent, restoration of land and compensation for non-land assets. Contractors will also be responsible for restoration of land and compensation for non-land assets.

Construction Phase

Air Quality

The Project may impose air quality impacts during the construction phase. The alignment of the Project is along the main thoroughfare. It is anticipated that ambient air pollutants concentration is dominated by the vehicular emission. Nevertheless, the construction works, especially the excavation works, for the Project will generate fugitive dust without proper implementation of mitigation measures.

Generally, the construction of footbridge would not require deep excavation. In addition, the column and tables top construction and steel works are unlikely to have significant dust emission. The possibility of pre-cast method could be considered during detail design stage, and thus the air quality impact will be well controlled within the area, instead. Therefore, the fugitive dust emission from the construction works is considered insignificant compared to the already existing high ambient air pollutants concentration.

The use of construction equipment may also emit air pollutants. Given that the scale of the Project is relatively small, and the site area is limited, the number of construction equipment are limited. Therefore, the air pollutant emissions from the construction equipment is considered insignificant compared to existing high ambient air pollutants coming from motor vehicles.

Due to the proximity to the air sensitive receptors, mitigation measures shall be properly implemented to minimize the potential impacts, as follows:

- Regular sprinkling of water over crush materials, such as gravels and soil materials;
- Covering the dusty material in the stockpiling area entirely by impervious sheeting;
- Usage of efficient equipment;
- Provision of site hoarding as far as practicable for the excavation works area;
- Proper scheduling construction work hours, i.e. piling activities is anticipated to be conducted on daytime hours (7:00AM-7:00PM) to minimize the potential air quality and noise impact to the sensitive receptors and regular commuters;

- Construction Personal Protective Equipment (PPE) will be provided to all construction workers. This equipment is but not limited to safety glasses, eye and face protectors and earplugs to protect construction workers from dust and noise generation.
- Alternative vehicle routing to minimize the potential air quality impact to the daily pedestrians; and
- Regular air quality monitoring to minimize exceedances in permissible levels that may affect public health, as proposed in **Table 6.2**.

With proper implementation of the above-mentioned mitigation measures, adverse air quality impact on the air sensitive receptors is not anticipated during the construction phase.

Surface Water Quality

Potential surface water quality impacts due to silt runoff, sanitary wastes and chemicals storage are anticipated during construction phase. But potential surface water quality is considered minimal thus proper mitigation measures could be adopted to minimize the risks of water pollution.

Based on site observation, there are nearby creeks (e.g. wide creek has been located underneath Balintawak LRT-1 Station stairwell at south EDSA). Hence, the proposed footbridge foundation should avoid sitting on top of and too close to the creek. Also, proposed footbridge envisaged to span over the creek to minimize disruptions. Also, Pasig River may also be affected by construction at Guadalupe Station.

Nevertheless, good solid waste management practices will be adopted. Domestic wastes from construction workers will be managed through a portable toilet which will be set-up by the contractor. Regular domestic waste disposal will be collected daily by a third-party contractor to ensure cleanliness in the work place and avoid possible water quality impacts to existing drainage and/or waterbodies. All construction materials and chemicals will be properly stored and managed in secured storage area with provision of secondary containment. Silt traps will be installed for all nearby water bodies. The waste soil and other debris will be properly handled and disposed in a regular basis. Training will be provided to site workers to improve their awareness on solid waste management practices.

Risk of Water Pollution from Oil, Grease and Fuel Spills

During the construction phase, spill of oil, grease and fuel from the construction materials and equipment is likely. If the spill enters the water bodies, it will lead to water contamination and degradation of water quality. However, there is no water bodies located nearby the Project alignments except Guadalupe Station. Therefore, potential risk of water pollution from oil, grease and fuel spills is considered minimal.

Good site management practices will be adopted. Construction equipment and vehicles should be serviced by accredited service providers with suitable wastewater facilities. Oil, grease and fuel spills can be minimized through secured containers with proper labels placed at designated location.

Risk of Soil Contamination from Chemical Leakage

During the construction phase, chemical leakage, such as lubricant and oil, from the storage container is anticipated. Without proper storage and management of the chemical, the soil will be contaminated by the chemical during the construction phase.

To prevent potential chemical leakage, the storage container shall be checked for leakage or spillage before use. The storage container shall be properly labelled and placed on a secondary containment to prevent potential leakage. With proper waste management and housekeeping measures, potential risk of soil contamination from chemical leakage is considered minimal.

Noise

The Project may impose noise impact during construction phase, due to the construction activities within the construction site, particular with the use of construction equipment.

Given that the scale of the Project is relatively small and the site area is limited, the number of construction equipment are limited. Moreover, the alignment of the Project is along the main thoroughfare, the ambient noise level is dominated by the road traffic noise. The contribution to the overall ambient noise level from the construction activities is therefore insignificant.

Due to the proximity to the noise sensitive receptors, mitigation measures shall be properly implemented to minimize the potential impacts, as follows:

- Installation of mufflers or silencers on heavy equipment and machineries;
- Regular maintenance of construction equipment;
- Use of quieter construction equipment where practicable;
- Avoid simultaneous use of noisy equipment;
- Provision of noise barriers next to the construction equipment, which may provide up to 10 dB(A) noise reduction;
- Provision of noise enclosure for relatively small construction equipment, which may provide up to 20dB(A) noise reduction;
- Provision of retractable noise barriers in front of the noise sensitive receptor if necessary; and
- Proper scheduling construction hours to minimize the potential noise impact to the sensitive receptors and regular commuters.

Further to the above proposed mitigation measures, regular noise monitoring to minimize exceedances in permissible levels that may affect public health. Based on the limited baseline study consisting of only 1-hr measurements per station, the ambient noise level has already exceeded the noise standard as stipulated in the IFC-EHS Guidelines for Noise Management. Therefore, noise measurement for at least 24-hr continuous sampling per station during pre-construction phase is required during the DED stage to establish the noise criteria (i.e. no exceedance from maximum increase in background levels by 3dBA). During construction phase, the contractor shall conduct noise measurement every month as prescribed in the

EMoP (**Table 6.3**). Further mitigation measures shall be considered when exceedance is likely to minimize the noise impacts to the sensitive receptor.

With proper implementation of the above-mentioned mitigation measures, adverse noise impact on the noise sensitive receptors is not anticipated during the construction phase.

Aesthetic Conditions

During the construction phase, there will be unacceptable aesthetic condition due to heavy traffic and inaccessible walkways. Given that the duration of the construction is relatively short, the impact is considered temporary.

Nevertheless, DOTr and its consultant should ensure that the contractor will be in full compliance to ensure that the site is clean as far as practicable and visually acceptable during construction phase. The Project design should harmonise within the existing surroundings as much as practicable.

Accessibility

Due to construction, it is likely that some existing walkways will be temporarily inaccessible, tolerating some of the pedestrian to use the side of the road as their passageway. This may therefore cause heavy traffic during rush hour.

Proper planning on the traffic management that includes safe access to pedestrians, should be considered during the design phase. Alternative routes should be recommended. Post road signals and traffic wardens are also recommended to minimize the inconvenience caused due to the temporarily inaccessibility.

Occupational Health and Safety

Occupational health impact and safety issue due to the construction activities is anticipated during the construction without provision of proper protection measures. According to the Pollution Prevention and Abatement Handbook of the World Bank, various health impacts, such as acute or chronic occupational disease, would be the results of exposure to pollutants. Worker Provisions are necessary to ensure employment and worker health and safety met. This includes the Occupational Health and Safety Plans that should be imposed towards the completion of the Project.

As the project involves elevated structures/walkways, passive fall protection shall be in place such as provision for working platforms and scaffolds, railings and lifelines, as well as safe access.

Furthermore, suitable trainings and workshops (e.g. working at heights, etc.) would be provided to the construction workers to engage awareness for the possibilities of risks and accidents during and after work hours. PPEs are required upon entering the construction sites. Therefore, the possibility of risks and accidents from general construction activities could be minimized.

The Project would inevitably impose potential air quality and noise impacts on the construction workers. With proper implementation of air quality and noise control measures as-mentioned in the above sections, and also the provision of PPEs, the occupational health impacts due to the construction activities could be minimized.

As also mentioned above, the Project will be located along the main thoroughfare, residential area and commercial area, where potential traffic and hazard driving conditions on the construction workers is also anticipated along the area. Given that proper traffic management and temporary alternative routes have been proposed, the potential risk will be minimized. Nevertheless, the above-mentioned trainings and workshops for the construction workers will also engage awareness of the potential traffic and hazard driving conditions near the construction site.

Furthermore, due to influx of workers/ work camps, public health impacts are not discounted. There is also a potential rise in gender-based violence (GBV) and HIV/AIDS/STDs during civil works. Thus, GBV and HIV/AIDS awareness and prevention campaign will be provided to the workers.

With reference to the SPS, preventive and protective measures shall be provided to secure the occupational health and safety. DOTr will ensure that Contractor will prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, through the following:

- Identify and minimize, so far as reasonably practicable, the causes of potential hazards to workers;
- Provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- Provide appropriate equipment to minimize risks and requiring and enforcing its use;
- Train workers and provide them with appropriate incentives to use and comply with health and safety procedures and protective equipment;
- Document and report occupational accidents, diseases, and incidents; and
- Have emergency prevention, preparedness, and response arrangements in place.

Community Health and Safety

Community hazard due to various environmental impacts, especially air quality and noise impacts and possible traffic and hazard driving condition is anticipated during the construction phase. Some existing walkways will also be temporarily inaccessible, tolerating some of the pedestrian to use the side of the road as their passageway. This may therefore cause heavy traffic during rush hour.

Various air quality and noise control measures, as proposed above, will minimize the potential impacts and thus the health impacts. Besides, signages (no notices) on the detour arrangements will be provided around the construction site, as appropriate, where pedestrian traffic is common. Construction works access to the construction site will be segregated to pedestrians for safe access. Traffic management plan will be prepared to improve the potential traffic and driving condition, and thus avoid/ minimize possible accident risks during the construction phase.

To ensure the mitigation measure will be properly implemented, the contractor should provide Construction EMP for development of the construction zone, traffic management and worker camp to minimize interference by the construction activities, regarding the air quality, noise, traffic and visual impacts.

Impacts on the Poor, Women and Children, Indigenous Peoples

While there are no indigenous peoples present in the area, safety will be the key concern on the poor, women and children in the vicinity of the Project during the construction phase.

When it comes to gender issues, a potential rise in GBV is expected, thus there should be awareness and prevention campaign will be provided to the workers. Also, the project should propose equal opportunities to women to avoid their potential exclusion in employment opportunities.

To ensure the safety for all users, including the poor, women and children, the Project will ensure secure, well-lit and well managed walkways with continuous monitoring and security during the construction phase. In addition, the Project will secure a Certificate of Non-overlap (CNO), if needed, since there are no IPs present.

Hazard Driving Conditions and Accident Risks

As mentioned above, the Project will be located along the main thoroughfare, residential area and commercial area, where potential traffic and hazard driving conditions is anticipated along the area. Nevertheless, proper planning on traffic management has been considered during the design stage. An alternative routing and temporary traffic management schemes/ guidelines will be proposed during the DED stage. Therefore, hazard driving condition could be improved during construction phase.

Possible Transmission of Communicable Diseases

During construction phase, possible transmission of communicable disease is anticipated due to poor sanitation and poorly managed waste disposals by the construction workers.

Proper waste disposal, hygiene and drainage plans must be imposed to minimize disease transmitted by mosquito and rodents. Training will be provided to the construction workers on the solid waste management for proper waste handling and disposal, as well as the good practices on hygiene and sanitation to minimize the possibility of communicable diseases.

Operation and Maintenance Phase

Responsibility of Maintenance

To maintain the good condition of the proposed footbridge over its operation, regular maintenance is required. The facilities of the proposed footbridge, including the CCTV, lighting system, lift, drainage system, kiosk and advertising panel, shall be properly checked and repair regularly. The CCTV, lighting system and also the lift should be properly maintained to ensure that objective of the Project, i.e. to provide convenient, direct and safe pedestrian safety, will be achieved throughout the Project operation.

The maintenance will be delegated to a collaborative group of facilities and institutions along the stations, such as local government and private business owners.

Health and Safety During Operations Phase

The overall objective of the Project is to provide safe pedestrian to ensure the security for women, children, LGBT, PWDs and senior citizen. However, without proper maintenance of the proposed footbridge, it would likely impose different kinds of danger to them, such as sexual harassment and robbery. Given that the CCTV and the lighting system would be maintained regularly, the real time condition of the proposed footbridge could be monitored and thus the issue of insecurity could be mitigated.

Furthermore, the collaboration between the Metropolitan Manila Development Authority (MMDA) and the Philippine National Police (PNP) could observe the operating condition and the security issue of the proposed footbridge from time to time. Therefore, the safety and security of the proposed footbridge could be ensured at all times.

5.4 Summary of Anticipated Environmental Impacts

The above-mentioned anticipated environmental impacts (including cumulative impacts) for the Project during design, construction and operation are summarized in **Table 5.1**.

Table 5.1 Summary of Anticipated Environmental Impacts Due to Project Implementation

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
Design Phase							
Utilities	<ul style="list-style-type: none"> Interruption to telecommunication and electricity due to relocation of poles and wires 	High	Temporary	Local	Major	<ul style="list-style-type: none"> Develop inventory of affected utilities Consult and liaise with service providers/agencies Provision of water deliveries, if needed Consult and discuss with the affected people, providing sufficient time to disclose the information for possible interruption during relocation. Permits to be secured prior project construction. DOTr will ensure that the Contractor will establish the Emergency Response Procedures to manage anticipated service interruptions during pre-construction stage. 	Non-significant
Civil works and Land	<ul style="list-style-type: none"> Land acquisition leading to 	High	Permanent	Regional	Major	<ul style="list-style-type: none"> Consider Purchase or lease of land with agreement settled 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
Acquisition	<ul style="list-style-type: none"> obtaining the ROW, which may trigger involuntary resettlements Possible cutting or relocation of trees 					<ul style="list-style-type: none"> between DOTr and the land owner. Prepare inventory of affected trees and apply for tree cutting/balling permit. 	
Traffic	<ul style="list-style-type: none"> Traffic and hazard driving conditions due to the heavy traffic of the main thoroughfare 	High	Temporary	Regional	Major	<ul style="list-style-type: none"> Prepare traffic management plan/guidelines Prepare alternative routes 	Non-significant
Involuntary Resettlement	<ul style="list-style-type: none"> Displacement of the informal business sector – the vendors (both ambulant and semi-fixed). 	High	Temporary	Local	Major	<ul style="list-style-type: none"> Observe potential positive and negative impacts of the Project as to be suggested during consultation meetings and stakeholders' activities and address through associated mitigating measures, such as conduct of social assessment and livelihood support, if necessary 	Non-significant
Construction Phase							
Air Quality	<ul style="list-style-type: none"> Dust and air pollution emission due to the construction activities and use of construction equipment. 	Low	Temporary	Limited	Minor	<ul style="list-style-type: none"> Regularly sprinkling of water over crushed materials, (e.g. gravels and soil), regularly Cover dusty materials by impervious sheeting Use efficient equipment Provide site hoardings as far as practicable Schedule construction hours to minimize impacts to sensitive receptors and regular commuters Prepare alternative routes Monitor the air quality during construction 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
						<ul style="list-style-type: none"> Regular air quality monitoring to minimize exceedances in permissible levels that may affect public health, as proposed in Table 6.2 	
Surface water quality/ Risk of water pollution from oil, grease and fuel spills	<ul style="list-style-type: none"> Pollution due to silt runoff, sanitary waste and chemical storage Contamination due to spills of oil, grease and fuel from construction materials and equipment 	Low	Short-lived	Limited	Minor	<ul style="list-style-type: none"> Store and manage construction materials and chemicals in proper storage area, with provision of secondary containment Keep the storage area tidy and housekeeping actively managed. Install silt traps Ensure that government-accredited waste handlers will dispose waste soil and other debris on a regular basis. Provide training to workers Employ accredited service providers with suitable wastewater facility for the maintenance and servicing of equipment and vehicles Storage oil, grease and fuel in secured container with proper labels, and place at designated locations. There should be spill management plan, as part of the Contractor's Environmental Management Plan (CEMP), readily available which defines the specific prevention plans and procedures to be followed when spills occur to ensure that the potential of severe environmental damage is mitigated. Workers must ensure that any spills are treated with great care, and dealt with promptly, to minimize the possibility of any of them becoming a major issue. The spill management plan will guide workers by 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
						<p>outlining the key steps for removal (e.g. use of absorbent materials), temporary storage, transport and disposal of contaminated materials.</p>	
Risk of soil contamination from chemical leakage	<ul style="list-style-type: none"> Soil contamination due to chemical leakage 	Low	Short-lived	Limited	Minor	<ul style="list-style-type: none"> The construction safety will regularly check the chemical storage container. Check the storage container for leakage or spillage before use. If there are suspected or visible chemical leak, the construction safety will immediately report to the construction manager for assessment and if necessary temporary stoppage of work will be implemented Suspected contaminated soil will be segregated and stored properly with labels. Label and place the storage containers on a secondary containment Ensure that government-accredited waste handlers will dispose waste soil and other debris, through a third-party contractor, as necessary. 	Non-significant
Noise	<ul style="list-style-type: none"> Exposure to loud sounds of construction equipment affecting sensitive receivers and nearby pedestrian users 	Medium	Temporary	Limited	Medium	<ul style="list-style-type: none"> Install mufflers or silencers on heavy equipment and machineries Maintain construction equipment regularly Use quieter construction equipment where practicable Avoid simultaneous use of noisy equipment Provide noise barriers and enclosures to construction equipment Provide retractable noise barriers to noise sensitive receptors Schedule construction hours to minimize impacts to sensitive 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
						receptors and regular commuters	
Existing Infrastructure and facilities	<ul style="list-style-type: none"> Interruption to telecommunication and electricity due to relocation of poles and wires. 	High	Temporary	Local	Major	<ul style="list-style-type: none"> Verification of the number of affected poles and wires followed by consultation and liaison with service providers / agencies DOTr will prepare a Utilities Relocation Procedure/ Protocol to manage any possible event regarding the service interruption by the Project. 	Non-significant
Aesthetic conditions	<ul style="list-style-type: none"> Temporary unacceptable aesthetic condition due to heavy traffic and inaccessible walkways 	Low	Temporary	Local	Minor	<ul style="list-style-type: none"> Be in full compliance to ensure that the site is clean as far as practicable and visually acceptable during construction phase The design should harmonize the Project within the existing surroundings as much as practicable. 	Non-significant
Accessibility	<ul style="list-style-type: none"> Heavy traffic during rush hours due to the inaccessible walkways and use of the side roads as an alternatives, during the construction activities. 	Medium	Temporary	Limited	Medium	<ul style="list-style-type: none"> Implementation of traffic management plan that should be coordinated with all traffic management groups and enforcers and stakeholders. Advanced notification to all affected stakeholders Recommend alternative routes during construction phase. Post road signals and traffic wardens 	Non-significant
Occupational Health and Safety	<ul style="list-style-type: none"> Occupational health impacts due to exposure of pollutants 	High	Temporary	Local	Major	<ul style="list-style-type: none"> Implement properly the air quality and noise control measures Prepare and include the Occupational Health and Safety Plans in the CEMP prior to mobilization of workers and implement until the 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
	<ul style="list-style-type: none"> Safety issue due to traffic and hazard driving condition (i.e. use of vehicles and equipment) Improper usage and storage of chemicals Potential rise in GBV and HIV/AIDS/ STDs, in relation to civil works. 					<p>completion of the project.</p> <ul style="list-style-type: none"> Provide suitable trainings and workshops to workers (including HIV/AIDS and GBV awareness and prevention campaign) Alert the possible traffic and hazard driving condition Prepare traffic management plan, with alternative routings Educate the workers on proper handling and storage of chemicals Provide PPEs 	
Community health and safety	<ul style="list-style-type: none"> Community hazards during construction includes water, air and noise pollution and road accidents. 	High	Temporary	Regional	Major	<ul style="list-style-type: none"> Provide signages or notices prior the construction Barricades and detour arrangements must be placed to eliminate impacts on the pedestrian users and nearby community. Prepare traffic management plan with alternative routings Implement properly the air quality and noise control measures Contractor shall implement CEMP and by all means to minimize the interference by the construction activities. This is expected to be in place at least a month before the start of the civil works. 	Non-significant
Impacts on the poor, women	<ul style="list-style-type: none"> Safety of the poor, women and children 	High	Temporary	Local	Major	<ul style="list-style-type: none"> Ensure secure, well-lit and well managed walkways with continuous monitoring and security 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
children, PWDs and Indigenous Peoples	<ul style="list-style-type: none"> in the area during the construction phase Potential rise in GBV in relation to civil works. Potential exclusion in employment opportunities 					<ul style="list-style-type: none"> Construction workers should undergo awareness-raising to prevent GBV (i.e. sexual harassment committed against pedestrians and the members of the gender community in the project areas). Equal employment opportunities to women Secure CNO, if needed. 	
Hazardous driving conditions and accident risks	<ul style="list-style-type: none"> Risks issue due to traffic and hazard driving condition 	Medium	Temporary	Local	Medium	<ul style="list-style-type: none"> Prepare traffic management plan with alternative routings 	Non-significant
Possible transmission of communicable diseases	<ul style="list-style-type: none"> Poor sanitation, solid waste disposal and possible transmission of communicable diseases 	Low	Short-lived	Limited	Minor	<ul style="list-style-type: none"> Impose proper waste disposal, hygiene and drainage plans Provide trainings to workers 	Non-significant
Operation and Maintenance Phase							
Responsibility of Maintenance	<ul style="list-style-type: none"> Condition of the footbridge over its operation 	Low	Permanent	Local	Medium	<ul style="list-style-type: none"> Check and repair regularly the facilities of the footbridge, such as CCTV, lighting system, lift, drainage system, kiosk and advertising panel Delegate to a collaborative group of facilities and institutions along stations 	Non-significant
Health and Safety	<ul style="list-style-type: none"> Safety and security issue without proper maintenance 	Low	Permanent	Local	Medium	<ul style="list-style-type: none"> Maintain regularly the CCTV, lighting system and lift Collaborate with MMDA and Philippine National Police to observe the 	Non-significant

Impact Field	Anticipated Impacts on the Environment	Intensity	Duration	Scope	Assessment of Potential Effect	Options for Prevention or Mitigation or Enhancement	Significance of Residual Effect
	nance and management					operating condition and security issue	

5.5 Cumulative Impacts

Cumulative impacts result from the combined, successive and incremental effects of an action, project or activity when added to other existing, planned or anticipated future development projects (IFC Good Practice Handbook on Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, 2013).

In the vicinity of Guadalupe station, there are two major infrastructure projects to be implemented – the Makati Subway and the Fort Bonifacio – Makati SkyTrain projects. The Makati Subway is a 10-km line with 10 stations. The SkyTrain on the other hand, is a 1.87-km elevated transit system that will link Guadalupe MRT-3 Station to the Uptown Mall in Uptown BGC.

Similar to the methodology done for the assessment of individual impacts, the cumulative impact assessment identifies the valued environmental and social components (VECs), shown in succeeding table, arising from the construction of the elevated walkway, the Makati Subway and the SkyTrain.

Environment	Valued Environmental Components
Physical	Disturbance of soil
	Surface water quality of Pasig River
	Air quality, noise
Biological	Flora
	Fauna
Socio-economic	Affected land and structures
	Traffic condition
	Businesses around Guadalupe area
	Public infrastructure
	Public transport
	Walkability
	Sound environment
	Community and occupational health and safety

Since the project has no control over the actions that will be undertaken by the Makati Subway and SkyTrain proponents that will affect similar VECs identified for the project, the following are recommended steps:

- Identify and agree with the two proponents on the spatial and temporal scope of individual projects;
- Establish information on baseline status of VECs (e.g., baseline water quality of Pasig River);
- Assess the contribution of Makati Subway and SkyTrain under evaluation to the predicted cumulative impacts;

- d) Evaluation of significance of predicted cumulative impacts;
- e) Design and implementation of mitigation measures.

As previously indicated in Figure 3.21, exact alignments of the Makati Subway and the Fort Bonifacio – Makati SkyTrain are not yet available during the preparation of this IEE. A press release that came out in December 2019 however, states that the proponents of both projects agreed to have a common station that will have access to the MRT 3 Guadalupe station and the Pasig River ferry system. Further coordination with the proponents and the design team of the Makati Subway and the Fort Bonifacio – Makati SkyTrain will be continued. It is not yet known at this time if there will be overlaps in the construction timelines for these infrastructure projects in the Guadalupe area but coordination would ensure that construction time and the resulting construction impacts could be possibly reduced and jointly mitigated. Progress regarding this will be included when the IEE is updated during detailed design. Ultimately, once all the transport systems in the Guadalupe area are operational, the walkways in Guadalupe would provide a safe, all-weather connectivity for the pedestrians using these transport systems.

6 Environmental Management Plan (EMP)

6.1 General

All key players in the implementation of the EDSA Greenways Project are responsible in protecting the environment and maintaining all mitigating measures and monitoring plans monitor are complied.

All responsibilities should be aligned with the regulations set by the Department of Environment and Natural Resources- Environmental Management Bureau (DENR-EMB) and Asian Development Bank -Safeguard Policy Statement (ADB-SPS), as well as its permits and all necessary approvals and consultations. This Environmental Management Plan (EMP) will ensure that all plans are followed. The EMP will be included as an annex in the bid documents to ensure that the contractors are fully aware of their responsibilities to implement the EMP and adequate budget and resources are allocated.

6.2 Institutional Arrangements and Framework for Environmental Management

Institutional Arrangements

DOTr, as the Executing Agency (EA) of the Project, will adopt a design and build (D&B) scheme to implement the EDSA Greenways Project. A project management office (PMO) will be established to oversee overall project implementation and supervise the D&B contractor. DOTr will engage a construction supervision consultant (CSC) to support the PMO. The environmental specialists of PMO and CSC will work closely together to ensure that the project's environmental management plan (EMP) will be implemented and monitored effectively and the project will be compliant with the Philippine government and ADB policies on environmental management and protection. CSC will review all contract documents such as detailed plans/drawings, technical specifications, construction

contract including the IEE and EMP, and other documents to determine any conflicts in the provisions, details, and insufficient information that may hinder the smooth execution of the works. The Contractor will implement the EMP and monitoring programs specified in the safeguards documents. ADB ensures that all safeguards activities are aligned with applicable laws, regulations and policies pertaining to environment, health, safety and social policy of the Philippine government and ADB SPS.

EDSA Greenways PMO, including all staff under it, should be established upon the implementation of the project, meaning once the Project starts its DED stage.

Institutional Framework for Environmental Management

Institutions responsible for executing and monitoring the environmental aspects of this Project are summarised below:

- DOTr will ensure that EMP and monitoring program are implemented in the DED stage of project, construction, and operations phase. DOTr will engage design and build (D&B) contractors to finalize the detailed engineering design (DED) based on the schematic design and construct the project. DOTr will also establish a project management office (PMO).
- A construction supervision consultant (CSC) will also be engaged by DOTr to assist the PMO for monitoring and supervising the implementation of the EMPs. The CSC will assist PMO in 1) ensuring that the IEE is aligned with the design, and 2) updating the IEE based on the DED.
- D&B contractors will be responsible for the implementation of the EMP during the pre-construction and construction phases. The contractors will appoint environmental officers who will ensure that the mitigating measures are properly implemented and monitor EMP implementation. The environmental officers will prepare and submit monthly reports to CSC and the DOTr-PMO.

The roles and responsibilities of the key players in EMP implementation and environmental monitoring of the EDSA Greenways project are summarized in Error! Reference source not found..

Table 6.1 Responsibilities for EMP Implementation

Agency	Responsibilities
Department of Transportation (DOTr)	<ul style="list-style-type: none"> • Lead in implementing, managing, and operating the Project. • Responsible in appointing/engaging or establishing the following: <ul style="list-style-type: none"> ○ A Project Management Office (PMO); ○ Design and build (D&B) contractors of the Project. ○ Construction Supervision Consultants (CSC); and • Responsible for environmental compliance, securing national and local government units (LGU) permits, environmental monitoring, and consultations. • Ensure that the EMP and the IEE are considered in the DED stage of project and implemented during construction and operations phase. • Ensure that the EMP is included in all bidding and contract

Agency	Responsibilities
	<p>documents for different project phases.</p> <ul style="list-style-type: none"> • Ensure that funds for environmental monitoring are sufficient, properly implemented and accounted. • Ensure that the Project is aligned with ADB SPS (2009), ADB Gender and Development Policy (1998) and World Bank Group's General Environmental, Health and Safety (EHS) Guidelines and applicable Philippine laws and regulations pertaining to environment, health, safety and social policies. • Ensure that the Contractor will prevent accidents, injury, and disease, including COVID-19 transmission, arising from, associated with, or occurring during work. • Submit semi-annual environmental monitoring reports (SEMR) on EMP implementation to ADB. • Establish a Grievance Redress Mechanism (GRM) to address all project-related complaints.
Project Management Office (PMO)	<ul style="list-style-type: none"> • DOTr unit directly responsible for EDSA Greenways Project implementation and supervision. • Ensure smooth implementation of the project during pre-construction, construction, and operations phase; strictly monitors the efficiency of CSC and all contractors in terms of environmental management and EMP implementation during all project phases. • Ensure strict implementation and monitoring of EMP schedule and budget. Constantly review the EMP and update, if necessary. Propose corrective actions if mitigation measures are inadequate, additional mitigation for unanticipated impacts, and address non-compliance. • Regularly coordinate with other concerned government offices such as MMDA and LGUs and provide project updates to stakeholders on project and EMP implementation. • Ensure that the EMP is included in all bidding and contract documents for different project phases. • Ensure proper documentation of submitted contracts, bidding and monitoring reports relating to EMP implementation. • Review SEMRs prepared by CSC before submitting to DOTr and ADB. • Designate a GRM officer and ensure that the GRM is fully functional and all project-related complaints are addressed and documented until they are resolved. The GRM officer shall: <ul style="list-style-type: none"> (i) coordinate with the LGUs to ensure that complaints filed with and endorsed by the LGUs are properly integrated in the GRM, with status provided, as necessary; (ii) furnish the complainant a written response within two (2) days after a resolution has been reached with copies provided to the LGU and other concerned parties; (iii) provide updates on the GRM to the SEMR; (iv) prepare a Grievance Redress Mechanism report when

Agency	Responsibilities
	required.
Construction Supervision Consultants (CSC)	<ul style="list-style-type: none"> • Provide technical support to PMO in all environmental concerns of the project. • The CSC will work closely with the PMO in ensuring that: <ul style="list-style-type: none"> (i) environmental management and monitoring as described in the IEE and EMP are considered in Detailed Engineering Design (DED). (ii) contractors are compliant with all necessary permits, and all other Philippine government and ADB requirements. • Supervise and assist when necessary, the contractors in preparing the contractor's environmental management plan (CEMP) and the conduct of 24-hr baseline air quality and noise level measurements, the results of which will be included in the CEMP. The CEMP should be approved by the CSC and DOTr and cleared by ADB prior to start of construction. • Review and update the IEE and EMP when necessary, to reflect final detailed engineering design, and explain to the Contractor of his responsibilities in the implementation of and compliance with said plans. • Assist in the conduct of a pre-construction meeting with the Contractor and all project stakeholders, including utility owners, to clarify potential environmental issues. • Provide environmental safeguards orientation, training and capacity building, particularly on EMP implementation and monitoring, to DOTr personnel involved with the project and the contractors, if necessary. • Provide support in developing and implementing the communications strategy and the project grievance redress mechanism. • Ensure that the environmental management plans (EMP) are implemented by the contractors. • Conduct regular site visits to confirm compliance with the IEE, EMP and CEMP and monitor if environmental mitigating measures are properly implemented, including validation of contractors' reports. • Should non-compliances or unanticipated impacts occur during construction, issue stop-work orders, as needed, identify necessary corrective actions, make recommendation/s on environment mitigation measures to the DOTr; • Undertake monthly monitoring of the contractor's environmental performance and implementation of the EMP and propose a corrective action plan to improve performance or address non-compliance. Consolidate the results of the monthly monitoring into a semi-annual environmental monitoring report (SEMR) for submission to PMO. • Review and update the IEE and EMP when necessary. • Prepare a Project Completion Environmental Monitoring Report after completion of construction, detailing the status

Agency	Responsibilities
	of EMP implementation, outstanding environmental issues and time-bound corrective action plan, where necessary.
Design and Build (D&B) Contractor	<ul style="list-style-type: none"> Engage an environment officer upon mobilization who will be the contractor's lead person for all environmental concerns of the project. Provide adequate resources for EMP implementation and monitoring. Prepare a CEMP aligned with the project EMP. The CEMP should be approved by the CSC, DOTr-PMO and cleared by ADB prior to start of construction. Conduct 24-hr continuous baseline air quality and noise measurements. Identify sampling locations where there are sensitive receptors and activity schedule, for approval of CSC and PMO. Baseline results will be included in the CEMP as basis for assessing the adequacy of mitigation measures during construction. Update CSC and PMO in all environmental-related concerns during the construction phase. Conduct weekly self-monitoring of EMP implementation to be compiled in a monthly report to be submitted to CSC and PMO. Participate in constant review of EMP and CEMP. Propose corrective actions if mitigation measures are inadequate, additional mitigation for unanticipated impacts, and to address non-compliance. Implement corrective actions and additional mitigation in coordination with the PMO and CSC, when necessary.
Asian Development Bank (ADB)	<ul style="list-style-type: none"> Monitors the Project's compliance with SPS and Philippine government environmental requirements. Reviews all environmental monitoring report to ensure that adverse impacts and risks are properly addressed, and all mitigating measures are properly implemented. Conduct periodic site visits to assess status of EMP implementation and over-all environmental performance of the Project; Participates in constant review of EMP. Proposes corrective actions if mitigation measures are inadequate, additional mitigation for unanticipated impacts, and to address non-compliance. Discloses the project IEE and SEMRs on ADB's web site.

6.3 Management Plan

As a part of the project's commitment to protect the environment and stakeholder, the EMP for the EDSA Greenways Project is summarized in **Table 6.2**. Mitigation and management measures are also provided for each identified key environmental impact. The EMP will be included as requirements in bidding documents and civil works contract to ensure that contractors will appropriately implement the provisions in the EMP.

Table 6.2 Impact Management Plan

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule	
				Implementation	Monitor			
DETAILED DESIGN and PRE-CONSTRUCTION PHASE								
Land acquisition	The Land	Acquiring land to serve as landing areas for stairs and elevators	Purchase or other modes of acquisition under RA 10752 should be considered.	DOTr-PMO, CSC	DOTr	PhP19.40M (Balintawak), PhP59.62M (Common Station), PhP27.89M (Cubao), PhP66.70M (Guadalupe) and PhP19.71M (Taft) ⁴	Before works	Civil
Tree cutting/earth balling	The Land	Earth balling should there be affected trees along alignment stations	All relevant permits, including tree cutting/ earth balling permit should be secured prior to activity. Replacement of cut trees will be based to the DENR Memorandum Order (DMO) 2012-02.	DOTr-PMO, CSC, Contractor	DENR-EMB-NCR, DOTr	Part of Project cost	Mobilization period prior to site clearing and civil works	
Utilities relocation	The People	Interruption of telecommunication and electricity	Prepare the inventory of affected poles and wires, followed by consultation	DOTr-PMO, CSC, Service	DOTr	Part of Project cost	During project detail design and mobilization	

³ In the DED phase, when the implementation arrangement and design are finalized more accurate indicative cost may be provided.

⁴ Land Acquisition and Resettlement costs found in **Table 3.7**.

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
		due to utilities relocation	and liaison with service providers / agencies	providers/ agencies			period prior to site clearing and civil works
Temporary usage of one lane in EDSA and permanent usage for Balintawak Station Reduction of lane width	The Land	Traffic	Necessary permit must be duly applied and submitted, and consultations must be undertaken with DOTr, MMDA and all affected government agencies. Consultation works with the MMDA	DOTr-PMO, CSC, Contractor	DOTr	Part of Project cost	During project detail design and mobilization period prior to site clearing and civil works
Direct impact on nearby community	The People	Physical, Psychological and Livelihood effect on the community	Information and Education Campaign (IEC) must be duly done to inform the affected community and businesses of the plans, possible effects and time duration of the Project.	PMO, CSC	DOTr	Part of Project cost	During project detail design prior to site clearing and civil works
Ambient Air Quality and Noise Level	Air and Noise level	Air and Noise levels are expected to increase during construction due to vehicular movement and	24-hr continuous measurement of TSP, PM ₁₀ and PM _{2.5} around the project sites before construction to establish baseline. 24-hr continuous noise measurement near	Contractor	DOTr-PMO, CSC	PhP 25,000/ sampling location	During project detail design

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
		equipment operations	sensitive receptors to establish background noise levels for comparison against the IFC-EHS guideline values.				
Environmental Management	All components	Non-implementation of mitigation measures	Preparation and approval of a contractor's environmental management plan (CEMP) prior to start of construction.	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	Prior to start of civil works.
Climatology	The Air	Change on local micro-climate	Provision for use of mist machines during operation phase especially during humid summer season to be included in the project design subject to confirmation during detailed design	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During project detail design.
Traffic Management	The People	Construction activities may increase traffic	Preparation of site-specific traffic management plans and measures, in coordination and consultation with MMDA and LGUs	D&B Contractor	DOTr-PMO, CSC	Part of the D&B contract	During project detail design.

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
CONSTRUCTION PHASE							
Air Pollution	The Air	Fugitive emissions may be generated through construction activities that may degrade air quality	Regular sprinkling of water over crush materials, such as gravel and soil material Covering the dusty material in the stockpiling area entirely by impervious sheeting Provision of site hoarding as far as practicable for the excavation works area Proper scheduling construction hours Alternative vehicle routing Dust monitoring will be conducted within the project area and near sensitive receptors. Workers will be provided with appropriate PPEs compliant with the Bureau of Working Conditions of the Department of Labor and Employment (BWC-DOLE) Occupational Safety and Health Standards.	Contractor	DOTr-PMO, CSC	PhP 25,000/sampling location (for air and noise)	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
Pollution due to generator sets	The Air	Emission of air pollutant due to the use of equipment (i.e. generators)	<p>Permit to operate (PTO) must be duly applied upon procurement of generator sets.</p> <p>Usage of efficient equipment</p> <p>Proper scheduling construction hours</p> <p>Alternative vehicle routing</p> <p>Dust monitoring will be conducted within the project area and near sensitive receptors.</p> <p>Workers will be provided with appropriate PPEs compliant with the Bureau of Working Conditions of the Department of Labor and Employment (BWC-DOLE) Occupational Safety and Health Standards.</p>	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period
Combustion of Fossil Fuels	The Air	Combustion of fossil fuels from vehicles and equipment may temporarily degrade air quality	<p>Construction vehicles will undergo government emission compliant tests.</p> <p>Vehicles and equipment to be used should be regularly maintained.</p>	Contractor	DOTr-PMO, CSC	PhP 25,000/sampling location (for air and noise)	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			<p>Use of efficient equipment. Site hoarding will be provided as far as practicable for the excavation area.</p> <p>Workers will be provided with appropriate PPEs compliant with the BWC-DOLE Occupational Safety and Health Standards.</p> <p>Traffic management guidelines and trainings should be conducted to the workers to control proper usage of vehicles and equipment.</p> <p>Regular air quality monitoring within the project site and sensitive receptors</p>				
Surface water quality	The Water	Construction materials and wastes from workers may contaminate nearby creeks/ rivers due to run-off water (i.e. wet deposition)	<p>Sewage and other domestic discharges will be connected to government sewer or septic tank hauled by the accredited DENR hauler.</p> <p>Good solid waste management practices will be adopted.</p>	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			<p>Domestic wastes from construction workers will be managed through a portable toilet which will be set-up by the contractor. Regular domestic waste disposal will be collected daily by a third-party contractor to ensure cleanliness in the work place and avoid possible water quality impacts to existing drainage and/or waterbodies.</p> <p>It is anticipated that there will be no construction camps to be established due to the limited space allotted for the project, thus the workers will have to go to the site based on their shifts/schedule. However, if the project proponent/contractors have decided to provide barracks or tents for the workers, criteria for site selection should be established during the DED stage.</p>				

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			Construction materials and chemicals will be properly stored and managed in secured storage area with provision of secondary containment Installation of silt trap Waste soil and debris will be handled and stored properly, with proper training to workers regarding the waste management practices				
Risk of water pollution from oil, grease and fuel spills	The Water	Contamination of water due to oil, grease and fuel spills	Oil, grease and fuel shall be stored in secured containers with proper labels at designated location. Construction equipment and vehicles should be serviced by accredited service providers with suitable wastewater facilities.	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period
Soil contamination	The Land	Chemical leakage or spillage will potentially pollute the soil	Storage container shall be checked for leakage or spillage before use Storage container shall be properly labelled and	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			placed on a secondary containment Implement the spills management plan included in the CEMP.				
Noise level	Noise Level	Noise levels are expected to increase during construction due to vehicular movement and equipment operations	Nearby communities will be kept informed of the noisy construction works. Heavy equipment and machineries that produce high levels of noise will be fitted with mufflers or silencers, if necessary, or replaced by quieter equipment Appropriate PPE will be provided to operators and workers who will handle heavy equipment that generates high levels of noise. Regular maintenance of all vehicles, machinery, and heavy equipment will be ensured and there will be an installation of noise barriers or enclosures, if necessary.	Contractor	DOTr-PMO, CSC	PhP 25,000/sampling location (for air and noise)	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			Ambient noise level monitoring will be conducted on a regular basis.				
Noise, Traffic and Disturbance to Community	The People	Construction activities may increase noise, traffic, disturbance and community stress	Ensure workers, machineries and equipment are all in proper working order to prevent unnecessary noise. Traffic management guidelines and trainings should be conducted Implementation of Traffic Management Plan with alternative routings shall be prepared	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period
Existing Infrastructure and Facilities	The People	Shifting of poles and wires during construction phase leading to interruption of telecommunication and electricity service	Verification of the number of affected poles and wires followed by consultation and liaison with service providers / agencies Prepare a Utilities Relocation Procedure/ Protocol to manage any possible event regarding the service interruption by the Project.	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
Aesthetic Condition	The People	Unacceptable aesthetic condition due to heavy traffic and inaccessible walkways	Be in full compliance to ensure that the site is clean as far as practicable and visually acceptable during construction phase The design should harmonize the Project within the existing surroundings as much as practicable.	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period
Accessibility	The People	Some existing walkways will be temporarily inaccessible during the construction phase	Alternative routes should be recommended when the existing walkways are temporarily inaccessible during the construction phase. Post road signals and traffic wardens are also recommended.	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period
Health Effects	The People	Construction activities may increase health effects due to pollution (water contamination and dusts, disruption of sleep patterns due to noise)	IEC program to the barangay/ families to explain the nature and character of the project. Proper information dissemination will be provided. First aid and emergency response procedures will be in place.	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
Occupational health and safety	The People	Potential occupational health impact and safety issue during construction	<p>Implementation of air quality and noise control measures</p> <p>Traffic management</p> <p>Use of PPEs within the construction site for all construction staff</p> <p>Training to workers to engage awareness of occupational health and safety and the good practices</p> <p>Provide suitable trainings and workshops to workers (including HIV/AIDS, COVID-19, and GBV awareness and prevention campaign)</p> <p>Contractor shall follow the recommendation in the SPS on the occupational health and safety mechanism</p> <p>Passive fall protection shall be in place such as provision for working platforms and scaffolds, railings and lifelines, as well as safe access</p>	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			<p>Ensure worker's social and economic well-being as well as physical safety and health are implemented in accordance with Occupational Safety and Health Standards of the Department of Labor and Employment (OSHA-DOLE).</p> <p>Implement government-approved guidelines and protocols on the prevention of COVID-19 transmission in work areas and project facilities.</p>				
Impacts on the Poor, Women, Children and PWDs	The People	<p>Safety and security issue during construction phase</p> <p>Potential rise in GBV in relation to civil works.</p> <p>Potential exclusion in employment opportunities</p>	<p>Ensure secure, well-lit and well managed walkways with continuous monitoring and security</p> <p>Construction workers should undergo awareness-raising to prevent GBV (i.e. sexual harassment committed against pedestrians and the members of the gender community in the project areas).</p>	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
			Secure CNO if needed				
Possible Transmission of Communicable Diseases	The People	Possible transmission of communicable disease due to poor sanitation and poorly managed waste disposals by construction workers	Proper waste disposal, hygiene and drainage plans must be imposed to minimize disease transmitted by mosquito and rodents. Training will be provided to construction works on the solid waste management for proper waste handling and disposal HIV/AIDs awareness and prevention campaign will be provided to the workers	Contractor	DOTr-PMO, CSC	Part of the contractor's contract	During construction period
OPERATIONS PHASE							
Solid Waste Management	The Land	Generation of Solid Waste	Waste bins will be strategically located. Implement solid waste management for proper disposal. Close coordination with the LGUs, MMDA and private entities to ensure cleanliness and maintenance	LGUs, private entities, MMDA, O&M Contractor	DOTr	To be determined during DED phase	During operations phase

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
Peace and order	The People	Safety and security issue without proper maintenance and management	<p>Check and repair regularly the facilities of the footbridge, such as CCTV, lighting system, lift, drainage system, kiosk and advertising panel</p> <p>Delegate to a collaborative group of facilities and institutions along Common Station</p> <p>Maintain regularly the CCTV, lighting system and lift</p> <p>Collaborate with MMDA, barangay and Philippine National Police (PNP) to observe the operating condition and security</p>	MMDA, barangay, PNP, Private entity or O&M contractor	DOTr	To be determined during DED phase	During operations phase
Transport linkages	The People	Better and safe access to and connection to different transport modes	N/A	N/A	N/A	N/A	During operations phase
Economic values	The People	Linkages to nearby malls will attract easy access	N/A	N/A	N/A	N/A	During operations phase

Project Phase/ Environmental Aspects	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Institutional Responsibility		Estimated Cost ³	Implementation Schedule
				Implementation	Monitor		
Institutions and other public Services	The People	Better access to nearby hospitals, schools and other institutions	N/A	N/A	N/A	N/A	During operations phase
Aesthetic/ Visual Landscape	The People	Improved pedestrian will enhance aesthetic/ visual landscape, thus organised transport system	N/A	N/A	N/A	N/A	During operations phase
ABANDONMENT PHASE							
Removal of unnecessary facilities	The People	Employment during removal of unnecessary facilities	Implementation of hiring the local first	Contractor	DOTr	Not applicable	During abandonment phase
			No enhancement plan formulated	Contractor	DOTr	Not applicable	During abandonment phase

6.4 Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) is a systematic process to receive, evaluate, and address all project-related grievances. A project level grievance mechanism is made available to allow appeals against any disagreeable decision, practice or activity arising from land or other assets acquisition. Stakeholders will be fully informed during consultations and through the Project Information Booklet (PIB), of their rights and of the procedure for addressing grievances. Complaints and grievances relating to any aspect of construction will be addressed.

Implementation of grievance redress shall be anchored on several principles to guide process, decisions, resolutions, and way forward: (i) confidentiality; (ii) clarity in disseminating the GRM procedure and cases. Where necessary, the local language will be used as well as layman's terms to further understanding; (iii) transparency during the grievance procedure upholding gender responsiveness and cultural appropriateness; (iv) accessibility of GRM to stakeholders at no costs and without retribution.

There are different modes of filing complaints:

- Verbally or written directed to the DOTr, the EDSA Greenways PMO, the LGU or to a project representative, including CSC and the contractor.
- DOTr Action Center Hotline 7890 will be used as an option for filing complaints.

All complaints received in writing (or prepared in written form, when received verbally) shall be properly documented acted upon immediately. This will be properly logged and communicated immediately to the GRM. Communication channels with local government units (LGUs) will be established to ensure that all project-related grievances filed with the LGUs are integrated into the project GRM. All grievances will be monitored until full resolution, documented and reported in the semi-annual environmental monitoring report (SEMR). Complaints will be resolved through negotiation processes, consistent with Philippine government and ADB policies, to arrive at a resolution/ consensus, pursuant to the procedures detailed below:

Level I – DOTr, through the GRM Officer, will coordinate closely with the local government units in addressing project-related complaints and ensure that grievances filed with the LGUs are integrated into the project GRM and are properly documented. The GRM Officer will inform the project unit that has direct responsibility for resolving the complaint, e.g. D&B contractors for construction-related complaints, and request for immediate action. The complainant will be notified within three days of filing the complaint, on the process, steps, and timeframe for resolving the complaint.

Level II – If the complaint cannot be resolved at Level I or if the complainant is not satisfied with the action taken, it can be elevated to Level II. The PMO, through the GRM Officer, will convene a meeting with the complainant, the concerned project units, the LGU representative, including the CSC and contractor if the complaint is construction related. The PMO has 15 calendar days within which to resolve the complaint once it is elevated to Level II. The resolution will be officially communicated in writing to the complainant within two (2) working days from the date of the issuance of the decision. Copies of the resolution will be provided to the LGU and all concerned parties.

The existence of the project GRM shall not impede the complainant's access to the Government's judicial remedies and administrative resolution through concerned government agencies, such as the DENR and EMB.

The procedure and options for resolving resettlement issues are included in the separately prepared resettlement plan.

ADB's Accountability Mechanism. In addition to the project GRM, ADB's accountability mechanism (May 2012) also applies to the project. The accountability mechanism provides opportunities for people that are adversely affected by ADB-financed projects to express their grievances, seek solutions, and report alleged violations of ADB's operational policies and procedures, including safeguard policies. ADB's accountability mechanism comprises of (i) consultation led by ADB's special project facilitator to assist people adversely affected by ADB-assisted projects in finding solutions to their concerns and (ii) providing a process through which those affected by projects can file requests for compliance review by ADB's Compliance Review Panel.

Gender Based Violence. To ensure the safety for all users, including the poor, women and children, the Project will ensure secure, well-lit and well managed walkways with continuous monitoring and security during the construction phase. To prevent gender-based violence (GBV), construction workers shall undergo awareness-raising to prevent sexual harassment committed against pedestrians and the members of the gender community in the project areas. GBV complaints will also be observed and accommodated during the civil works as part of the Grievance Redress Mechanism.

6.5 Environmental Monitoring Program

The environmental monitoring reports will include environmental monitoring activities, as well as the results if compliant with the DENR Standards. Monitoring will be conducted during construction phase and report will be submitted to DOTr and ADB. The EMoP implementation monitoring are as follows:

1. Contractor - The contractor should submit a monthly monitoring report to DOTr and CSC.
2. CSC – The CSC should validate the contractor's report by conducting site visits and interviews with affected people. CSC will include updates on EMP implementation in the progress reports and submit semi-annual environmental monitoring reports (SEMR) to DOTr during project implementation. The SEMR will be submitted by DOTr to ADB for disclosure on ADB's website.

During the pre-construction stage, inventory and surveys will be undertaken, should there be a need for land acquisition and earth balling. There are also expected diversion or relocation of public utility posts for electricity and telephone connections, hence these are also included in the surveys to identify all affected structures of the Project. Moreover, necessary permits should be secured prior to the Project construction.

Under the PEISS, the Project will only acquire a CNC thus monitoring will only be undertaken for the compliance of the ADB IEE requirements, unless DENR also

requires this as part of their condition. **Table 6.3** summarizes the environmental monitoring plans for the Project.

The Environmental Quality Performance Level (EQPL) are defined by three levels: the Alert or Red Flag” which is early warning; the “Action Level” is the point where environmental management measures are employed to prevent reaching the regulated limit level; and “Limit Level” is the regulatory standard that must not be exceeded and for which emergency response measures must be employed to reduce pollutants to lower than standard unit. Alert and Action Levels in **Table 6.3** have no values for now as these will be set during DED once baseline levels had been firmly established thru 24-hr sampling.

Table 6.3 Environmental Monitoring Plan (EMoP)

Environmental Aspects	Parameters to be monitored	Monitoring Procedure	Alert Level	Action Level	Limit Level*	Institutional Responsibility		Estimated Cost ⁵
						Implementation	Monitor	
Air Quality	PM10 and PM2.5	Sampling via portable dust meters to be conducted 24-hr every month at 2 sampling locations, per stations, near sensitive receptors.	PM10: 100µg/Ncm PM2.5: 40µg/Ncm	PM10: 125µg/Ncm PM2.5: 45µg/Ncm	PM10: 150µg/Ncm PM2.5: 50µg/Ncm	Contractor	DOTr	PhP 25,000/ sampling location (for air and noise)

⁵ In the DED phase when the implementation arrangement and design are being finalized, an indicative cost, and sampling details would be revised where a form of accuracy can be guaranteed. All necessary and additional surveys must be completed prior to construction.

7.1 Introduction

One important involvement of the community in the Project is through Public Consultation. Public consultation aims to disclose all proposed plans of the proponent to the stakeholders and get the views of the public towards the Project. Public consultation may be through stakeholders and consultation meetings. This can be done through series of Information and Education Campaign (IEC) program. IEC activities may be in the form of focus group discussions (FGDs), key informant interviews (KIIs) and perception surveys.

This chapter will discuss all the engagement done to the public and other DOTr's plans for public disclosure.

7.2 Objectives

The objectives of the public consultation include making the public knowledgeable of the Project plans, getting the public's views on the possible effect of the Project to the environment and to the community itself, encouraging the public to participate in project design and needs, and collecting the local's knowledge to provide prevention, mitigation and enhancement measures for every possible impact.

As a key component of the preparatory study for the EDSA Greenways Project, a series of FGDs were conducted with individuals from the communities in the vicinity of the select train stations along EDSA. The FGDs and KIIs gathered experiences and inputs from those that use the existing pedestrian facilities found on these train stations.

Focus group research is designed to gather spoken data from members of a small group. The individuals belong to a clearly defined geographic community (neighbourhood) or shared interest group (such as pedestrians) or more rarely, the public (residents of a community)⁷.

The results of the FGDs and KIIs will supplement the community input to formulate draft goals and objectives for the EDSA Greenways Project.

Five (5) FGDs and 10 KIIs were organised. The topics included:

- Issues or problems about the pedestrian facilities such as sidewalks, footbridges, walkways and crossings,
- User experiences of pedestrian facilities, and
- Recommendations to improve pedestrian facilities.

This survey was also conducted to triangulate the results the FGDs, KIIs and surveys that could further enhance the analysis of the study. The FGD information sheet, guide and perceptions tools are all shown in **Appendix E**.

⁷ Qualitative Analysis for Planning and Policy – Beyond the Numbers. 2007. John Gaber and Sharon Gaber. Chicago, Illinois: American Planning Association

7.3 Methodology

During the IEC, groups from the local government units and government agencies, non-government organisations, household and business, local institutions and communities affected by the Project were invited to discuss the project and its perceived effects.

The IEC Program, in the form of regular coordination meetings, project presentations and distribution of resource materials, was provided to inform the stakeholders what the Project is, who the proponent is, the anticipated benefits for the community, and the project development schedule.

This study utilized both qualitative and quantitative. The qualitative data were obtained from conduct of FGDs and KIs, while quantitative data was gathered through survey.

7.3.1 Qualitative

A unique characteristic of qualitative research is how all the observations generated in separate focus group meetings and KIs come together into a single rich, detailed data set. In this report, we have used *content analysis* in two ways: top-down, using the interview guide as a sieve to read through the focus group comments, or bottom-up (grounded), looking at key words used in the meetings or types of participants who joined the meetings to evaluate the focus group comments.

Using the interview guide as basis for analysing the responses, we arrive at two distinct set of replies from the focus groups – (a) safety and (b) ease of use.

Focus Group Discussions

Five FGDs were conducted from 16-20 April 2019 as presented in **Table 7.1**.

Table 7.1 FGD Schedule and Venue

Station	Venue
Taft Station	Jollibee- Zamora (9:00-11:00 am, 16 April 2019)
Guadalupe Station	Jollibee- Guadalupe (2:00-4:00 pm, 16 April 2019)
Cubao Station	Jollibee- PNB Aurora (9:00-11:00 am, 17 April 2019)
Balintawak Station	Jollibee- G. de Jesus (12:00-2:00 pm, 17 April 2019)
Monumento Station	Jollibee- Benin (9:00-11:00 pm, 20 April 2019)
Note: As outlined in Section 3.1 Monumento is initially included in the study but has not been taken forward to NEDA submission.	

The participants were identified by the barangay chairman using the following criteria:

- Pedestrian users who were direct beneficiaries of the project
- Barangay officers such as kagawads and barangay administrators

- Residents of the barangay, the profile of which are as follows:
 - Women
 - Elderly
 - Youth
 - PWDs
- Availability and willingness to participate in the FGDs

This was joined by 10-15 participants per FGDs, depending on the group. A total of 64 participants joined the FGD (**Table 7.2**).

Table 7.2 Distribution of Participants

Train Station	Train Line	No. of participants
Balintawak	LRT	14
Cubao	MRT	15
Guadalupe	MRT	13
Monumento	LRT	12
Taft	MRT	10
Note: As outlined in Section 3.1 Monumento is initially included in the study but has not been taken forward to NEDA submission.		

FGD participants were categorized as follows: (a) Female-Headed Households; (b) Disabled HHH; (c) W/in Poverty Threshold – Households; and (d) Others. They were also identified based on the group they belong to or represent such as the barangay, nongovernment organisations (NGO), vulnerable members of society, among others.

The facilitators first introduced themselves, provided an overview about the project and key stakeholders including the ‘Build, Build, Build’ Program of the national government and the EDSA Greenways Project.

Participants were then asked to sign the “information sheet” and “consent forms”. Ground rules for the focus group discussion were likewise tackled before the activity. E.g., there is no right or wrong response, open mindedness and willingness to listen to others or allowing for others to give their opinions.

Key Informant Interviews

A total of 10 key informants were interviewed (6 women and 4 men) representing various affected groups as follows:

- 1 Landowner
- 5 Vendors (ambulant and sedentary)
- 2 Heads of homeless families
- 2 Business operators (1 temporary disruption and 1 permanent)

7.3.2 Quantitative

Survey Design and Population

Stratified random sampling was used to determine the perception on the current facilities and project. **Table 7.3** shows the estimated number of sample size per area, while **Table 7.4** shows the profile of the participants. The number of MRT/ LRT passengers per station was used as sampling frame - a proxy variable since no available data on number of persons used the facilities.

Table 7.3 Sample Size per Station (MRT as of 2017, LRT as of 2014)

Station	Daily Average Passenger Traffic	Sample Size
Balintawak	27,307	14
Common Station	154,786	79
Cubao	102,318	52
Guadalupe	57,916	29
Monumento	103,367	52
Taft	311,521	158
Total	757,214	384
Note: As outlined in Section 3.1 Monumento is initially included in the study but has not been taken forward to NEDA submission.		

Source: <https://data.gov.ph/agencies/light-rail-transit-authority>;
<https://data.gov.ph/agencies/metro-rail-transit-line>

Table 7.4 Respondents' Profile

Respondent Profile	n	%
<i>Sex</i>		
Male	199	52%
Female	185	48%
<i>Gender Preference</i>		
Mas Lalaki	6	2%
Mas Babae	13	3%
Wala sa Dalawa	365	95%
<i>Average Age</i>	42.60	
<i>Civil Status</i>		
Single	140	36%
Married	192	50%
Divorced/Separated	19	5%
Widow	32	8%
No Response	1	0%

Respondent Profile	n	%
<i>Highest Educational Attainment</i>		
Elementary	41	11%
High school	190	49%
College	127	33%
Vocational	10	3%
Others (Master)	1	0%
None	9	2%
No Response	6	2%
<i>Disability</i>		
Vision Loss/Blindness	12	26%
Hearing Loss	5	11%
Physical	16	34%
Mental	14	30%
<i>Employment</i>		
Barangay Official	3	1%
Government Employee	15	4%
Private Employee	128	33%
Laborer/Contractor	14	4%
Tricycle/Jeepney Driver	8	2%
With Business Registered to SEC/DTI	11	3%
Informal Job (kasambahay, manininda, labandera, atbp)	91	24%
Others	18	5%
None	95	25%
No Response	1	0%
<i>Average Income per Month (in PhP)</i>		
0 – 5,000	63	22%
5,001 – 10,000	80	28%
10,001 – 15,000	79	27%
15,001 – 20,000	44	15%
More than 20,000	12	4%
No Response	10	3%

Data Collection Procedure and Organization Structure

A Survey Team Leader was hired to spearhead the survey team and ensure the smooth implementation of the survey, as well as the quality of data to be gathered.

About 12 local enumerators with experience in data collection provided support in the survey. They were trained for one day as a refresher on the use of the survey instrument and proper encoding of the survey instrument (**Appendix E**). Data was encoded, processed and analysed using the Microsoft Access & Excel Software.

7.4 Key Findings

7.4.1 Qualitative

In terms of demographics for FGD, the following are some of the major characteristics of the FGD participants:

- 95% of participants are 30 years of age and older
- There are more female (46) than male (18) participants
- There was a good mix of participants based on civil status – single (22%), married (31%) and widow/widower (25%)
- 40% of participants belong to households that have four members maximum
- 42% of participants work are *barangay* staff while 15% are presently in between jobs
- 52% of participants have monthly income of Php 20,000 and below; 22% of participants earn more than Php 20,000 per month while 26% of participants did not indicate their monthly income.

Perceptions on current status of existing pedestrian facilities

Common responses about existing pedestrian facilities mainly relate to design and safety concerns in the use of these facilities.

In terms of ease and comfort, existing footbridges make it difficult to children, the elderly, pregnant women and persons with disabilities (PWD) to use the facility. The steep inclines and steps contribute to this difficulty.

- “*Nakakahingal sa sobrang taas*” (I gasp when I climb the stairs because of its height), said one participant in Monumento Station
- “... *kadalasan ang elevator laging nasisira.*” (More often than not, the elevator is not working), said one participant in Cubao Station
- “*Sobrang kitid ang walkways, sidewalks at footbridges*” (Walkways, sidewalks at footbridges are too narrow), said one participant in Guadalupe Station
- “*Matarik masyado ang footbridge na gawa ng MRT*” (The footbridge of MRT is too steep), said one participant also in Guadalupe Station
- “... *hinihingal sa pag-akyat lalo na sa mga tulad naming buntis*”, said one participant in Monumento Station

Maintenance and upkeep are another common issue across the focus group participants. Those who are working for the *barangay* are unclear as to who should be responsible for the upkeep of these pedestrian facilities. This contrasts with Balintawak and Cubao, where focus group participants mentioned that their local

government unit (barangay and city) have been responsible maintaining the facility such as declogging the drainage.

Based on the results of KIIs, about 22% described that the sidewalks are now clean, however 22% also stated that the sidewalk is being occupied by vendors. It has been noticeable for the majority that the footbridge does not have sufficient lighting facilities. The walkways were described being an extension of the street vendor. i

In terms of usefulness of the facilities, 23% of the respondents perceived that the facilities will be most useful for the children and the youth and is least favourable to Person with Disabilities (PWD) as 16% responded.

User's experiences of existing pedestrian facilities

The experiences of the focus group participants are likewise similar on a number of issues.

Safety and security are on the top of those concerns.

- *"Maraming mandurukot"* (There are many petty thieves), said one participant in Taft station.
- *"May snatching na nangyayari sa tulay"* (Snatching happens on the bridge), commented by a participant in Guadalupe station

Specifically, pedestrian facilities in Cubao station concern the focus group participants due to sex workers, women and children, that stay in the pedestrian facilities. Cubao has a number of "beer houses" outside the train station.

On the other hand, street children that include what are referred to as "*batang hamog*" and "rugby boys" are a common sight at the foot of Guadalupe Station.

Focus group participants have also raised a concern about homeless people turning the pedestrian facilities in Balintawak Station as sleeping quarters.

Moreover, focus group participants mentioned ambulant vendors as another obstruction present in footbridges. These vendors have no permits from either the barangay or LGU.

Based on the KIIs, about 43% experienced being mugged or held up and snatched (21%). Forty percent of the respondents rated the performance of the agencies responsible to the facilities as average basis the current state.

Responses on proposed improvements of existing pedestrian facilities

Focus group participants' suggestions to improve pedestrian facilities revolve around design and upkeep. Design features that would help them have an easier and better pedestrian experience in using the facilities were mentioned such as elevators. However, focus group participants in Balintawak have reservations due to the business establishments (market) in the area. They think that people might use the elevator to transport goods and might contribute to wear and tear of elevators intended for pedestrians.

Rest rooms and breast-feeding stations were mentioned by mothers and women during the discussion as welcome additions to better pedestrian facilities. Another

improvement would be installing lights and closed-circuit television (CCTV) to serve as deterrent to crime.

Focus group participants in Cubao recommended that different stakeholders should communicate with one another and clarify their responsibilities. City government (Engineering Office), barangay, MRT and the MMDA have roles to play.

Security of these pedestrian facilities should be addressed. The participants also mentioned the need of authorities in monitoring and surveillance especially at night. Maintenance of cleanliness is another recommendation of the group. The present upkeep of these facilities is unsatisfactory.

Awareness on the Project

Apart from the assessment of the facilities, key informants also assessed the respondents' awareness of the project. Sixty percent of those interviewed have awareness of the Build Build Build Program, but 100% were not aware of the EDSA Greenways Project.

When the key informants were asked on their perception of the benefits of the project, 42% would provide efficient connectivity, while 37% perceived that the project will provide additional employment facilities. While there were perceived benefits, 30% of the key informants anticipated that the project may cause permanent or temporary loss of livelihood as a disadvantage of the project.

Thirty-five percent of the key informants suggested the project to have an elevator as an added feature, while 19% suggested lighting facilities and CCTV to be installed. Also, majority of the key informants expects the project to be completed.

There will be 90% participation from the key informants will be expected once the project has been implemented. Forty percent are willing to participate in information – dissemination of the project.

7.4.2 Quantitative

Utilization of the existing pedestrian facilities

The majority of the respondents interviewed were either from outside the City but within Metro Manila (38%) or outside the barangay but within the City (30%). They usually used the facilities as their access to be in their desired destinations. It was noted that although most of the respondents were not from the affected barangays, they still regularly used the facilities - majority daily (42%).

Table 7.5 Usage of Pedestrian

Item	# of Respondents	% of Total
<i>Point of Origin</i>		
Within the Barangay	57	15%
Outside Barangay but within the City	117	30%
Outside the City but within Metro Manila	146	38%
Outside Metro Manila	64	17%

Item	# of Respondents	% of Total
<i>Point of Destination</i>		
Within the Barangay	136	35%
Outside Barangay but within the City	114	30%
Outside the City but within Metro Manila	105	27%
Outside Metro Manila	29	8%
<i>Use of Pedestrian</i>		
Road (pedestrian lane)	81	21%
crossing	30	8%
footbridge	273	71%
<i>Frequency of Utilization</i>		
Daily	162	42%
Weekly (1 to 6 times a week)	158	41%
Monthly (1 to 6 times a month)	51	13%
Rarely	11	3%
No Response	2	1%

Current state of the pedestrian facilities

Respondents, generally perceived that the current pedestrian facilities were not responsive to the needs of Person with Disabilities (PWD), youth/ children; and senior citizen. On the other hand, it is responsible to the needs of female; and lesbian, gay, bisexual, and transgender (LGBT) groups.

Table 7.6 Responsiveness to Needs

Current pedestrian facilities are responsive to the needs of:	Yes		No	
	# of Respondents	% of Total	# of Respondents	% of Total
Females	381	99%	3	1%
PWDs	2	1%	382	99%
Youth/Children	11	3%	373	97%
Senior Citizens	3	1%	381	99%
LGBT	381	99%	3	1%

According to the respondents, various untoward incidents had been experienced on the current pedestrian such as discrimination, bullying, sexual harassment, and crime.

Table 7.7 Incident on Current Pedestrian Facilities

Incidents of any of the following in the current pedestrian facilities	Yes		No	
	# of Respondents	% of Total	# of Respondents	% of Total
Sexual harassment	41	11%	343	89%
Bullying	40	10%	344	90%
Discrimination	29	8%	355	92%
Crime	60	16%	324	84%

Awareness of the project

About 58 percent of the respondents were not aware on the Build Build Build program, while 42% were aware of the Project. The information was mostly sourced from the television (68%) and social media (21%).

Table 7.8 Awareness of the Build Build Build Project

Awareness on the Build, Build Build Program	# of Respondents	% of Total
Yes	160	42%
No	224	58%
Source of Information	n	%
Barangay/City Official	0	0%
Meeting about the Project	0	0%
Proponent of the Project	0	0%
Government Agencies	1	1%
<i>Others:</i>		
Neighbor/relative	1	1%
Newspaper	3	2%
Radio	8	5%
Social Media	33	21%
Television	109	68%
No Response	5	3%

In terms of the EDSA Greenways Project as part of the Build Build Build Program, the respondents generally perceived that the said project would create additional job/ employment (22%); enhance quality service and bridge connections (22%); and safety of senior citizen, female, children and PWDs (21%).

Table 7.9 Benefits of the Project

Potential Benefits from EDSA Greenways Project	# of Respondents	% of Total
Additional Job/Employment	384	22%
Quality Service and improve bridge connections	379	22%
Safety of Senior Citizen, Female, Children and PWDs	369	21%
Easy access of facilities	324	18%
Improved infrastructure	297	17%

On the other hand, the respondents also perceived that the Project may also cause negative impacts particularly during construction, such as cause of traffic and difficulty on crossing.

Table 7.10 Negative Impacts of the Project

Potential Negative Impacts from the EDSA Greenways Project	# of Respondents	% of Total
Possible effect on health due to pollution (e.g. noise and water contamination)	11	2%
Need to relocate affected person in the project area	0	0%
Safety of senior citizen, female, children and PWDs	2	0%
Traffic during construction period	348	56%
Increase volume of waste	12	2%
Difficulty on crossing during construction	254	41%

In general, the respondents perceived that the Project will benefit all types of groups including vulnerable groups. With this, the respondents have a high level of support for the Project ranging from 8-10.

Table 7.11 Project Perceived Beneficiaries

Beneficiaries of the EDSA Greenways Project	Will Benefit		Will Not Benefit	
	# of Respondents	% of Total	# of Respondents	% of Total
Female	383	99.7%	1	0.3%
PWDs	375	97.7%	9	2.3%
Children/Youth	383	99.7%	1	0.3%
Senior Citizen	376	97.9%	8	2.1%
LGBT	384	100%	0	0.0%

Table 7.12 Level of Support for the Project

Level of Support for the Project	# of Respondents	% of Total
1	0	0%
2	1	0%
3	3	1%
4	2	1%
5	10	3%
6	4	1%
7	17	4%
8	123	32%
9	111	29%
10	110	29%
No Response	3	1%

The information gathered have shown that actual users in the communities where the train stations who have valuable design insights of pedestrian facilities.

This confirms the idea that enhanced pedestrian connectivity, accessibility, safety and comfort begins with a shared understanding among stakeholders of such kind of pedestrian facilities. Stakeholders here include the designers, engineers, city officials and citizens and advocates.

Generally, the common responses from FGD and the KII showed that the footbridge is not well lit hence, the risk of being mugged, held up or snatched is high. This therefore need for immediate improvement of the facilities.

It was also notable that the respondents from both FGD and KII perceived that the footbridge is not beneficial to PWDs. The respondents suggested elevator, lighting facilities and CCTV installed. They also anticipate provision of additional employment upon implementation. High participation from both FGD and KII respondents will be expected once the project is implemented.

In addition, survey respondents perceived that the current pedestrian facilities were not responsive to the needs of PWD, youth/children; and senior citizen. It is only responsive to female and LGBT groups.

Our manifest content analysis of the responses show that pedestrian facilities should be designed to allow pedestrian of all ages and abilities to use it. Height of landings and steps should be considered in the design and construction, i.e., gentle grade ramp. Installation of lights and CCTV are likewise important to the focus group participants.

Ensuring that pedestrian facilities are free from obstructions such as vendors, street people is another key recommendation from the participants.

7.5 Project Stakeholder Consultation Meeting

As part of the FS activities, stakeholder engagement sessions were held to present the concept design schemes for the stations, discuss possible impacts of the

Project in the environment and fulfil engagement requirements in the community. The complete details of the stakeholder engagement are summarized in **Table 7.13**.

Table 7.13 Stakeholder Engagement Details

Date	Participants	Venue
8 May 2019, 8:30 AM	Government agencies, ADB	16F The Columbia Tower, Ortigas Avenue, Barangay Wack-Wack, Mandaluyong City
8 May 2019, 1:00 PM	Guadalupe and Taft Station identified Stakeholders	
9 May 2019, 8:30 AM	Monumento and Balintawak identified Stakeholders	GO Hotels Cubao 840 Aurora Blvd, Quezon City
9 May 2019, 1:00 PM	Common and Cubao Stations identified Stakeholders	
24 May 2019, 1:00 PM	PWDs	NCDA Board Room, Isidora Street, Brgy. Holy Spirit, Quezon City
Note: As outlined in Section 3.1 Monumento is initially included in the study but has not been taken forward to NEDA submission.		



Registration of Participants for PM Session



Opening Remarks from Ms. Edna Clemente of DOTr



Project Presentation by Mr. Corey Wong of Arup



Environmental Presentation by Mr. David Rollinson of Arup



DOTr Representative during Open Forum
8-May-2019- PM Session



Opening Remarks from Mr. Eric Ferre
 of DOTr



Project Presentation by Mr. Corey
 Wong of Arup



Environmental Presentation by Mr.
 David Rollinson of Arup



NCD Representative during Open
 Forum

9-May-2019- AM Session



Registration of Participants during PM Session



Opening Remarks from Mr. Fidel Hapal of DOTr



Project Presentation by Mr. Klervin John Collado of Arup



Environmental Presentation by Ms. Angel Salcedo of Arup



Open Forum during PM Session

9-May-2019- PM Session



Discussion of EDSA Greenways -Project Objectives from Mr. Fidel Hapal of DOTr



Project Presentation by Mr. Klervin John Collado of Arup



Environmental Presentation by Ms. Maria Catherine Rontos of Arup



Open Forum Ms. Carmen Zubiaga, Officer- In- Charge of the National Council on Disability Affairs
24 May 2019

Figure 7.1 Stakeholder Consultation Meeting, 8-9, 24 May 2019

List of Stakeholders

As part of the feasibility studies, the environmental and social process identifies the likely issues or impacts that the project may cover. Stakeholders' consultation was conducted to get the perception and possible suggestions of the affected communities and businesses to the Project. This covers the discussion of the Project, including its objectives, scope, major design observations, environmental impacts and development plans.

The identified key stakeholders' groups for the Project are listed in **Table 7.14**.

Table 7.14 Stakeholders Identified in the Project Site

Stakeholder Group	Composition
Government	Department of Transportations (DOTr) Department of Public Works and Highways (DPWH) Department of Social Welfare and Development (DSWD) Department of Environment and Natural Resources (DENR) Philippine National Police (PNP) Philippine Commission on Women (PCW) Metropolitan Manila Development Authority (MMDA) National Council on Disability Affairs (NCDA) LGUs Mayor and Vice Mayor's Office Gender and Development Council Office for Senior Citizen Affairs (OSCA) Civil Society Office Local barangay in Table 4.13 . Landing areas as discussed in Section 3.3.4 .
Non-Government Organizations/ Civil Society Groups	Women's groups Senior Citizens/ PWDs/ Children's groups – Barangay Group Inclusive Mobility Network LGBT Groups: Babaylanes Inc. ⁸ , ASEAN Sexual Orientation, Gender Identity, and Expression (SOGIE) Caucus Urban Poor groups: Damayan ng Maralitang Pilipinong Api (DAMPA) ¹ Asian Development Bank (ADB) Samahan ng mga Pilipina para sa Reporma at Kaunlaran (SPARK) Philippines UN Women Safe Cities Metro Manila

⁸ DAMPA is a non-government organization (NGO) that aims to provide basic services and social protection to urban poor families. While Babaylanes, also an NGO, protects LGBT from unnecessary discrimination and promoting gender awareness. Their presence represents the vulnerable and LGBT groups.

Stakeholder Group	Composition
	Tahanang Walang Hagdanan, Inc.(TWHI) Philippine Federation of the Deaf, Ephpheta Foundation for the Blind, IAMYOU/ Inclusion Initiative Inc. The Teacher's Gallery, Down Syndrome Association of the Philippines, Inc. (DSAPI) Autism Society Philippines Save the Children Inclusive Mobility Network
Business	Informal sector SMEs Informal Settlers Public Transportation Federation of Jeepney Operators and Drivers Association of the Philippines (FEJODAP) UV Express Tricycle Operators and Drivers Association (TODA) Metro Rail Transit 3 Light Rail Manila Corporation Large scale businesses/ corporations/ service providers Listed in Table 4.12 MERALCO-Quezon City branch, Cubao branch, Makati and Mandaluyong branch, Pasay City branch Maynilad and Manila Water Business Area/MWSS PLDT
Institutions	Schools/universities/daycare centers UP School for Urban and Regional Planning (UP SURP) UP Center for Women's and Gender Studies (UP CWGS) Listed in Table 4.12 Hospitals Listed in Table 4.12

Issues and Concerns

The summary of issues and concerns and recommendations and solutions of the participants during the engagement are presented in **Table 7.15**.

Table 7.15 Summary of Issues and Concerns Conducted at the Preparation Stage

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
8 May 2019, AM Session		

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
Mr. Arnel Ubalde <i>Pasay City LGU</i>	Will Shaw Boulevard (including the Pasig, Mandaluyong, and San Juan) have access to the pedestrian?	Mr. Corey Wong (Arup) and Mr. Shuji Kimura (ADB): The scope of the <i>EDSA Greenways Project</i> contract only includes the six stations namely Monumento, Balintawak, Common Station, Cubao, Guadalupe and Taft. Shaw Boulevard will be included in another study (i.e. " <i>Ortigas Greenways Project</i> ").
	How to ease the traffic in Cabrera-Taft Flyover? Will it occupy one lane during construction activities?	Mr. Corey Wong (Arup): This area will be further studied and check if the project location will cause a major issue.
	Will the operations of the project be open 24 hours for the pedestrians and how will the security system going to work?	Mr. Corey Wong (Arup): During operations phase the project is open to pedestrian 24/7 but the scheme for security needs to be finalised.
	Were the existing businesses which will be affected by the project considered?	Mr. Corey Wong (Arup): The stakeholders that will be affected by the project were already identified. After the election, there will be specialised studies on physical and economic displacements as well as the vulnerable groups who will be affected by the project.
Mr. Edgardo Del Rosario <i>Quezon City Engineering Department</i>	Provide overview of the project; the scope of the study in Quezon City is quite broad.	Mr. Corey Wong (Arup): A copy of the power point presented during the Stakeholder's Meeting will be provided.
	Who will be responsible in the maintenance of the project?	Mr. Corey Wong (Arup): DOTr will hire a third-party to maintain the project. The revenues that will be generated from the advertising units and small kiosk can be of support for the operational cost.
	Are rest seats considered on the project?	Mr. Corey Wong (Arup): It is ideal to have rest areas, but some controversies were being raised such that the homeless people will use those seats.
	Did you consider incorporating the path	

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
	walk to the existing pedestrian?	However, if it is decided to place rest areas on the project, it will be designed in such a way said scenario is prevented.
	Consider the legal aspects on the project.	Noted.
Ms. Aurora C. Cieco <i>Caloocan City LGU</i>	Limitations of Monumento Station	Mr. Corey Wong (Arup): <i>(Arup presented the proposed design for the Monumento Station).</i> It was explained that the Bureau of Fire Protection required height to accommodate the fire truck boom is 6m. Thus, this limits the pedestrian project to be built. Also, other proposal is to build a roundabout around the Andres Bonifacio Monument however the National Historical Commission does not allow any structures that will obstruct the viewpoints of the monument.
Engr. Carolyn M. Dechino <i>MMDA</i>	Was the traffic management cost accounted?	Mr. Corey Wong of Arup: The consideration of traffic impact analysis and traffic management costs are included in the feasibility study. The foot path will have lighting but security on the ground is not within the scope of the project.
	There is a need for traffic impact analysis and traffic management plan during construction activities.	
	Will the footpath underneath the bridge will have security guard for safety purposes?	
Ms. Excelsa Tongson <i>UPCWGS</i>	How the needs of the children and women considered during the planning?	Ms. Tamayo (Gender Specialist of the Project): The ADB and DOTr has safeguards for gender responsiveness in all projects. The <i>EDSA Greenways Project</i> has drafted a Gender Action Plan (GAP) which includes the following: (i) accommodation of two wheelchairs each way; (ii) lift for the wheelchairs; (iii) half open elevators; (iv) PWD sensitive signages; (v) tactile flooring for the

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
		blind; and (vi) lighting and CCTV monitoring for safety and security.
	How is safety of the children to the gap of the rails, and design of stairwell considered?	Mr. Corey Wong (Arup): The rails will be closed, the design of stairwell will not be too steep, and there will be signages and safety barriers for pedestrians.
	With regards to harassment of women on the pedestrian, how will the project address this situation?	Ms. Maya Tamayo (Gender Specialist of the Project): The design of the pedestrian is not the same for the existing pedestrian. The project will have an advertisement spaces and reserved spaces for important information. There will also be mechanism on how to seek help during this kind of scenarios.
	Recommendation: To have an all gender restrooms and must have a campaign on how to use it.	Noted.
Ms. Gina Chan <i>UPCWGS</i>	How will the pollution during construction and operations phase be addressed? During operations, how will possible accidents at night be addressed?	Mr. David Rollinson (Arup): The Initial Environmental Examination (IEE) that will be conducted will take necessary measures for all environmental impacts identified such as lessening the blind spots and having security guards on duty during at night.
	Are the following items considered? Height of the walkways Distance of one stair to another Scope of maintenance, if only the elevated walkway included in the scope	Mr. Corey Wong (Arup): The need of going into the ground (e.g. underpass) or under the viaduct of LRT have stairs and ramps. The footpath underneath the bridge is also included in the scope of the maintenance.
	Recommendation: To have a Gender Sensitivity Training/Seminar to all construction workers and management.	Ms. Maya Tamayo (Gender Specialist of the project): The Gender Sensitivity Training/Seminar is included in the draft GAP.

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
Mr. Allan Saleh F. De Vera <i>Quezon City Planning Department</i>	Proposal on having bike lanes considered?	Mr. Corey Wong (Arup): The EDSA Greenways Project is entirely for walking ONLY. Bikers / bike lanes is a second priority on this study. Arup is open for the future extension on those areas. A different study will be needed for this.
	Feasibility study in Balintawak about Urban and Renewal Land Adjustment	
Engr. Lydia Chua <i>DPWH-NCR</i>	Is the EDSA-Taft Flyover being considered in the project?	Mr. Corey Wong of Arup: This will be noted. Can we request for the plans of the EDSA-Taft Flyover project?
Engr. Achilles Robiso <i>Pasay City Planning Office</i>	Will the existing columns of the footbridges be used in the project?	Mr. Corey Wong (Arup): There will be construction of a new columns for the project.
Mr. Jonathan Himala <i>Caloocan City LGU</i>	How the Economic Internal Revenue Rate (EIRR) be evaluated?	Mr. Corey Wong of Arup: The pedestrian traffic analysis was conducted during October 2018 and the EIRR was evaluated in a traditional way. The EIRR has incorporated the study from Singapore which proves that using walkways lessen the travel time.
	Are the benefits of the cost for time travel being considered?	
	Is the pedestrian traffic analysis being conducted?	
8 May 2019, PM Session		
Ms. Lorelie Reyes <i>LRT-A</i>	There is a signed Memorandum Agreement (MOA) between LRT-A and DOTr on the construction of transport interchange in connecting the LRT-2 and MRT-3. Based on the MOA, Filinvest will invest on this project. LRT-A can endorse Arup to Filinvest.	Mr. Corey Wong (Arup): Noted.
Ms. Sylvia Gamboa <i>Our Lady of Guadalupe Minor Seminary</i>	Will the project acquire portion of our property?	Mr. Corey Wong (Arup): There will be no acquisition of land within the property of Our Lady of Guadalupe Minor Seminary.

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
Mr. Bien Mateo <i>SM</i>	Will the property of SM be affected by the project?	Mr. Corey Wong (Arup): There is a need for some landings and the possibility of connecting pedestrian and SM properties.
Representative from MERALCO	Who will be responsible in the utility cost?	Mr. Corey Wong (Arup): The DOTr is the owner of the project and a third party will operate it. The third party will maintain the facility but the DOTr will pay them. Also, the DOTr is the applicant for the relocation of utilities, if needed.
	What is the certainty of the third party in handling the cost?	
	Is the DOTr will be the applicant in relocating the utilities?	
Mr. Corey Wong <i>Arup</i>	How long would it take for the utility to be relocated by MERALCO? Is it possible to handle the work for only 2-3 months?	Representative from Meralco: The technical team will work with DOTr for relocation of utility poles and the needs of the plans. The relocations will take 2-3 months. Meralco will look more into the details of the design of the project.
Mr. John Mark Dumpit <i>SMDC</i>	Recommendation: To have a signage that no vendors will be allowed on the pedestrian to ensure that the pedestrian will meet the goals of the project.	Mr. Corey Wong (Arup): Noted.

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Edgardo Del Rosario <i>Quezon City Engineering Department</i>	Aside from the elevators, will there be any facilities to be provided for the blind people/PWD? According to Accessibility Law of the Philippines, tactile floorings are required in the structures to be built and should follow international design concepts.	Mr. Corey Wong (Arup): Universal design will be considered. There will be strategies to allow visually-impaired people to use the facilities.
Maclarriz Ibasco <i>MERALCO</i>	What is the plan on the relocation of the utility poles?	Mr. Corey Wong (Arup): The Project team has worked together with MERALCO on the design. The removal of the utility poles and drainage systems will be done prior to the construction.
	Will be operator be incorporated in the budget?	

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
	Will there be a third-party contractor?	There will be a third-party contractor that will be hired by DOTr.
Eduardo Tacneng <i>Viron Transit</i>	Will the construction take the current space for pedestrian lanes?	Mr. Corey Wong (Arup): The pedestrian lanes will be used. One lane of EDSA will also be used during construction. Six meters is required during construction (i.e. two meters from the sidewalk, four meters from EDSA). A 1.5-m wide temporary footpath will be provided to pedestrians for use.
	Will the construction take one lane southbound of EDSA? This will cause more traffic.	Mr. Corey Wong (Arup): The traffic condition will worsen during construction phase but we need to look to the future and the improved walk environment (e.g. the lane in Balintawak that will be used in construction is not used well).
	Will there be a prohibition of vendors on the constructed Greenway?	Mr. Corey Wong (Arup): Vendors will be prohibited to ensure goals of the Greenways project are met.
	Is the project subject to NEDA approval?	Yes.
Marjorie Bayno <i>Magenta Legacy Inc.</i>	How long does the construction will take? Is it done simultaneously?	Mr. Corey Wong (Arup): The timeframe for the project is 16 months. Greenways in every station is desired to be done simultaneously.
	What are the material specifications present in the design phase?	Mr. Corey Wong (Arup): For the materials specifications, those will be present in the detailed design.
Wanet Lacsamana <i>Inclusion Initiative</i>	How corruption will be prevented?	Mr. Eric Ferre (DOTr): Once the project is approved by DOTr, proposal will be forwarded to NEDA for funding. There will be transparency in the process. The government is aware of the issues on corruption and is taking an action by eliminating proven corrupt DOTr officials. There will be a collaboration between DOTr and LGUs to make the project

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
		successful. The inputs from the LGUs are valuable in the project.
	How to ensure the safety of women, and the disabled? Is the design accessible to the PWDs?	Ms. Maya Tamayo (Arup): ADB-funded projects require gender responsiveness. This will be used in the design. Also, international standards will be followed. The project will be accessible to pregnant women, children, and PWDs. There will be orientations for the workers in the action plan for gender awareness.
	If there will be all gender restrooms?	Mr. Corey Wong (Arup): There will be concern on the maintenance cost but are willing to have one. It is needed to include all gender bathroom in the analysis.
	There will be Filipino workers during the implementation phase?	Mr. Corey Wong (Arup): Opportunity for employment are for locals.
Gino Yabut <i>Phil-Ville EDSA</i>	Are the footbridges connected to the malls?	Mr. Corey Wong (Arup): The footbridge connects to the main destination. These bridges are planned to be available 24/7 hence connecting this to the mall limits the accessibility (malls are closed in the evening).

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Rose Ricafuente <i>Brgy. Socorro</i>	Is the MRT connected to the Common Station?	Mr. Klervin Collado (Arup): Yes, it is connected.
	Is the design of the steps considered during its design phase?	Mr. Klervin Collado (Arup): The ladder/steps in the project are considered in the project. All proposed stations will have lifts to help the pedestrians particularly senior citizens. The design of the ladder has shorter step distances for easier access of the senior citizens.
Cyrel Balayong <i>Brgy. Socorro</i>	The current footbridges are damaged. How is the new Greenway being safe for everyone?	Mr. Fidel Hapal (DOTr): The rise is either open, or half open. Safety for women and children will be implemented. Stainless steel is not an option in

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
		the design and is looking for other materials to be used.
Wilma Ligot <i>ADHD Society of the Philippines</i>	Recommendation: There should be sensitivity training for the workers and neuro development cases should be addressed as well.	Mr. Klervin Collado (Arup): Noted.
	Are there signs at the Greenway that will follow the universal symbol of accessibility?	Mr. Fidel Hapal (DOTr): There will be Technical Working Group (TWG) for disable person and work plans for PWDs and senior citizens. The planned signages will reflect international standards but the provisions will be more detailed in the plan.
	Are the activities to be done for the Greenway can be connected or inferred to different sub-committees?	Mr. Fidel Hapal (DOTr): The action will be done with the sub-committees, and will be discussed to different stakeholder groups.
Teddy Magbuhos <i>MERALCO</i>	What will be the situation for utility poles?	Mr. Klervin Collado (Arup): There are conversations and consultations with Meralco about the relocation of the utility poles. The Greenways proposes an upgraded walkway this sidewalk is widened. There are also provisions about the relocation of the utility poles.
Josephine Esteban <i>ADHD Society of the Philippines</i>	Is there is a plan to use solar energy?	Mr. Klervin Collado (Arup): For the plan on using solar energy, we are noting the suggestion but the final source of electricity to be used will be included in the detailed engineering design.
	Where will the sources of electricity come from?	Mr. Klervin Collado (Arup): Sources of electricity will be discussed in the later part of the project and there will be constant coordination with Meralco regarding this matter.
	Recommendation:	Mr. Klervin Collado (Arup): Noted.

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
	LGU involved should be in-charge as well in the maintenance works.	
Dennis Roque <i>MECO</i>	There should be plans on pathways, water pipe layouts for the stations as well as correct water segregation on the Greenways.	Mr. Klervin Collado (Arup): Noted.
Ariel Bautista <i>YMMC</i>	Are there are comfort rooms at landing areas, comfort rooms for gender sensitive areas as well?	Ms. Maya Tamayo (Gender Specialist of the project): There is a plan for all gender bathroom and breastfeeding spaces. Although, it will be hard on the maintenance unless there will be a third-party maintenance provider responsible. Thus, we will check with the Local Government Units (LGUs) and communicate to the establishment owners or someone responsible to it.
	What are the action to be taken on sexual harassment?	Ms. Maya Tamayo (Gender Specialist of the project): On operation, there will be spaces given by the LGUs on dissemination information about this topic. The CCTVS and the security will be provided by the third-party service or maintenance contractor. Lastly, there will be rest pits on both sides for persons with wheelchairs.
Salve Magallanes <i>Brgy. Socorro</i>	It is hard for old people to use the stairs, especially when each step is high and there are no rest pits. Are there rest pits on the bridge? Can the elevators for senior citizens only?	Mr. Klervin Collado (Arup): There will be two breath spaces at the stairs 2.5m wide. The steps of the stairs are also modified. Elevator cars have more capacity to accommodate more pedestrians. The elderly, and PWDs are prioritised at the elevator.
	There should be toilets that have payments for clean and operating toilet facilities.	Mr. Klervin Collado (Arup): Noted.
Benjie Lumibao <i>Meralco</i>	There should be a maintenance plan and a	Mr. Klervin Collado (Arup): Noted.

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
	long-term maintenance on the project.	
	How long is the lifespan of the structure?	Mr. Corey Wong (Arup): Based on the economic and financial analysis made, lifespan is estimated to 30 years. Materials used should be replaced every 15 years.
24 May 2019, PWD Consultation		
Mr. Tony Llanes <i>Adaptive Technology for Rehabilitation, Integration and Empowerment of the Visually Impaired (ATRIEV)</i>	Query on economic concerns of the project especially during construction phase	Mr. Klervin Collado (Arup): The project will be supported by economic and resettlement studies.
Ms. Jo Esteban <i>ADHD Society of the Philippines</i>	Queried whether solar power, rainwater harvesting, etc. will be incorporated	Mr. Klervin Collado (Arup): These are considered.
Government office representative	Based on Guadalupe MRT station experience, the elevator is always defective. It is not satisfactorily maintained. For this project, it was mentioned that elevated walkway is quite high. How will this project address elevator malfunctions?	Mr. Klervin Collado (Arup): In HongKong, they made sure that elevators are never broken. This is a matter of maintenance. DOTr will hire a 3rd party service provider to ensure this. Meg Adonis (DOTr-Rail): DOTr is aware of the situation and actions are already being made.
Mr. Tony Llanes <i>Adaptive Technology for Rehabilitation, Integration and Empowerment of the Visually Impaired (ATRIEV)</i>	On the details of accessibility features, will it be inclusive of ICT designs?	Mr. Klervin Collado (Arup): There will be provision for tactile pavers and sensory device for the blind too. It will made sure that design will consider all forms of disability adapting universal design. Also, during detailed engineering, a series of consultations will be done.
Mr. Dondon Pagdagdaga <i>Cerebral Palsied Association of the Philippines</i>	Query on safety especially in case of emergencies such as earthquakes.	Mr. Klervin Collado (Arup): The geotechnical and geohazards teams has taken this into considerations. Lighting has always been a point of importance both during night and say. Active surveillance

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
		(CCTV) will also be in place. It will be considered in the design that the walkway/landing points will connect directly as possible to nearby hospitals.
Ms. Carmen Zubiaga <i>National Council on Disability Affairs (NCDA)</i>	<p>What is the commitment of DOTr and other agencies in terms of maintenance? Especially for the case of MRT and LRT which took them years to fix it and now it is still broken. Vulnerable sectors cannot use anymore the facilities. Expectation is that such issues will now be addressed in the next projects. This aspect should be incorporated already in the budgeting process.</p>	<p>Mr. Klervin Collado (Arup):</p> <p>The technical team has considered the use of ramps in cases of repair/maintenance however there are spatial constraints. Scenario is same with the provision of escalators, also maintenance cost is higher compared to elevator. Hence the team has focused in stairwell and lift/elevators.</p> <p>The maintenance cost per year was already computed and included in the proposed budget submitted.</p> <p>Meg Adonis (DOTr-Rail):</p> <p>In terms of policy and institutional side, they are still on the feasibility stage of the project. Inter-agency coordination/ consultations are being done and all concerns that has just been mentioned are being raised and discussed. Also, safeguards are being finalised with ADB and final documents will be shared.</p>
Mr. Dennis Marquez <i>St. Francis School</i>	<p>Long-term plan is in place, but he thinks that ergonomically there is an issue especially in terms of behaviour and motivation. As an educator for special children, concern is regarding power outages – will the provision of ramps for 24/7 operation be considered?</p>	<p>Mr. Klervin Collado (Arup):</p> <p>Some of the walkways will have direct linkages to the malls (e.g. Trinoma, SM North). In case of elevator break-down, people can access these ramps. In terms of ramps that will be available 24/7, this will cost a lot. Ramps will need more space, hence will cost more and it would be challenging to pass the EIRR requirements of NEDA.</p>
Representative from Parent Advocates for Visually-Impaired Children	<p>The goal is for the children to be independent someday. The facilities have to be accessible e.g. provision for tactile pavers. Concerns raised</p>	<p>Mr. Klervin Collado (Arup):</p> <p>In the current stage, railing safety has been considered. There is a provision for a buffer between the railing edge and the walkway to</p>

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
	is how safe for PWD to navigate the area alone/independently (e.g. is the railing safe for visually-impaired?)	prevent harm. Also during the next stage, which is the detailed engineering design, series of consultations will be made to ensure all concerns will be captured.
Mr. Emer Rojas <i>New Vois Association of the Philippines(NVAP)</i>	Query regarding the maintenance that for current facilities, maintenance is under DOTr and MRT Consortium. Who will handle the operation and maintenance for this project? Will there be space for the vendors such as stalls near ESDA, Ayala, etc.	<p>Mr. Klervin Collado (Arup):</p> <p>Even the project is not profit-oriented, 2 forms of income-generating projects has been included in the O&M calculations i.e. advertising and kiosks. It will be made sure that arrangements/provisions are formal and rental fees collected will proceed to funds for maintenance.</p> <p>For the other shares/funds for maintenance costs, sections nearest railway station/access points will be shouldered by MRT stations. The segment connected to private developers will be shouldered by the private developers.</p> <p>Meg Adonis (DOTr-Rail):</p> <p>By default, DOTr will provide portion in the operation and maintenance. They will also try to engage with the private corporations.</p>
Ms. Melba Gayta <i>Philippine Information Agency</i>	Query if private sector will be involved in the construction of the walkway. Will Ayala and SM be part of this? There are feedbacks that walkways are longer because of these establishments hence making it not PWD-friendly.	<p>Mr. Klervin Collado (Arup):</p> <p>The project will be ADB-funded. Private sector will not be involved yet in the construction but will be involved in the maintenance.</p> <p>As for the alignment, it is final for this stage but might have some changes during DED. It be made sure however that linkages are direct as much as possible.</p>
Ms. Dorothy Dimaandal <i>Community Physiotherapy and Rehabilitation Facilitators (CPREF) – Norfil Foundation</i>	In relation to previous query, are the funds from income-generating projects plus the private funds be enough for the operation costs? How	<p>Mr. Klervin Collado (Arup):</p> <p>Primary source of funds will be from advertising and kiosks, and will not be dependent on the private institutions.</p>

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
	about the long-term maintenance?	The elevator maintenance is major contributor for the cost, but this has been considered in the computations, with hopefully some spare.
Mr. Tony Llanes <i>Adaptive Technology for Rehabilitation, Integration and Empowerment of the Visually Impaired (ATRIEV)</i>	Is cost-benefit can be discussed with NEDA? Adding more investment for inclusion will increase economic benefit?	Mr. Klervin Collado (Arup): Bridges have much less of an economic matrix as the rails do. Also, for example, 5.33m high walkway will cost a lot for a ramp. Space will be of constraint.
Ms. Carmen Zubiaga <i>National Council on Disability Affairs (NCDA)</i>	Added on the previous concern that NEDA is looking for projects ensuring inclusion and SDG-responsive. NEDA's budget ceiling justification is irrelevant.	Maya Tamayo (Gender Specialist of Arup): The concern can be checked. Whilst inclusive design is costly, but they can commit to discuss with NEDA and negotiate with them. They will also request sectors/CSOs/advocates to push for this.
	There are various technologies for accessibility that are not necessarily expensive. We have to research.	Maya Tamayo (Gender Specialist of Arup): This recommendation has been noted.
	Regarding operations during emergencies. Is immediate action plan considered	Maya Tamayo (Gender Specialist of Arup): Action plan is being formulated and LGUs are also being engaged.
Ms. Melba Gayta <i>Philippine Information Agency</i>	What is the involvement of SM and Ayala especially in terms of design?	Fidel Hapal (DOTr): They will ensure that DOTr is on top of the project.
Mr. Leo Carlos <i>Parent Advocates for Visually Impaired Children (PAVIC)</i>	Some points regarding emergency scenarios: i. Provide a place of refuge as a recommendation; ii. For the visually-impaired, what happens after getting off the walkway? Iii. What happens during power failure? Will there be storage of back-up power?	Fidel Hapal (DOTr): DOTr will be proposing to LGUs to continue the development/interconnectivity of greenways project to their local projects. Suggestion for back-power was noted.
Ms. Michael Saludo	Query on the clearance/easement from the buildings. Is the	Mr. Klervin Collado (Arup): The easement will be 2m from the buildings. Regarding the

Stakeholder's Name / Office	Issue / Concerns or Suggestion	Response
<i>National Council on Disability Affairs (NCDA)</i>	walkway will be situated same level with 2nd floor of buildings? Thinking of the possibility for the medium-sized businesses to connect to greenways project. Also, this design can increase opportunities for PWDs to work in such establishments.	connectivity, exit distances has been considered. Connecting to the buildings can go both ways as it can also be a vessel for robbery, criminal activities, etc. But this suggestion will be checked.
Ms. Micah Celine Dela Rosa <i>Philippine Society for Orphan Disorders</i>	Is there a possible partnership with LGUs for continuity? It is better to involve NGOs as well and the LDCs.	Mr. Klervin Collado (Arup): This suggestion is noted. Fidel Hapal (DOTr): DOTr has also started to conduct consultations in the barangay level. It will be ensured that there will be basic sector representation.
Plt. Noah Sagun <i>PNP-Engineering</i>	Suggestion to consider lessening traffic jam during construction stage.	Mr. Klervin Collado (Arup): This suggestion is noted. Fidel Hapal (DOTr): End product is to segregate walking and commuters loading.
Ms. Melba Gayta <i>Philippine Information Agency</i>	Are we considering a long skygarden?	Mr. Klervin Collado (Arup): EDSA Greenways is sort of pilot for this.

7.6 Pedestrian Survey

Pedestrian surveys were conducted to get the current perception of the pedestrians on the existing footbridges around the study area. Demographics of the interviewees are presented first, followed by results. The locations of the pedestrian interview surveys were arranged at public transport stops/ entrances/ exits and key locations on podium level within the study area as shown in specifics in **Appendix G1**.

A total of 1,018 participants in the AM survey and 1,000 participants in the PM surveys were considered valid and used for the analysis in Cubao. Other Stations are as follows: 647 AM and 559 PM surveys in Guadalupe, 1,007 AM and 1,130 PM surveys in Taft, 819 AM and 924 PM surveys in Balintawak, and 1,436 AM and 1,435 PM surveys in Common Station.

Table 7.16 shows the distribution of participants per gender preferences for each station, except for Common Station where LGBT were not incorporated. **Appendix G2** shows the complete data per station.

Table 7.16 Gender Distribution of the Participants

Station	Male	Female	Transgender	None of the choices	Did not respond
Balintawak	42.3%	55.0%	0.3%	0.1%	2.3%
Common Station	48%	52%	-	-	-
Cubao	45.2%	47.6%	1.4%	0.3%	5.5%
Guadalupe	47.0%	49.1%	0.2%	0.3%	3.4%
Taft	43.6%	52.9%	0.7%	0.2%	2.6%

Appendix G3 summarises the proportion of arrival and departure journey by mode of transport during the AM Peak. In terms of arrivals, bus (coach) had the highest share (27.1%) in Cubao, while jeepney with 36.3% in Guadalupe and, LRT-1 with 30.5% in Taft.

For departure mode, bus (coach) is still the highest with 34.3% in Cubao and 33.8% in Balintawak. The majority of journeys uses MRT-3 with 31.1% in Guadalupe and jeepney in Taft with 35.6%.

Among rail modes in Cubao, more arrived via LRT-2 (10.8%) than MRT-3 (8.1%), but more left the area via MRT-3 (11.1%) compared to LRT-2 (7.6%).

PM Peak arrivals shows that jeepney predominantly ranks with 29.7% in Cubao, MRT-3 in Guadalupe with 25.7%, and still LRT-1 with 27.8% in Taft.

The departing mode are similar to the AM Peak at Cubao with bus (coach) at the highest rank with 31.7%, while MRT-3 ranked first with 27.8% at Guadalupe, jeepney with 36.7% in Taft and 31.4% in Balintawak and 27.3% in Common Station.

It was noted that walking option both for AM or PM surveys, either arrival or departure, is mostly considered the last option, if not as third or fourth option for all stations, except for Balintawak Station for AM and PM Peaks arrival mode, and Common Station for AM Peaks arrival (AM and PM Peaks) and departing (AM Peaks) mode.

For the trip purpose, the survey results show work related trips account the highest in all stations, with 53% in Cubao, 70% in Guadalupe, 62% in Taft, 40% in Balintawak and 61% in Common Station, followed by trips returning home in the morning trip. While, for the evening peak, trips returning home accounts the highest with 46.0% in Cubao, 59.2% in Guadalupe, 62% in Taft, 67% in Balintawak and 45% in Common Station (**Appendix G4**). These commuters are mostly staying in the area rather than transiting, if not, almost equal percentage, except for Taft (PM Peaks) Station and Common Station (AM and PM Peaks). (**Appendix G5**)

Interviewees were next queried whether they considered the current pedestrian facilities (i.e., footpaths and footbridges) well-designed for at-risk pedestrian groups. At-risk groups may include women, LGBT, pregnant women, people with disabilities, children, and senior citizens. Lastly, interviewees were queried on whether they considered the current pedestrian routings to be safe for women from sexual harassment.

Findings show that most interviewees consider the current pedestrian infrastructure to be relatively well designed for at-risk groups. Interviewees in Cubao and Guadalupe consider design the poorest for people with disabilities at 67% and 68%, while Taft respondents consider the PWDs and senior citizens with 66%. Lastly, people with disabilities are focused with 70% in Common Station and 59% in Balintawak, and senior citizens with 55% in Balintawak. These are likely due to lack of elevators and the poor crossing conditions of EDSA. 60-75% of the interviewees from different stations consider the pedestrian routing in the area to be safe for women from sexual harassment. (**Appendix G6**).

Not surprisingly, there is some discrepancy in how women view facilities compared to men, with some percentage point discrepancy (around 5-10% for most groups) for design for different at-risk groups.

Pedestrians were queried on which improvements are most desirable. **Appendix G7** shows the desired pedestrian improvements by percentage. The most desired improvement for Cubao is to provide wider footpaths and more lighting (cited by about 30% of all respondents), more PWD facilities (cited by about 39% of all respondents) in Guadalupe, lighting with 20% in Common Station, more covered walkway (at 47%) for Taft and more lighting and more covered walkways (cited by about 51% and 48% of all respondents, respectively) in Balintawak.

It is noted that respondents also consider other improvements however, many of these suggestions are not directly related to the walk/pedestrian environment including more frequent train service, better enforcement of traffic rules, and better driver behaviour.

In addition, gender-based preferences were also recorded to determine any specific preference by men or women. **Appendix G8** shows the number of respondents and approximate percentage desiring a specific improvement by stated gender. Each station valued different improvements per gender, and despite these preferences, it is important that these barometers by gender have been assessed in order to ensure equal consideration of the needs of different genders in the formulation of potential pedestrian enhancement strategies.

7.7 Gender Relations and Identified Issues

Pedestrian Survey

Available data showed that Light Rail Transit (LRT) daily ridership has reached 459,400 passengers, as of March 2018. (2018, Business Mirror) Meanwhile, MRT 3 average daily ridership in 2017 was 463,000 from 20 operational trains and in February 2018, it was down to 260,000 from 8 operational trains (Rappler, 2018). **Table 7.3** shows daily average passenger traffic in covered stations.

The data from the pedestrian survey, perception survey in the barangays, stakeholders' consultation, and FGDs show that women, people with disabilities and senior citizens use the pedestrian facilities and any improvement on these would directly affect them. A 2017 study has concluded that streets in Metro Manila are not yet friendly to the visually impaired (*Aganad, et al, 2017*). Thus, existing structures and facilities are difficult for PWDs to access. A 2007 study by Kunieda and Roberts on Inclusive Access and Mobility in Developing Countries including the Philippines, showed that there are numerous barriers to movement in the pedestrian environment, most particularly in developing countries. And while there

have been improvements to access for the PWDs mandated through legislation, there is a systemic deficiency in monitoring and enforcement of legislation.

Table 7.16 shows the distribution of participants per gender identity for each station, except for the Common Station where question on gender identity was not included. The pedestrian survey show that transgender persons are users of pedestrian facilities surrounding the covered stations in the greenways project. Although it is not the total representation of the Lesbians, Gays, Bisexuals, and Transgender (LGBT) community, its mere presence pushes for an inclusive pedestrian facilities design and plan.

In the Common Station pedestrian survey conducted by the team, out of 2,900 respondents, 52% were women and 48% were men. Senior citizens comprised 3.8% of the total respondents. Although only 10% of the respondents think that existing pedestrian facilities do not address women's needs, and 4% of the respondents agree that pedestrian facilities in the common station do not address the needs of the PWDs, children/youth, senior citizens, and LGBT, 31% of respondents expressed that women, PWDs, children/youth, senior citizens, and LGBT are not free from sexual harassment, in the common station pedestrian facilities.

In Cubao pedestrian survey conducted by the team, 45.2% out of 2,000 respondents were male, 47.6% were female, and 1.4% identified as transgender. Thirty percent (30%) of respondents considered design of current pedestrian facilities inadequate for PWDs and 28% perceives the same for senior citizens and children. Meanwhile, 23% and 24% consider these facilities inadequate for LGBT and pregnant women respectively. Twenty-seven percent (27%) of the respondents consider pedestrian routing in the area unsafe for women pedestrians and perceived as not free from sexual harassment.

In Guadalupe, a total of over 1,200 interview surveys were conducted, 47.0% were male, 49.1% were female, 0.2% considered themselves transgender. Twenty-three percent (23%) of the respondents thought that women passing through Guadalupe pedestrian facility are not free from sexual harassment. Twenty-five percent (25%) considered the facility poorly designed for PWDs and 29% thought it is poorly designed for senior citizens. Twenty-five percent (25%) and 24% thought the facility is inadequate for pregnant women and children, respectively. Twenty percent (20%) and 15% considered the pedestrian facility in Guadalupe poorly designed for LGBT and women in general, respectively. Twenty-nine (29%) percent perceived that women using the facility are not free from sexual harassment.

In Taft, out of 2,150 respondents 43.6% were male, 52.9% were female, 0.7% identified as transgender. Twenty-five percent (25%) of the respondents considered the facility was poorly designed for PWDs, senior citizens, pregnant women, children, LGBT and women in general. Also, 25% felt that women are not safe from sexual harassment while passing through.

Lastly, from the 1,000 Balintawak pedestrians interviewed, 55.0% identified as male, 42.6% as female, 0.3% as transgender. Forty percent (40%) of the respondents felt that the facility is poorly designed for senior citizens and children. Forty-one percent (41%) considered it inadequate for PWDs and pregnant women. Twenty-five percent (25%) and 23% felt that it is poorly designed for LGBT, and

women in general, respectively. Forty-one percent (41%) felt that women are not free from sexual harassment when they use the facility.

Over-all, the pedestrian survey shows that the pedestrian facility users find that the existing facilities do not address the needs of and inaccessible to some sectors of the community.

Perception Survey

The perception survey conducted in the Common Station (Phase 1) nearby barangays and among the participants in the stakeholder meetings involved 111 male respondents and 98 female respondents. Four (4) indicated that they identified as transwomen, another four (4) identified as queer, and one (1) identified as a transman. Twenty-two (22) were senior citizens and thirty-seven (37) were PWDs.

Bullying and discrimination against women, PWDs, youth/children, and LGBT are happening when they use the facilities in the common station. Forty-eight percent (48%) think that women are not safe from bullying and 39% think that PWDs, children/youth, senior citizens, and LGBT are also bullied while using the facility. Forty-six percent (46%) believe that women are not free from discrimination, while 37-38% think that PWDs, children/youth, senior citizens and LGBT are not safe from discrimination. Thirty-one percent (31%) of respondents expressed that women, PWDs, children/youth, senior citizens, and LGBT are not free from sexual harassment, in the common station pedestrian facilities. More than half of the respondents (52%) believe that women are not safe from crime and 43% believe that PWDs, children/youth, senior citizens, and LGBT are likewise not safe from crime in the common station.

Table 7.17 Perception Survey Results (Phase 1)

Current pedestrian facilities are responsive to the needs of: (n:209)	Yes		No	
	# of Respondents	% of Total	# of Respondents	% of Total
Female	169	81%	22	11%
PWD	161	77%	8	3%
Youth/Children	164	78%	8	3%
Senior Citizens	160	76.5%	8	3%
LGBT	163	78%	8	3%

Perception survey covering Phase 2 showed that respondents, generally perceived that the current pedestrian facilities were not responsive to the needs of PWD, youth/children; and senior citizen but it is responsive to the needs of female; and lesbian, gay, bisexual, and transgender (LGBT) groups.

Table 7.18 Perception Survey Results (Phase 2)

Current pedestrian facilities are responsive to the needs of:	Yes		No	
	# of Respondents	% of Total	# of Respondents	% of Total
Female	381	99%	3	1%
PWD	2	1%	382	99%
Youth/Children	11	3%	373	97%
Senior Citizens	3	1%	381	99%
LGBT	381	99%	3	1%

Eleven percent (11%) of the respondents in Phase 2 has expressed that sexual harassment is experienced by pedestrians, 10% said bullying is happening, 8% indicated that there is discrimination in the area, and 16% said crime is present.

Table 7.19 Security and Safety Perception on the Current Pedestrian Facilities (Phase 2)

Incidence of any of the following in the current pedestrian environment:	Yes		No	
	# of Respondents	% of Total	# of Respondents	% of Total
Sexual harassment	41	11%	343	89%
Bullying	40	10%	344	90%
Discrimination	29	8%	355	92%
Crime	60	16%	324	84%

In all the data gathering activities conducted for this assessment, it can be concluded that Metro Manila pedestrian facilities do not meet the users' needs. Responses from the FGDs, Surveys, KIIs, and Stakeholders Consultations raised pedestrian facilities issues on: Design and Facility, Access, Safety and Security, Environment and Aesthetics, and Other Concerns. Common issues raised by pedestrians relate to design, accessibility, and safety concerns (**Appendix D**).

Participants in the stakeholders' meetings and FGDs have expressed the inaccessibility of existing footbridges and pedestrian facilities to PWDs, pregnant women, children, and the elderly, as shown in **Table 7.20**. The design of the footbridges' steps is too narrow and too steep, in some instances existing footbridges are too high to cross. In most cases, elevators are not working (**Appendix D**).

The National Council on Disability Affairs (NCDA) representative pointed out the lack of facilities for other PWD pedestrians and non-functioning lifts and escalators in some stations. In most cases, PWDs are perceived to be only wheelchair users. In designing and planning for inclusive infrastructure and facilities, it is very crucial to take into consideration needs of other PWDs apart from those with mobility difficulty and physical impairments. The other types of disability also include: mental/brain, orthopedically handicapped, hearing, speech, visual disability, psychosocial, chronic illness, cognitive or learning, and multiple disabilities.

In the consultation conducted with the broad PWD network in partnership with the NCDA, PWD groups have expressed the need to provide alternative for PWDs entry/exit to/from the pedestrian facilities in case elevators/lifts break down, particularly during emergency situations such as earthquakes and fire. They also expressed the need to negotiate the inclusion of ramps in the walkways and landings despite the increase in cost. They further argued that development of inclusive infrastructures necessitates more financial and labor investments, but studies have shown that the rate of return in terms of economic growth and peoples' health and well-being is high.

On the other hand, "the cost of not incorporating universal design can be significant as inaccessible environments limit economic, education, health, social and other opportunities for people with disability, and make them more dependent on others...People with disability access to public and private transport is a key factor in breaking down barriers. Providing access from home to roads, transport stops and between buildings is critical in ensuring increased access to a wide range of services." (*AUSAID, 2013*). In addition, "primary carers for people with disability are often women, whose wider participation in family and community activities can be restricted due to caring responsibilities. In addition, children who are carers are often denied long-term education, which restricts their employment and social opportunities" (*AUSAID, 2013*), thus restricting PWDs' mobility, in the same manner the elderly, adds on to the multiple burden of women.

In addition, open and uncovered walkways contribute to its low usability rate. Pedestrians structures cannot be used when it's raining or too hot in the summer. Wet and slippery walkways also contribute to its inaccessibility. Participants mentioned the low quality of construction materials used in building the footbridges in the areas and its poor/lack of maintenance.

Vendors occupy a portion of the footbridges, particularly in the Common, Balintawak, Guadalupe, Taft and Cubao stations. Their presence is barrier to mobility and movement of pedestrians.

Restrooms facilities were also a concern and the poor upkeep of these in areas where there are available facilities for commuters. In the Common and Balintawak stations, people relieve themselves along/near the footbridges which caused unpleasant smell emanating from the walkways and hazard to health of commuters/pedestrians. In the stakeholders' engagement fora conducted, women and senior citizens representatives raised the possibility of looking into providing all gender restrooms and diaper changing/breastfeeding facilities in walkways located far from the malls.

Table 7.20 Issues and Concerns of Barangay and CSOs Representative-Design, Facility, and Accessibility

Themes	Issues and Concerns	Solutions/ Recommendations
Design and facility	<p>Improper placement of footbridges.</p> <p>The lack of gender-neutral toilets for pathways (Munoz to SM journey), that may benefit LGBT, pregnant women, and seniors</p>	<p>Sexual Orientation and Gender Identity and Expression (SOGIE) sensitization</p> <p>Incorporating gender neutral toilets in longer pathways</p>
Access	<p>Standard height and width of steps; design of the stairs and steps not accessible to pregnant women, PWDs, seniors, children; Too high footbridges. The steep inclines and steps contribute to this difficulty</p> <p>Low maintenance of structures</p> <p>Low quality of construction materials</p> <p>Elevators are not working</p> <p>The design and materials used pose danger and hazard particularly when it rains, and the steps become slippery. Participants question the choice of steel in building the foot bridges.</p>	<p>Dedicated spaces/facility for seniors/ PWDs</p> <p>Assistance to seniors and PWDs who prefers to walk</p> <p>Working elevators, escalators</p> <p>Standard width for wheelchairs and ramps</p> <p>Railings</p>
Environment and aesthetics	<p>Structures cannot be used when it rains and may become too hot during summer or daytime</p> <p>Dirty, garbage is visible</p> <p>People sleeping on the footbridges</p> <p>Vendors occupy space, so path becomes narrower (Muñoz market/ Brgy Veteran's Katipunan, Bahay Toro, Magsaysay)</p> <p>Restroom facilities in the stations are present but no water supply</p> <p>The absence or lack of greenery</p> <p>Cleanliness and sanitation are compromised because people relieved themselves in the foot bridges</p>	<p>Canopies / covered walkway</p> <p>Sufficient facility</p> <p>A green design with lots of spaces</p>

The transport survey results as shown in **Table 7.21**, reflect the issue of accessibility raised in the FGDs. The top three recommended improvement were additional lighting, more canopies over the walkway, and wider footpaths. Women respondents chose more elevators/escalators, more facilities for PWDs, and fewer at-grade road crossings as the top three improvements they want to see in future pedestrian facilities.

Perception surveys conducted in the nearby barangays support these data. Although only 10% of the respondents think that existing pedestrian facilities do not address women's needs in the common station, a considerable percentage of respondents expressed that women, PWDs, children/youth, senior citizens, and LGBT are not free from sexual harassment, bullying, discrimination, and crime in the pedestrian facilities of the six stations.

Issue of safety generally comes from women, senior citizens, and LGBT. LGBT representative shared that they feel unsafe when they are checked by the security because they have to declare their gender, and this may result to shaming and discrimination by insensitive security personnel. In addition, they are often discriminated in queues and restrooms because of the availability of all gender restroom in public spaces.

In one of the consultations, an anecdotal report of a young woman harassed by one of the construction workers in Katipunan, Quezon City was shared. This harassment case is not isolated. Incidence of harassment committed by employees/staff in civil works have been reported globally. A \$265 million World Bank infrastructure project in Uganda was cancelled after evidence of misconduct by a government contractor, including sexual harassment of female workers and road workers having sexual relations with underage girls, has been found. (Berger, 2018) In March 2009, a construction worker in Quezon City was also arrested to catcalling a woman on the street and charged with direct violation of the Quezon City's Anti-Catcalling Ordinance, passed into law in 2016 (*ABS-CBN News, 2019*).

Proper lighting and security cameras were the most common recommendations from the surveys and FGDs to ensure safety and security among the pedestrians in all stations. Awareness raising of existing laws and policies against sexual harassment and violence against women and children is strongly recommended to avoid above-mentioned cases. Existing footbridges grid flooring are also susceptible to voyeurism and dangerous to children, people with canes, and working women in high heels. Similarly, enclosed areas such as elevators should be designed in way that sexual harassments are prevented.

Table 7.21 Issues and Concerns of Barangay an CSOs Representative - Safety and Security

Theme s	Issues and Concerns	Solutions/ Recommendations
Safety and Security	<ul style="list-style-type: none"> No streetlight Open live wire within arm's reach; cable wiring too low, children can even reach it No/ lack of security Young kids commit crimes (hold-up, throw stones) and when caught they come back to the site because of the lack of facility for these children Crimes are rampant, usually done by young adults 	<ul style="list-style-type: none"> Additional security should be adopted by every barangay Create a barangay network to address security issues and other concerns with government agencies as lead Covered walkway Orientation for workers, guards on Gender Sensitivity Training (GST), and SOGIE 101 Orientation and information dissemination on catcalling and street harassment and

Theme s	Issues and Concerns	Solutions/ Recommendations
	<ul style="list-style-type: none"> • Harassment of female students • Slippery flooring when raining • Cat calling by construction workers, the inconvenience and harassment push them to find longer path which means longer travel time • LGBT feels unsafe when they are security checked because they have to declare their gender and may result to shaming and discrimination by insensitive security personnel, they are often discriminated in queues and restrooms • Footbridges grid flooring are susceptible to voyeurism and dangerous to children, people with canes. • Petty crimes: snatching and mugging 	<p>how to report them; the creation of mechanism for reporting and information dissemination of ordinances</p> <ul style="list-style-type: none"> • Presence of CCTV • Creation of gender police knowledgeable of the issues and concerns of women and LGBT and the presence of women's desk or information on where to approach them
Others	<ul style="list-style-type: none"> • Sales people/flyers aggressively offer their products to people— inconvenient and bordering on pedestrian discomfort • No bike lane • Roads are being repaired when there is nothing wrong with them • Vendors occupy large part of the sidewalk. • Sex workers presence in Cubao, street children (rugby boys) in Guadalupe, and homeless people in Balintawak 	<ul style="list-style-type: none"> • Coordination • Dialogue to solve traffic problem • Depot for provincial buses so they do not have to ply metro streets • Bike lane • Orientation on the concept of safe spaces for pedestrians — safety, security

Given the above-mentioned mandates and commitments of the Philippine government on mainstreaming gender in all its plans and budget, the implementing agency of the EDSA Greenways project should take this opportunity and require the implementing private partner to provide jobs during civil works to the local residents including women and PWDs. Providing women and PWDs with jobs very near to their place of residence will not only give them economic independence but also comfort of knowing that they are close to their children and homes. More than giving women's space and leeway to perform their triple roles, the implementing

agency can go further by training their male workers on gender equality and empowerment, particularly on sharing the burden of reproductive work with the women in their homes. Other training needs can be identified to address other gender issues: Anti-Sexual Harassment and VAWC, HIV AIDS prevention, Trafficking and Prostitution, orientation on gender and disability, and the like.

Exploring institutional collaborations with Technical Education and Skills Development Authority (TESDA), Department of Social Welfare and Development (DSWD), Local Government Units (LGUs) in identifying women and PWDs trained or untrained workers is another possible initiative. TESDA has fulfilled its mandate to ensure that recipients of their skills training are 50% women. They have trained women welders, tile setters, masonry, handling heavy equipment etc. The implementing agency can facilitate the hiring of these women and PWD graduates as part of the labor force of the EDSA Greenways Project. Women and PWDs can also be hired as skilled workers and those in charge of maintenance in the future. This has a precedent when DOTr and TESDA signed a Memorandum of Agreement (MOA) on 11 December 2018 in support of the Public Utility Vehicle Modernisation Program (PUVMP). The MOA covered the implementation of the PUV Modernisation Program's Stakeholder Support Mechanism Component particularly, the Training and Social Assistance for the affected stakeholders under the PUVMP. A budget was allocated by DOTr for the skills training of the following: displaced persons affected by the PVUMP, those who opt to voluntarily exit from and continue in the transport industry, new stakeholders in the industry, and family members of dependents of the affected stakeholders. This may be replicated in the implementation of and ensuring the effective gender mainstreaming in the Project Greenways.

In the 2017 World Economic Forum's Gender Gap Report, the Philippines fell to 10th place from 7th place in 2016. The report indicated that for every P100 men earn in the country, women only earn P76. The Philippines may surpass all other Asian countries in the Gender gap ranking but it maintains a gender gap score of 79%, higher than that of the 68% global gap (*WEF, 2017*). The EDSA Greenways project implementer should therefore ensure that qualified workers are paid equally regardless of sex and gender.

In the FGD discussion, barangay representatives raised the issue of existing vendors groups known as the MRT Southbound Vendors Association (accredited by Barangay Pag-asa) and an SEC-registered North Avenue EDSA Vendors Association (NRRS). The MRT Southbound Vendors Association has twelve (12) women members out of twenty-two (22), with most of them Moros. These women vendors usually take their children with them while vending. Currently, they have no permits to sell but they find ways to assert their economic activity even without a permit. Their products range from food to accessories. Barangay officials claim that they often engage in violent altercations and relieve themselves on the premises, which make the pedestrian facilities not conducive for pedestrians to pass through.

Consultations conducted among vendors in the five stations showed that these groups may also be potential pool of workers (unskilled/skilled) during the civil works. In Balintawak stations, some of the members of the ambulant vendors association have done carpentry, masonry, paint work in construction. Half of the vendors that will be affected of the project is women who are interested in doing unskilled labor in the construction of the walkways. In Cubao station, one-woman vendor took undergraduate Math courses and had experienced working for the

Department of Social Welfare and Development (DSWD) as enumerator and humanitarian worker during calamities.

Women in prostitution/ sex workers presence in Cubao station was mentioned in the barangay consultations. Dialogue/consultation should be initiated with a local organization doing work in trafficking and prostitution to ensure their safety and protection during the implementation of the project.

The EDSA Greenways implementing firm and agency should conduct a dialogue with these vendors and women who may be displaced upon project implementation. They may be organized and be provided with capacity building activities that may include but are not limited to forming cooperatives, livelihood skills training, and financial literacy program. Funding for this may be accessed through a piggy-back grant on poverty reduction which allocates 60% to infrastructure and 40% to soft activities such as organizing and capacity building activities.

Women, PWDs, senior citizens, and children should be consulted in the development of RAP. Proportionate and adequate representation should be ensured in all consultation and decision-making processes. Enable and empower women to participate and negotiate for themselves in these processes. Developing a gender responsive RAP will be discussed in a separate document.

8 Findings and Recommendations

8.1 Findings and Recommendations

The major issues and recommendations for the EDSA Greenways are listed below:

- There are no environmentally areas near the Project site.
- There will be environmental impacts during project construction, but these will be temporary.
- Impacts will be mitigated by proper implementation of measures indicated in the EMP.
- Drainages and other public utilities, such as electricity and communication posts, that will be affected will be prioritized to ensure continuous service. Lines and poles need relocation, if found to be affected, to prevent service disruption.
- Appropriate public disclosure and necessary announcements will be done prior to the construction stage to provide alternative routes to the affected communities, businesses and commuters in the area. Furthermore, these information disclosures are also required by ADB through Public Communications.
- There will be 2-7 landings per station allotted for the stairs and elevators. This will be properly acquired to minimize issues with displacement.
- There will be negative but temporary impacts on air and water quality, noise level, soil and traffic, during construction. Mitigating measures are provided in the EMP and monitoring plans will be carried out to ensure that these measures are implemented effectively.
- Identified impacts during operations phase are generation of solid waste and disturbance of peace and order. These impacts will be mitigated and monitored in coordination with other government offices such as MMDA, PNP and LGU.
- There are no sensitive ecological areas and archaeological spots in the area.
- DOTr will manage and monitor plans for mitigation and monitoring of the project and that there is allocated project budget for these monitoring and surveys.

While these are the target benefits from the EDSA Greenways Project:

- Employment opportunities during construction and operation of the project.
- Better linkages and safe access to different transport modes.
- Linkages to nearby malls will attract easy access, thus increase economic values.
- Better access to nearby hospitals, schools and other institutions.
- Organize transport system due to enhanced aesthetic/ visual landscape.
- Promotes walkable environment thus reduce carbon footprint.

8.2 Conclusion

This IEE report studied all implications of environmental and social impacts for the EDSA Greenways Project. Through the various review of the secondary data, field visits and consultations to stakeholders (i.e. affected communities, LGUs, businesses/ vendors), it can be concluded that the pedestrian construction plans will likely affect the environment but will have a beneficial impact to the public during operations phase.

Some negative impacts, such as impact on air and water quality, noise level, and soil during construction, are not discounted. However, this IEE concludes that these minimal and temporary environmental impacts will be minimised through implementation of mitigating measures. Monitoring plans will also be conducted to ensure the Project's compliance with the Philippine environmental regulations and ADB policies.

The Project aimed to integrate transport interchange (i.e. MRT, LRT, MMS, BRT and public transport terminals) through efficient, direct and safe pedestrian linkages. Thus, this pedestrian connectivity improvement will positively help the environment and the community since this will make the public transport more attractive and will encourage modal shift from private vehicles to the public transport network.

Finally, this report has identified some impacts on the environment and as per ADB's SPS, the EDSA Greenways Project under Category B requires this IEE Report.

Should there be significant unanticipated impacts encountered during project implementation or if there are major changes in project scope and location, the IEE and EMP will be updated.

- [1] Presidential Decree No. 1586 “Establishing an Environmental Impact Statement System, Including Other Environmental Management Related Measures and For Other Purposes”, the Republic of the Philippines
- [2] DAO 2003-30 “Implementing Rules and Regulations (IRR) of PD 1586 (Establishing Environmental Impact Statement System”, Department of Environment and Natural Resources of the Republic of the Philippines
- [3] EMB-MC 2014-005 “Revised Guidelines for Coverage Screening and Standardised Requirements under the Philippine Environmental Impact Statement System (PEISS)”, Department of Environment and Natural Resources of the Republic of the Philippines
- [4] Republic Act No. 7586 “National Integrated Protected Areas System Act of 1992”, the Republic of the Philippines
- [5] DAO 1992-25 “National Integrated Protected Areas System (NIPAS) Implementing Rules and Regulations”, Department of Environment and Natural Resources of the Republic of the Philippines
- [6] Republic Act No. 9275 “The Philippine Clean Water Act of 2004”, the Republic of the Philippines
- [7] Presidential Decree No. 1067 “The Water Code of the Philippines 1976”, the Republic of the Philippines
- [8] DAO 2016-08 “Water Quality Guidelines and General Effluent Standards of 2016”, Department of Environment and Natural Resources of the Republic of the Philippines
- [9] Republic Act No. 8749 “Philippine Clean Air Act of 1999”, the Republic of the Philippines
- [10] DAO 2000-81 “Implementing Rules and Regulations for Republic Act 8749”, Department of Environment and Natural Resources of the Republic of the Philippines
- [11] Noise Control Regulations of the National Pollution Control Commission Rules and Regulations of 1978, the Republic of the Philippines
- [12] National Pollution Control Commission MC No. 002 Series of 1980, Section 78- Ambient Noise Quality and Emission Standards for Noise, the Republic of the Philippines
- [13] Republic Act No. 8371 “Indigenous Peoples’ Rights Act 1997”, the Republic of the Philippines
- [14] DAO 2017-15 “Guidelines on Public Participation under the Philippine Environmental Impact Statement (EIS) System”, Department of Environment and Natural Resources of the Republic of the Philippines
- [15] Philippine National Framework and Guidelines for Environmental Health Impact Assessment 1997, Department of Health. Environmental Health Service of the Republic of the Philippines

- [16] DENR MC 2010-14 “Standardisation of Requirements and Enhancement of Public Participation in the Streamlined Implementation of the Philippine EIS System”, Department of Environment and Natural Resources of the Republic of the Philippines
- [17] DENR MC 2008-08 “Clarification of the Role of LGUs in the Philippine EIS System in Relation to MC 2007-08”, Department of Environment and Natural Resources of the Republic of the Philippines
- [18] Asian Development Bank Safeguard Policy Statement (2009), Asian Development Bank
- [19] Asian Development Bank Gender and Development Policy (1998), Asian Development Bank
- [20] Environmental, Health and Safety Guidelines, International Finance Corporation of the World Bank Group
- [21] 2011-2030 Quezon City Comprehensive Land Use Plan, Arup
- [22] Philippine Geoportal ArcGIS Online- Aerial, PAGASA Modified Corona System of Climate Classification, National Mapping and Resource Information Authority
- [23] DAO 2016-08 “Water Quality Guidelines and Effluent Standards”, Department of Environment and Natural Resources of the Republic of the Philippines
- [24] Water Resources Assessment for Prioritised Critical Areas (2014), the National Water Resources Board (NWRB).
- [25] Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Department of Science and Technology of the Republic of the Philippines
- [26] Philippine Food Security Information System, Philippine Statistics Authority of the Republic of the Philippines
- [27] Presidential Proclamation 2146 (1981), “Proclaiming Certain Areas and Types of Projects as Environmentally Critical and Within the Scope of the Environmental Impact Statement System Established under Presidential Decree No. 1586”, the Republic of the Philippines
- [28] EMB MC 005 “Revised Guidelines for Coverage Screening and Standardized Requirements” (2014), Department of Environment and Natural Resources of the Republic of the Philippines
- [29] 2015 Census of Population, Philippine Statistics Authority
- [30] Quezon City Ecological Profile (2015), Quezon City Local Government of the Republic of the Philippines
- [31] Building a Disaster Resilient Quezon City Project: Hazard, Vulnerability and Risk Assessment Report (2013), Earthquakes and Megacities Initiative
- [32] F8-2 Ergonomic Assessment of Street Warning Signs for the Visually Impaired in Metro Manila (2017), Aganad, et al

-
- [33] Pollution Prevention and Abatement Handbook 1998, the World Bank Group
 - [34] Pasay Comprehensive Development Plan, City Government of Pasay
 - [35] Comprehensive Land Use Plan (2013-2023) Volume 1: Profile of Makati.
 - [36] Caloocan Local Climate Change Adaptation Plan, City Planning and Development Department of City Government of Caloocan
 - [37] Bureau of Soils and Water Management. Soil Classification dataset, Arup Envi Mnl
 - [38] National Capital Region, Department of Environment and Natural Resources of the Republic of the Philippines
 - [39] PHIVOLCS. West Valley Fault dataset, Arup Envi Mnl
 - [40] PHIVOLCS. Ground Shaking Map kmz, Arup Envi Mnl
 - [41] PHIVOLCS. Liquefaction Map kmz, Arup Envi Mnl
 - [42] PHIVOLCS. Tsunami Hazard Map dataset, Arup Envi Mnl
 - [43] Mines and Geosciences Bureau. Flood Hazard Map, Arup Envi Mnl
 - [44] Philippine Senate Government Publication (2017), Senate of the Philippines
 - [45] Pasay City Comprehensive Development Plan, City Planning and Development Office of City Government of Pasay City

Appendix A

ADB Categorisation Checklist

A1 ADB Checklist

- Rapid Environmental Assessment (REA) Checklist
- A Checklist for Preliminary Climate Risk Screening
- Initial Poverty and Social Analysis
- Indigenous Peoples Impact Categorisation
- Involuntary Resettlement Impact Categorisation
- Summary Poverty Reduction and Social Strategy

Appendix B

Land Takes

Appendix C

Noise Sampling Results



Appendix D

Attendance Sheets and Minutes of Meeting
(Stakeholder and FGDs)

Appendix E

Consultation and Perception Survey Tools

Focus Group Discussion Participant Information Sheet

	EDSA GREENWAYS PROJECT	
IMPORMASYON NG KALAHOK SA TALAKAYAN/ FOCUS GROUP DISCUSSION (FGD)		
Pangalan: _____		
Edad: _____	Kasarian: _____	Kalagayang Sibil: _____
Tirahan: _____ _____ _____	_____ _____ _____	
Bilang ng Miyembro ng Pamilya: _____	_____	
Tirahan (Pangalan): _____	_____	
Pangunahing Pinagkakabitang: _____	_____	
Buwangang Kita: (Kawalan/maagang lang pa) _____	_____	
Lugar madalas gumamit ng pedestrian crossing: _____		
Gaano kadalas dumadaan?		
Alin-alin: <input type="text"/>	<input type="text"/>	
Hindi madalas: <input type="text"/>	<input type="text"/>	
long buses sa kanda lang?		
Iba pang lugar: <input type="text"/>	<input type="text"/>	
Beam pumpupada?		
Tirahan: <input type="text"/>	<input type="text"/>	
Pasaalan: <input type="text"/>	<input type="text"/>	
Yali: <input type="text"/>	<input type="text"/>	
Iba pang lugar (Pakikipag-ugnay): _____		
PAGBIBIGAY PAHINTULOT		
Alagay, sa _____ ay kinang-kanta na makikipag-ugnay sa Focus Group Discussion (FGD) o pag-uusap tungkol sa EDSA GREENWAYS PROJECT sa magpapagay ng pedonatal sa ako sa makikipag-ugnay ng DOT/ARUP Team. Bilang saluapay, itatagay ko sa mag-aling bagay sa ibaba:		
Pangalan: _____	Signature: _____	Date: _____

Focus Group Discussion Guide Questions

EDSA GREENWAYS PROJECT



Focus Group Discussion (FGD) Guide Questions

1) Green-Threshold Thresholds (GTH) – Greened House and House (GHH)
2) High Priority Threshold – Threshold (WPH) (TH)

Pataas ng FGD: _____ Lugar: _____

Klasipikasyon ng mga Kalahok: ☐ FHH ☐ GHH ☐ WPH ☐ OTHERS _____

Pangalan ng Facilitator: _____

Lantad: Ito ay magiging gabay at hindi gagamitin bilang "questionnaire". Ang mangalape ay mawawala ang mga mawawawagang paksa at hindi sa under na nakawawag sa ibaba. Ang mga ita pang kaharapang it magiging ay ito ay sa klasipikasyon ng mga kalahok.

I. Layunin:

Ang FGD ay isinasagawa para makita ang kosa ukayang estado ng pedestrian facilities sagaya ng sidewalks, footbridges, walkways, crossings mula sa _____ station hanggang _____ station.

II. Mga Grupo:

Kasapi na baranday, lano kasapi ng CEO at grupo ng "vulnerable"

III. Daloy: (90 minuto)

A. Introduksyon:

1. Pagpapakita ng Research Team. Pagpapakita sa ARUP at DOT
2. Pagpapaliwanag tungkol sa EDSA Greenways Project.
3. Pagpasa ng consent forms at info sheet ng kalahok sa FGD.
4. Pagpapaliwanag ng gabay/procedure rules at daloy ng FGD.
5. Paliwanag ng mga kalahok sa FGD.

Mula: Pagpapakita ng mga kalahok. Pagpapaliwanag muli tungkol sa pananaliksik at ang layunin ng FGD. Pagpapaliwanag ng mga "ground rules" (i.e. walang tema o matatag na mga paglalayap sa mga ibang paksa o ideya, pakikinig sa mga ibang kalahok at pagpasa ng kanilang mga sagot o opinyon, pagbibigay ng pagkakataon para sa mga ibang kalahok na ibig pang ipataguro ang ideya).

Maaring magamula sa "ice breaker" na tanong para sa pagpapalakas ng sandi.

- B. Pagsasagawa ng FGD.
- C. Pagtatapos ng lathalaian.

Pagpapalantat sa mga kalahok at pagbabahagi ng mga sumunod na gawain ng aarangkaso o pag-aaralan. Pagbibigay ng panahon para sa mga karagdagang mungkahi o komento ukol sa mga nabanggit na paksa at sa pagsasagawa ng FGD.

IV. Mga Tanong:

- A. Perimulang Salita at Pagpapalakas (10 minuto)
- B. Mga Isyu o problema sa pedestrian facilities kagaya ng sidewalks, footbridges, walkways, crossings (30 minuto)
 - 1. Ano po ang masasabi ninyo sa kasalukuyang pedestrian facilities kagaya ng sidewalks, footbridges, walkways, at crossings? Ilatalatag ng sasabihin at itanong ang mga sumusunod kung hindi sa nabanggit:
 - disenyo
 - safety/ seguridad
 - social acceptability
 - 2. May risk liha o hindi-masagana na isang kasalukuyang seguridad na komunidad?
 - Panayam (bulig o hindi)
 - Edad
 - Pagbabasa
 - wala't madalas
 - ilaga
 - 3. Naranas o nahakla na pa ba kayo ng mga sumusunod habang ginagamit ninyo ang mga pedestrian facilities?
 - bullying o pananakot
 - diskriminasyon
 - sexual harassment/sekswal na panligalig
 - krimen o pagmasakaw
 - 4. Ano po ang naging pangyayari? Naging tugon ng awarded kapalis ng bulig o barangay?
- C. Pagkuna ng mga ideya tungkol sa kanya-aya o mayyos na pedestrian facilities. (30 minuto)
 - 1. Gawain: Iakha-isa-isa ang mga plano sa pedestrian facilities sa mga kalahok at itatag ng angkop na hashtag na itatag na ipinamahagi; aprub o hindi aprub.

(Mga Karangalan, Residents, drawing o larawan ng mga disenyo ng pedestrian facilities)

2. Ano ang masasabi ng mga kalahok sa larawan ng pasilidad na ito? Tanungin kung bakit ganoan ang naging sagot.
3. May nangangailangan bang partikular ang sumusunod:
 - Babas
 - LGU
 - Senior citizens
 - PWDs
 - Mga bata

D. Iba pang rekomendasyon. (10 minuto)

1. Anu-ano pa ang iba pang rekomendasyon para maging mas mapaganda at mapakinabangan ng larat ang mga pedestrian facilities natin? Sa rehatangit?

E. Paglalaras (10 minuto)

1. May mga gusto pa sa kayang dagdag – komento, suhestyon, reaksyon sa mga napag-usapan at sa pagpapagana ng FCD?

Pasasalamat at pag-alala sa mga sumunod na gawin ng EDBA Greenways Project.

Key Informant Interview Guide



EDSA GREENWAYS PROJECT

ARUP

KEY INFORMANT INTERVIEW GUIDE (LGU, MMDA, DPWH, LRT, MRT, Barangay, Others)

Date of IIT: _____ Venue: _____

Potential Participants:

- ☐ MMDA ☐ LRT ☐ BARANGAY
☐ DPWH ☐ MRT ☐ LGU
☐ OTHERS, SPECIFY _____

A. INFORMANT'S PROFILE

Name of Key Informant: _____

Designation/Position: _____

Office/Agency: _____

Length of Stay in Office: _____

Name of Interviewer: _____

B. INTRODUCTION AND GROUND RULES

- Thank you for agreeing to do this interview. My name is _____ from the DOT/ARUP Team.
- We will discuss one of the proposed projects of the government, the EDSA Greenways Project and generate your insights, views and opinions on the Project.
- The interview will last about 1-1.5 hours.
- Everything will be treated with utmost confidentiality and to protect your privacy, we will NOT attribute your name with anything that you say.
- At any time during our conversation, please feel free to let me know if you have any questions or if you would rather not answer any specific question. You can also stop the interview at any time for any reason.
- Please remember that we want to know what you think and feel and that there is no right or wrong answer.
- Is it OK if I conduct this interview today?

C. ROLES AND RESPONSIBILITIES IN THE EXISTING PEDESTRIAN FACILITIES SUCH AS SIDEWALKS, FOOTBRIDGES, WALKWAYS AND CROSSINGS (Answer FIRST the specific pedestrian crossing.)

- (i) What are the specific roles and responsibilities of your organization/agency in the maintenance/administration of the existing pedestrian crossings?
- (ii) What are your specific roles and responsibilities related to the maintenance and/or administration of the existing pedestrian crossings?

D. ASSESSMENT OF THE CURRENT PEDESTRIAN FACILITIES

- (i) How do you describe the current state or condition of the following?
- Sidewalks
 - Footbridges
 - Walkways
 - Crossings
- (ii) In your opinion, are these facilities friendly, favorable or helpful to the following?
- Women, esp. Pregnant Women
 - Persons with Disabilities (PWDs)
 - Children and Youth
 - Senior Citizens
 - LGBT
 - Others _____
- (iii) Can you cite some experiences or past events that occurred in the said pedestrian facilities such as the following:
- Sexual harassment
 - Bullying
 - Discrimination
 - Rape/Gang wars
 - Crime
 - Others _____
- (iv) How do you assess the performance of the agencies/persons responsible for these facilities?

E. KNOWLEDGE AND AWARENESS ON THE PROJECT

- (i) Have you heard of the Build-Build-Build Program of the present administration? When did you know of the program?
- (ii) Have you heard of the EDSA Greenways Project? What do you know about the project? What are its objectives?

F. PERCEPTIONS ON THE PROJECT

(a) What are the benefits or advantages of the Project in your area/s of responsibility?

- Additional employment opportunities
- Efficient connectivity
- Enhance health and safety of the vulnerable groups
- Others: _____

(b) What about the disadvantages of the Project in your area/s of responsibility, if any?

- Health and safety hazards including pollution during construction period
- Temporary loss of livelihood
- Traffic in the construction site
- Impossible or existing pedestrian crossings/walkways
- Others: _____

G. SUGGESTIONS AND RECOMMENDATIONS

(a) Do you have any suggestions and recommendations in the design, and/or implementation of the project?

(b) What is your important message to the project?

(c) Is there anything else that you would like to add about any of the topics that we have discussed or other areas that we did not discuss but you think are important?

H. PARTICIPATION IN THE PROJECT

(a) Will you support the Project?

(b) Are you willing to participate in the planning/implementation of the project?

	Planning	Implementation
Information Dissemination		
Public Dialogue and Consultation		
Committee Membership		
Conduct of Related Surveys		
Others: _____		

THANK YOU for your time and participation in this interview. The information that you provided will be very helpful in the planning and eventual implementation of the PROJECT.

Perception Survey Form

EDSA GREENWAYS PROJECT



Subject: Perception Survey

Date:

Job No/Ref:

IMPORMASYON TUNGKOL SA RESPONDENT

1. PANGALAN (Last, first, middle)			
2. LAKARAN			
	Malaya	Barangay	City/State
3. Seksu (sex)	<input type="checkbox"/> Lalaki	<input type="checkbox"/> Babae	EDAD _____
4. 7.5 years before and after work (before/after work)	<input type="checkbox"/> masarap	<input type="checkbox"/> masabana <input type="checkbox"/> walang pakikilala	tu. pa _____
4. KAPANSANAN (how many people in household)	<input type="checkbox"/> 1-2 <input type="checkbox"/> 3-4 <input type="checkbox"/> 5-6 <input type="checkbox"/> 7-8 <input type="checkbox"/> 9-10 <input type="checkbox"/> 11-12 <input type="checkbox"/> 13-14 <input type="checkbox"/> 15-16 <input type="checkbox"/> 17-18 <input type="checkbox"/> 19-20 <input type="checkbox"/> 21-22 <input type="checkbox"/> 23-24 <input type="checkbox"/> 25-26 <input type="checkbox"/> 27-28 <input type="checkbox"/> 29-30 <input type="checkbox"/> 31-32 <input type="checkbox"/> 33-34 <input type="checkbox"/> 35-36 <input type="checkbox"/> 37-38 <input type="checkbox"/> 39-40 <input type="checkbox"/> 41-42 <input type="checkbox"/> 43-44 <input type="checkbox"/> 45-46 <input type="checkbox"/> 47-48 <input type="checkbox"/> 49-50 <input type="checkbox"/> 51-52 <input type="checkbox"/> 53-54 <input type="checkbox"/> 55-56 <input type="checkbox"/> 57-58 <input type="checkbox"/> 59-60 <input type="checkbox"/> 61-62 <input 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KAALAMAN AT PANANAW TUNGKOL SA PROYEKTO

[illegible]

WARANING SALANAT POC

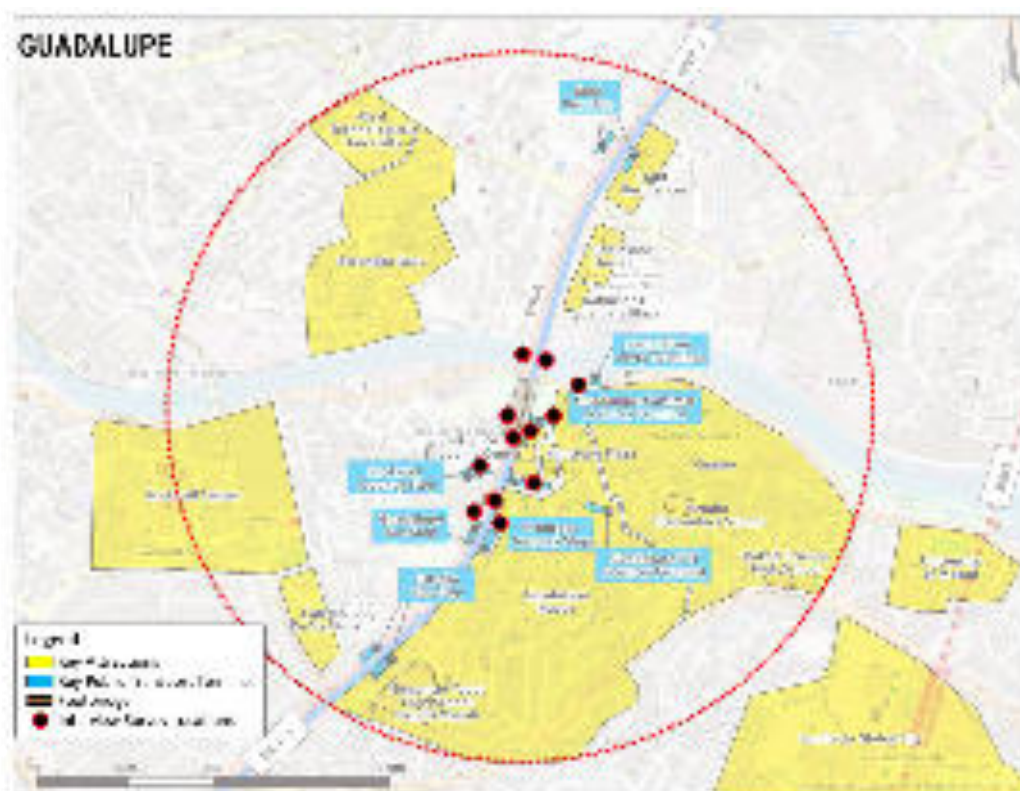
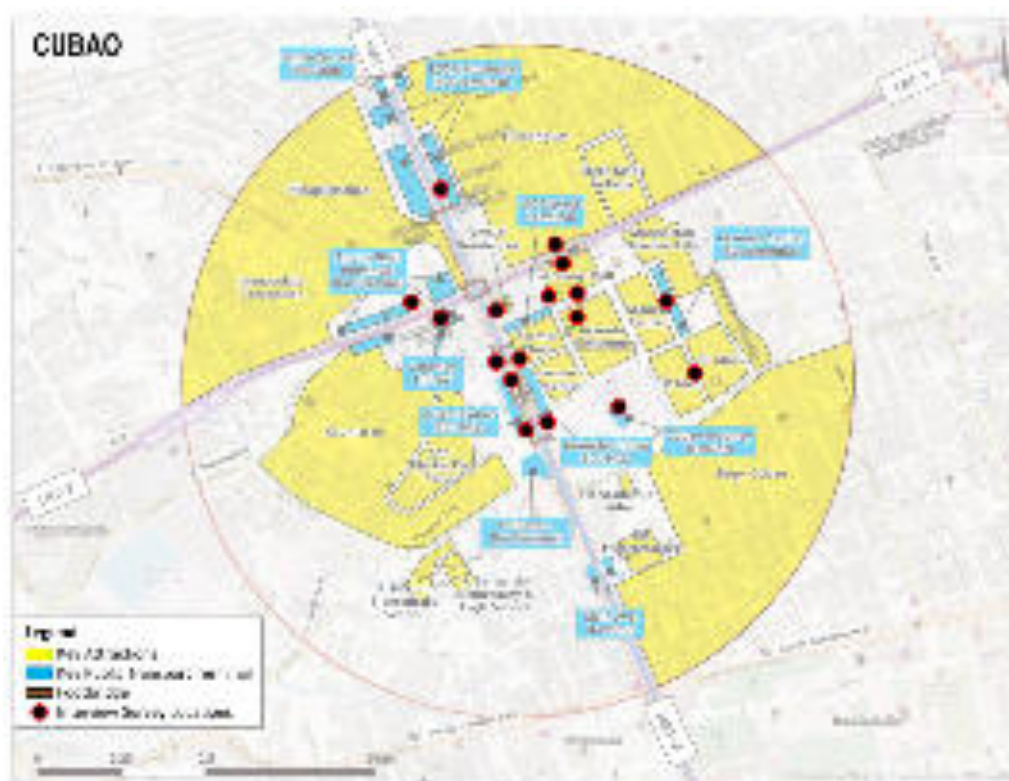
Appendix F

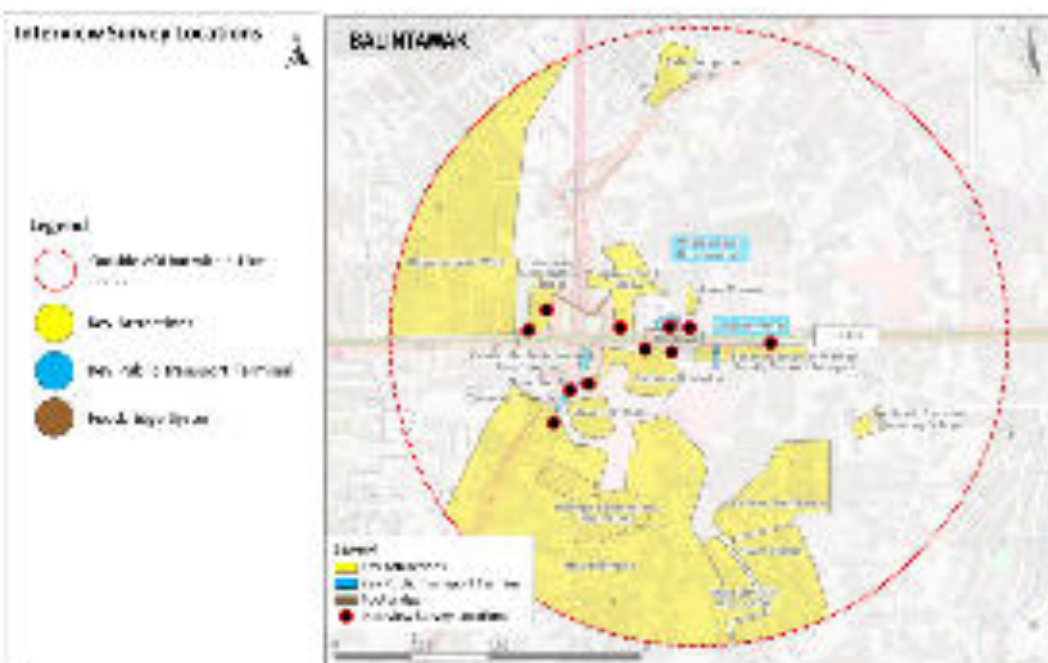
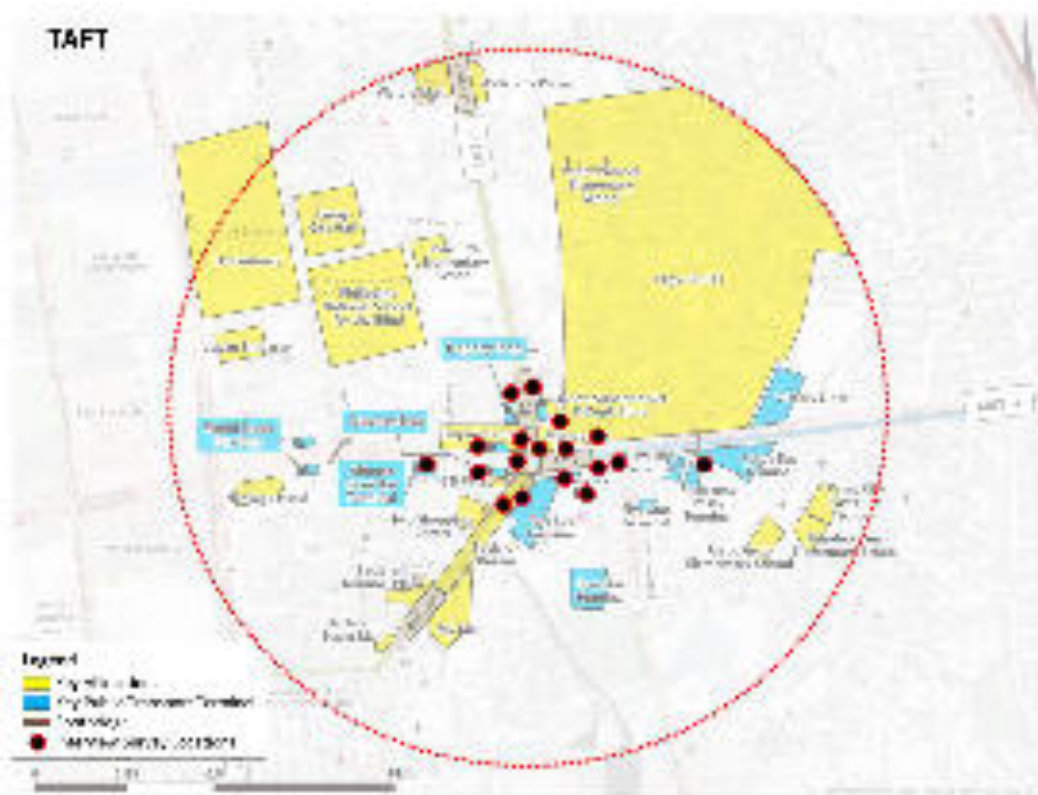
FGD and KII Raw Results

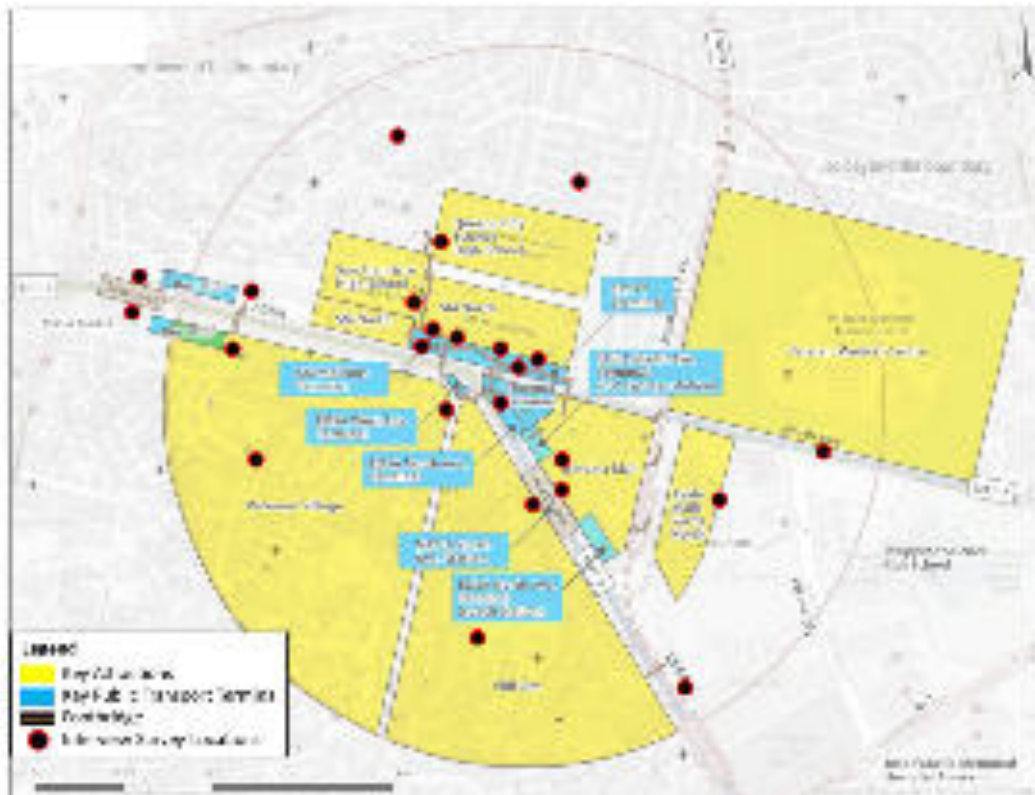
Appendix G

Pedestrian Survey

G1 **Location**







G2 Demographics of Interviewees

Cubao

Time Period	Gender	# of Interviewees by Age							
		Belo w 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
AM	Male	7	159	171	87	25	47	496	48.7%
	Female	20	175	137	59	20	41	452	44.4%
	Transgender	0	4	4	0	1	0	9	0.9%
	None of the Above	1	1	1	1	0	0	4	0.4%
	No Answer	1	19	17	5	1	14	57	5.6%
	Total	29	358	330	152	47	102	1018	100%
	% of Total	3%	35%	32%	15%	5%	10%	100%	
PM	Male	15	189	138	54	12	8	416	41.6%
	Female	20	248	136	69	19	17	509	50.9%
	Transgender	0	9	10	0	0	0	19	1.9%
	None of the Above	0	3	0	0	0	0	3	0.3%
	No Answer	2	21	14	5	0	11	53	5.3%
	Total	37	470	298	128	31	36	1000	100.0%
	% of Total	4%	47%	30%	13%	3%	4%	100%	
AM + PM Peak	Male	22	348	309	141	37	55	912	45.2%
	Female	40	423	273	128	39	58	961	47.6%
	Transgender	0	13	14	0	1	0	28	1.4%
	None of the Above	1	4	1	1	0	0	7	0.3%
	No Answer	3	40	31	10	1	25	110	5.5%
	Total	66	828	628	280	78	138	2018	100.0%
	% of Total	3%	41%	31%	14%	4%	7%	100%	

Guadalupe

Time Period	Gender	# of Interviewees by Age							
		Belo w 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
AM	Male	3	91	124	44	31	13	306	47.3%
	Female	6	109	118	51	29	8	321	49.6%

Time Period	Gender	# of Interviewees by Age							
		Below 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
	Transgender	0	0	0	1	0	0	1	0.2%
	None of the Above	1	1	0	0	0	0	2	0.3%
	No Answer	0	7	7	2	0	1	17	2.6%
	Total	10	208	249	98	60	22	647	100%
	% of Total	2%	32%	38%	15%	9%	3%	100%	
PM	Male	5	88	89	47	22	10	261	46.7%
	Female	11	87	93	47	21	12	271	48.5%
	Transgender	0	1	0	0	0	0	1	0.2%
	None of the Above	0	0	0	1	0	1	2	0.4%
	No Answer	0	9	6	3	2	4	24	4.3%
	Total	16	185	188	98	45	27	559	100.0 %
	% of Total	3%	33%	34%	18%	8%	5%	100%	
AM + PM Peak	Male	8	179	213	91	53	23	567	47.0%
	Female	17	196	211	98	50	20	592	49.1%
	Transgender	0	1	0	1	0	0	2	0.2%
	None of the Above	1	1	0	1	0	1	4	0.3%
	No Answer	0	16	13	5	2	5	41	3.4%
	Total	26	393	437	196	105	49	1206	100.0 %
	% of Total	2%	33%	36%	16%	9%	4%	100%	

Taft

Time Period	Gender	# of Interviewees by Age							
		Below 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
AM	Male	19	136	196	98	17	21	487	48.4%
	Female	22	191	174	60	11	32	490	48.7%
	Transgender	0	4	2	1	0	1	8	0.8%
	None of the Above	0	0	0	1	0	1	2	0.2%
	No Answer	1	7	7	1	1	3	20	2.0%

Time Period	Gender	# of Interviewees by Age							
		Below 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
	Total	42	338	379	161	29	58	1007	100%
	% of Total	4%	34%	38%	16%	3%	6%	100%	
PM	Male	5	121	195	88	10	25	444	39.3%
	Female	4	245	276	70	16	29	640	56.6%
	Transgender	0	6	2	0	0	0	8	0.7%
	None of the Above	1	1	0	0	0	0	2	0.2%
	No Answer	2	14	11	3	1	5	36	3.2%
	Total	12	387	484	161	27	59	1130	100.0 %
	% of Total	1%	34%	43%	14%	2%	5%	100%	
AM + PM Peak	Male	24	257	391	186	27	46	931	43.6%
	Female	26	436	450	130	27	61	1130	52.9%
	Transgender	0	10	4	1	0	1	16	0.7%
	None of the Above	1	1	0	1	0	1	4	0.2%
	No Answer	3	21	18	4	2	8	56	2.6%
	Total	54	725	863	322	56	117	2137	100.0 %
	% of Total	3%	34%	40%	15%	3%	5%	100%	

Balintawak

Time Period	Gender	# of Interviewees by Age							
		Below 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
AM	Male	23	63	147	74	23	15	345	42.1%
	Female	36	106	177	88	36	13	456	55.7%
	Transgender	0	1	2	0	0	0	3	0.4%
	None of the Above	0	0	0	0	0	0	0	0.0%
	No Answer	0	6	3	2	2	2	15	1.8%
	Total	59	176	329	164	61	30	819	100%
	% of Total	7%	21%	40%	20%	7%	4%	100%	
PM	Male	3	113	165	75	23	13	392	42.4%

Time Period	Gender	# of Interviewees by Age							
		Below 18	18-30	31-45	46-59	60 and Above	No Answer	Total	% of Total
	Female	20	168	189	89	25	12	503	54.4%
	Transgender	1	0	1	0	0	0	2	0.2%
	None of the Above	0	1	1	0	0	0	2	0.2%
	No Answer	1	7	11	3	1	2	25	2.7%
	Total	25	289	367	167	49	27	924	100.0%
	% of Total	3%	31%	40%	18%	5%	3%	100%	
AM + PM Peak	Male	26	176	312	149	46	28	737	42.3%
	Female	56	274	366	177	61	25	959	55.0%
	Transgender	1	1	3	0	0	0	5	0.3%
	None of the Above	0	1	1	0	0	0	2	0.1%
	No Answer	1	13	14	5	3	4	40	2.3%
	Total	84	465	696	331	110	57	1743	100.0%
	% of Total	5%	27%	40%	19%	6%	3%	100%	

Common Station

Time Period	Gender Respondent Most Closely Identifies With	Below 18	18-30	31-45	46-59	60 or Above	No Answer	Total	% of Total
AM Peak	Male	54	263	242	106	19	3	687	47.8%
	Female	48	340	226	99	32	4	749	52.2%
	Total	102	603	468	205	51	7	1,436	100.0%
	% of Total	7.1%	42.0%	32.6%	14.3%	3.6%	0.5%	100.0%	
PM Peak	Male	59	250	197	124	30	32	692	48.2%
	Female	60	310	195	114	29	35	743	51.8%
	Total	119	560	392	238	59	67	1,435	100.0%
	% of Total	8.3%	39.0%	27.3%	16.6%	4.1%	4.7%	100.0%	
AM + PM Peak	Male	113	513	439	230	49	35	1,379	48.0%
	Female	108	650	421	213	61	39	1,492	52.0%
	Total	221	1,163	860	443	110	74	2,871	100.0%
	% of Total	7.7%	40.5%	30.0%	15.4%	3.8%	2.6%	100.0%	

Cubao (AM Peaks)

Mode	Arrival	Mode	Departure
Bus (Coach)	27.1%	Bus (Coach)	34.3%
Jeepney	26.6%	Jeepney	20.7%
Walk	18.5%	Walk	18.4%
LRT-2	10.8%	MRT-3	11.1%
MRT-3	8.1%	LRT-2	7.6%
UV Express	3.7%	UV Express	4.8%
Motorcycle/Tricycle	3.0%	Motorcycle/Tricycle	1.1%
Taxi	1.0%	Taxi	0.7%
Grab	0.5%	Others	0.5%
No Answer	0.3%	Driving	0.4%
Driving	0.2%	No Answer	0.3%
Others	0.2%	Grab	0.2%
Total	100.0%	Total	100.0%

Cubao (PM Peaks)

Mode	Arrival	Mode	Departure
Jeepney	29.7%	Bus (Coach)	31.7%
Bus (Coach)	23.9%	Jeepney	27.5%
Walk	21.9%	Walk	16.3%
MRT-3	7.7%	MRT-3	7.3%
LRT-2	7.1%	UV Express	5.4%
UV Express	3.3%	LRT-2	4.4%
Motorcycle/Tricycle	2.8%	Motorcycle/Tricycle	3.9%
Taxi	1.8%	Others	1.4%
Grab	1.2%	Taxi	0.9%
Driving	0.5%	No Answer	0.5%
No Answer	0.1%	Driving	0.4%
Others	0.0%	Grab	0.3%
Total	100.0%	Total	100.0%

Guadalupe (AM Peaks)

Mode	Arrival	Mode	Departure
Jeepney	36.3%	MRT-3	31.1%
Walk	27.8%	Jeepney	20.2%
MRT-3	18.9%	Walk	19.9%
Bus (Coach)	13.1%	Bus (Coach)	18.5%
Motorcycle/Tricycle/Bicycle	2.0%	No Answer	7.9%
No Answer	0.8%	Motorcycle/Tricycle/Bicycle	1.4%
UV Express	0.5%	Private Car	0.5%
Taxi	0.3%	UV Express	0.3%
Private Car	0.3%	Taxi	0.2%
Grab	0.0%	Grab	0.0%
Ferry	0.0%	Ferry	0.0%
Total	100%	Total	100%

Guadalupe (PM Peaks)

Mode	Arrival	Mode	Departure
MRT-3	25.7%	MRT-3	27.8%
Jeepney	19.9%	Jeepney	22.4%
Bus (Coach)	18.1%	Walk	15.6%
Walk	15.6%	Bus (Coach)	9.7%
Motorcycle/Tricycle/Bicycle	2.9%	No Answer	4.6%
No Answer	2.0%	Motorcycle/Tricycle/Bicycle	2.8%
Ferry	1.1%	Ferry	1.7%
Grab	0.5%	Private Car	0.8%
Private Car	0.3%	UV Express	0.5%
UV Express	0.2%	Taxi	0.5%
Taxi	0.2%	Grab	0.0%
Total	100%	Total	100%

Taft (AM Peaks)

Mode	Arrival	Mode	Departure
LRT-1	30.5%	Jeepney	35.6%

Mode	Arrival	Mode	Departure
Jeepney	25.3%	MRT-3	18.5%
Bus (Coach)	17.1%	LRT-1	18.5%
MRT-3	11.3%	Bus (Coach)	16.3%
Walk	8.8%	Walk	4.3%
Motorcycle/Tricycle	4.1%	Motorcycle/Tricycle	3.5%
None, I live/work/study here.	1.9%	None, I live/work/study here.	2.2%
Private Car	0.5%	UV	0.8%
UV	0.3%	Taxi	0.4%
Taxi	0.1%	Grab	0.1%
Grab	0.1%	Private Car	0.0%
Other	0.0%	Other	0.0%
No Answer	0.0%	No Answer	0.0%
Total	100.0%	Total	100.0%

Taft (PM Peak)

Mode	Arrival	Mode	Departure
LRT-1	27.8%	Jeepney	36.7%
MRT-3	24.0%	LRT-1	18.3%
Jeepney	21.9%	Bus (Coach)	14.9%
Walk	11.2%	MRT-3	11.6%
Bus (Coach)	8.1%	Walk	9.6%
None, I live/work/study here.	3.5%	Motorcycle/Tricycle	3.7%
Motorcycle/Tricycle	2.8%	None, I live/work/study here.	2.7%
Taxi	0.4%	Taxi	0.8%
Private Car	0.2%	UV	0.7%
No Answer	0.1%	Private Car	0.5%
UV	0.0%	Grab	0.3%
Other	0.0%	No Answer	0.1%
Grab	0.0%	Other	0.0%
Grand Total	100.0%	Grand Total	100.0%

Balintawak (AM Peak)

Mode	Arrival	Mode	Departure
Walk	38.3%	Bus (Coach)	33.8%
Bus (Coach)	20.1%	Walk	24.9%
Jeepney	19.4%	Jeepney	18.6%
LRT-1	15.0%	LRT-1	16.5%
Motorcycle/Tricycle	3.9%	Motorcycle/Tricycle	2.6%
Driving	1.5%	Driving	2.3%
Taxi	1.0%	Taxi	0.6%
UV Express	0.4%	UV Express	0.5%
Grab	0.2%	Grab	0.1%
No Answer	0.1%	No Answer	0.1%
Total	100.0%	Total	100.0%

Balintawak (PM Peak)

Mode	Arrival	Mode	Departure
Walk	43.3%	Jeepney	31.4%
LRT-1	26.0%	Bus (Coach)	30.9%
Jeepney	15.4%	Walk	25.4%
Bus (Coach)	12.2%	LRT-1	8.5%
Motorcycle/Tricycle	1.6%	UV Express	8.2%
Private Car	0.8%	Motorcycle/Tricycle	1.7%
UV Express	0.4%	Taxi	1.2%
No Answer	0.2%	Private Car	1.2%
Taxi	0.1%	No Answer	0.9%
Others	0.0%	Grab	0.1%
Grab	0.0%	Others	0.0%
Total	100.0%	Total	100.0%

Common Station (AM/PM Peaks)

	AM Peak Trips				PM Peak Trips			
	Arriving		Departing		Arriving		Departing	
Mode	#	%	#	%	#	%	#	%
Walk	369	25.7%	364	25.3%	404	28.2%	254	17.7%
Jeepney	330	23.0%	250	17.4%	319	22.2%	392	27.3%
Bus (Coach)	289	20.1%	337	23.5%	253	17.6%	335	23.3%

UV Express	142	9.9%	126	8.8%	120	8.4%	194	13.5%
Motorcycle/ Tricycle	127	8.8%	69	4.8%	76	5.3%	91	6.3%
MRT-3	74	5.2%	220	15.3%	135	9.4%	51	3.6%
LRT-1	58	4.0%	25	1.7%	50	3.5%	31	2.2%
Taxi	15	1.0%	18	1.3%	23	1.6%	37	2.6%
Driving	13	0.9%	13	0.9%	17	1.2%	15	1.0%
Others	10	0.7%	9	0.6%	17	1.2%	14	1.0%
Grab	9	0.6%	5	0.3%	21	1.5%	21	1.5%
Total	1,436	100.0 %	1,436	100.0 %	1,435	100.0 %	1,435	100.0 %

Cubao

Trip Purpose	AM Peak	Trip Purpose	PM Peak
Work	53.1%	Going Home	46.0%
Going Home	23.6%	Work	21.6%
School	6.3%	Shopping/Malling	12.1%
Travel/Sightseeing	3.7%	Travel/Sightseeing	7.5%
Others	3.1%	Others	3.5%
No Answer	2.4%	School	2.6%
Transiting via Area	2.3%	No Answer	1.8%
Accompanying Dependents/Patient/Elderly	2.0%	Transiting via Area	1.7%
Shopping/Malling	1.6%	Accompanying Dependents/Patient/Elderly	1.6%
Marketing	1.2%	Marketing	1.0%
Hospital	0.8%	Taking Children to School	0.4%
Taking Children to School	0.0%	Hospital	0.2%
Total	100.0%	Total	100.0%

Guadalupe

Trip Purpose	AM Peak	Trip Purpose	PM Peak
Work	70.0%	Going Home	59.2%
Going Home	13.9%	Work	29.5%
School	4.5%	Going to Market	3.2%
Travel / Sightseeing	4.3%	Travel / Sightseeing	2.5%
Going to Market	2.5%	Shopping / Going to Mall	2.5%
Accompanying Dependents / Patient / Elderly	1.9%	Accompanying Dependents / Patient / Elderly	1.3%
Shopping / Going to Mall	1.7%	School	0.9%
Hospital	1.1%	Hospital	0.7%
Taking Children to School	0.2%	Taking Children to School	0.2%
Total	100.0%	Total	100.0%

Taft

Trip Purpose	AM Peak	Trip Purpose	PM Peak
Work	62.1%	Going Home	61.8%
Going Home	18.9%	Work	18.9%
School	8.2%	Shopping/Malling	6.9%
Travel/Sightseeing	4.1%	Travel/Sightseeing	5.1%
Others	2.3%	School	3.5%
Shopping/Malling	1.9%	Others	1.2%
Accompanying Dependents/Patient/Elderly	1.5%	Marketing	1.2%
Hospital	0.7%	Accompanying Dependents/Patient/Elderly	1.0%
Marketing	0.2%	Hospital	0.2%
Taking Children to School	0.2%	Taking Children to School	0.2%
Total	100.0%	Total	100.0%

Balintawak

Trip Purpose	AM Peak	Trip Purpose	PM Peak
Work	39.9%	Going Home	66.6%
Going Home	26.7%	Work	12.6%
School	9.6%	Others	7.6%
Others	8.1%	Going to Market	5.0%
Going to Market	7.6%	Shopping/ Going to Mall	4.3%
Travel/ Sightseeing	3.9%	Travel/ Sightseeing	2.2%
Shopping/ Going to Mall	2.2%	Accompanying Dependents/ Patient/ Elderly	0.9%
Hospital	0.7%	School	0.8%
Taking Children to School	0.7%	Hospital	0.2%
Accompanying Dependents/ Patient/ Elderly	0.5%	Taking Children to School	0.0%
Total	100.0%	Total	100.0%

Common Station

Primary Trip Purpose	AM Peak Trips		PM Peak Trips	
	#	% of Total	#	% of Total
Home	193	13%	650	45%
Work	882	61%	330	23%

School	198	14%	87	6%
Shopping/Malling	37	3%	205	14%
Travel / Sightseeing	42	3%	38	3%
Others	77	5%	103	7%
No Answer	7	0%	22	2%
Total	1,436	100%	1,435	100%

G5 % of Interviewees Staying or Transiting

Cubao

Stay or Transit	AM Peak		PM Peak	
	#	%	#	%
Stay (Work / Study / Shop / Live in Station Area)	500	49%	599	60%
Transit (Purpose in Station Area is to Interchange between Modes)	518	51%	401	40%
Total	1018	100%	1000	100%

Guadalupe

Stay or Transit	AM Peak		PM Peak	
	#	%	#	%
Stay (Work / Study / Shop / Live in Station Area)	329	51%	324	58%
Transit (Purpose in Station Area is to Interchange between Modes)	318	49%	235	42%
Total	647	100%	559	100%

Taft

Stay or Transit	AM Peak		PM Peak	
	#	%	#	%
Stay (Work / Study / Shop / Live in Station Area)	242	24%	377	33%
Transit (Purpose in Station Area is to Interchange between Modes)	765	76%	753	67%
Total	1,007	100%	1,130	100%

Balintawak

Stay or Transit	AM Peak		PM Peak	
	#	%	#	%
Stay (Work / Study / Shop / Live in Station Area)	524	64%	573	62%
Transit (Purpose in Station Area is to Interchange between Modes)	295	36%	351	38%
Total	819	100%	924	100%

G6

Opinion on Whether Pedestrian Facilities Are Well-Designed by At-Risk Group

Cubao

Stated Gender	Women	LGBT	Pregnant Women	People with Disabilities	Children	Senior Citizens	Routes Safe for Women from Sexual Harassment
Male	813	750	724	675	707	699	706
% of Male	89%	82%	79%	74%	78%	77%	77%
Female	848	750	724	664	692	674	717
% of Female	88%	78%	75%	69%	72%	70%	75%
Transgender	15	15	16	16	15	16	18
None of the Above	7	6	6	6	6	6	4
No Answer	47	34	54	34	33	56	20
Total	1,676	1,515	1,464	1,355	1,414	1,389	1,441
% of Total	83%	75%	73%	67%	70%	69%	71%

Guadalupe

Stated Gender	Women	LGBT	Pregnant Women	People with Disabilities	Children	Senior Citizens	Routes Safe for Women from Sexual Harassment
Male	481	454	429	398	424	401	422
% of Male	85%	80%	76%	70%	75%	71%	74%
Female	504	475	440	421	461	425	411
% of Female	85%	80%	74%	71%	78%	72%	69%
Transgender	2	2	2	2	2	2	1
None of the Above	3	3	3	3	3	3	3
No Answer	30	26	28	24	26	26	23
Total	987	931	871	821	887	828	834
% of Total	82%	77%	72%	68%	74%	69%	69%

Taft

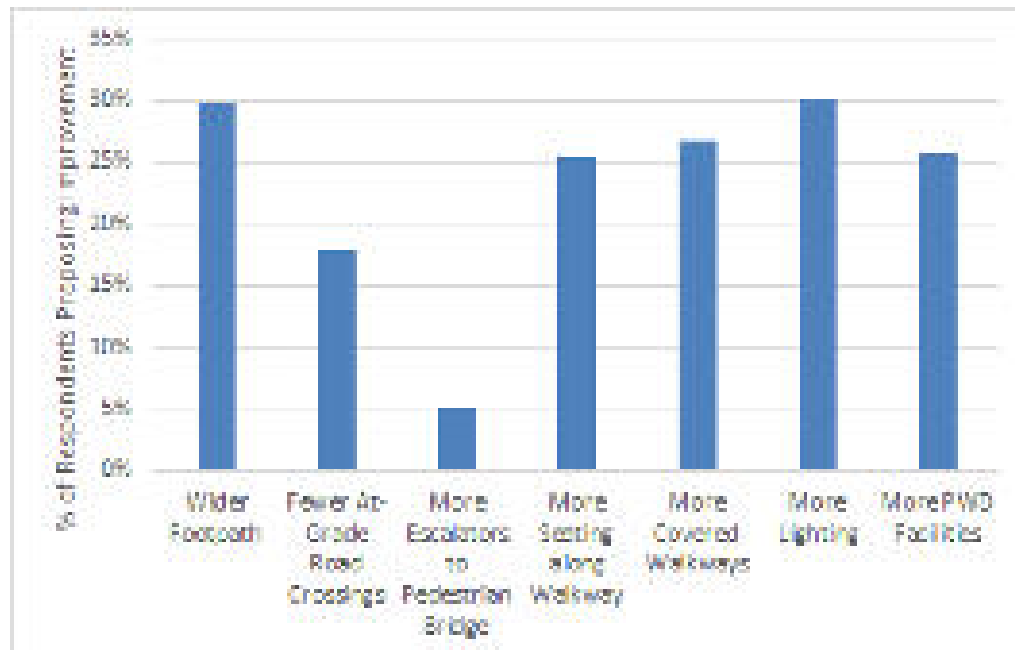
Stated Gender	Women	LGBT	Pregnant Women	People with Disabilities	Children	Senior Citizens	Routes Safe for Women from Sexual Harassment
Male	709	712	612	586	629	581	590
% of Male	76%	76%	66%	63%	68%	62%	63%
Female	862	869	791	786	826	784	758
% of Female	76%	77%	70%	70%	73%	69%	67%
Transgender	16	16	16	16	16	16	16
None of the Above	2	2	1	1	2	2	1
No Answer	31	31	31	29	29	29	30
Total	1,587	1,587	1,587	1,587	1,587	1,587	1,587
% of Total	76%	76%	68%	66%	70%	66%	65%

Balintawak

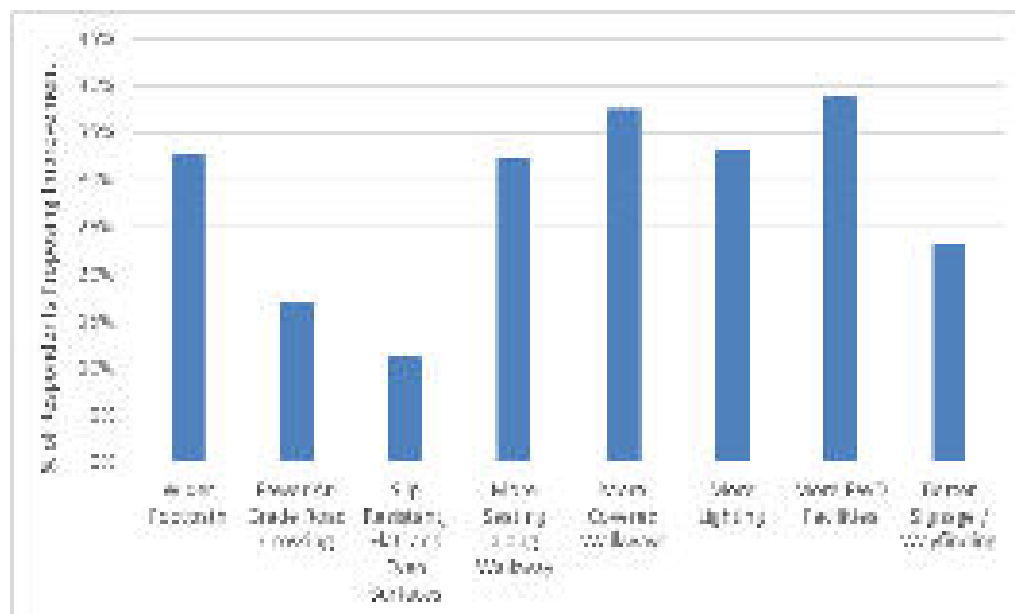
Stated Gender	Women	LGBT	Pregnant Women	People with Disabilities	Children	Senior Citizens	Routes Safe for Women from Sexual Harassment
Male	360	354	289	284	299	280	270
% of Male	21%	20%	17%	16%	17%	16%	15%
Female	382	372	281	278	283	266	301
% of Female	22%	21%	16%	16%	16%	15%	17%
Transgender	3	3	3	3	3	3	2
None of the Above	2	2	2	2	2	2	2
No Answer	26	21	18	19	19	16	23
Total	745	729	573	565	585	549	573
% of Total	75%	73%	57%	57%	59%	55%	57%

Note: Only 1,000 interview results were valid and used for the above statistics.

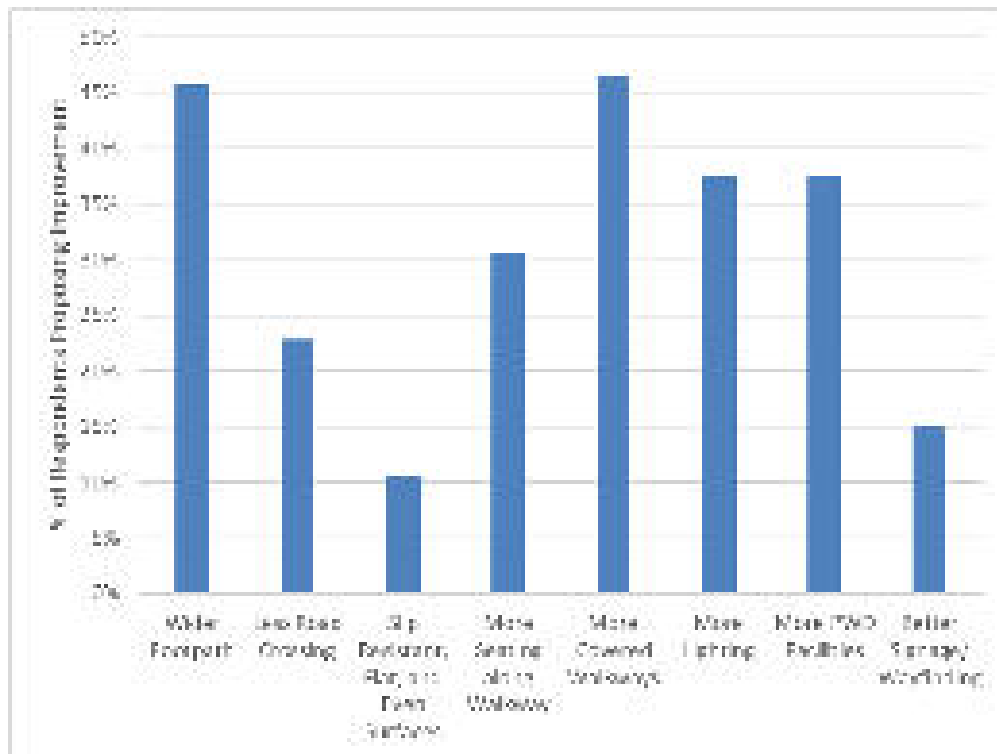
Cubao



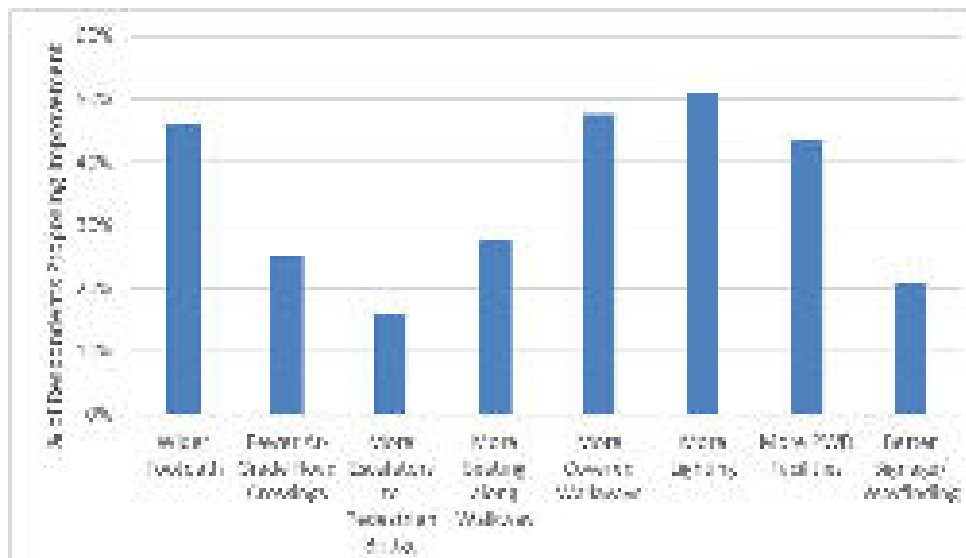
Guadalupe



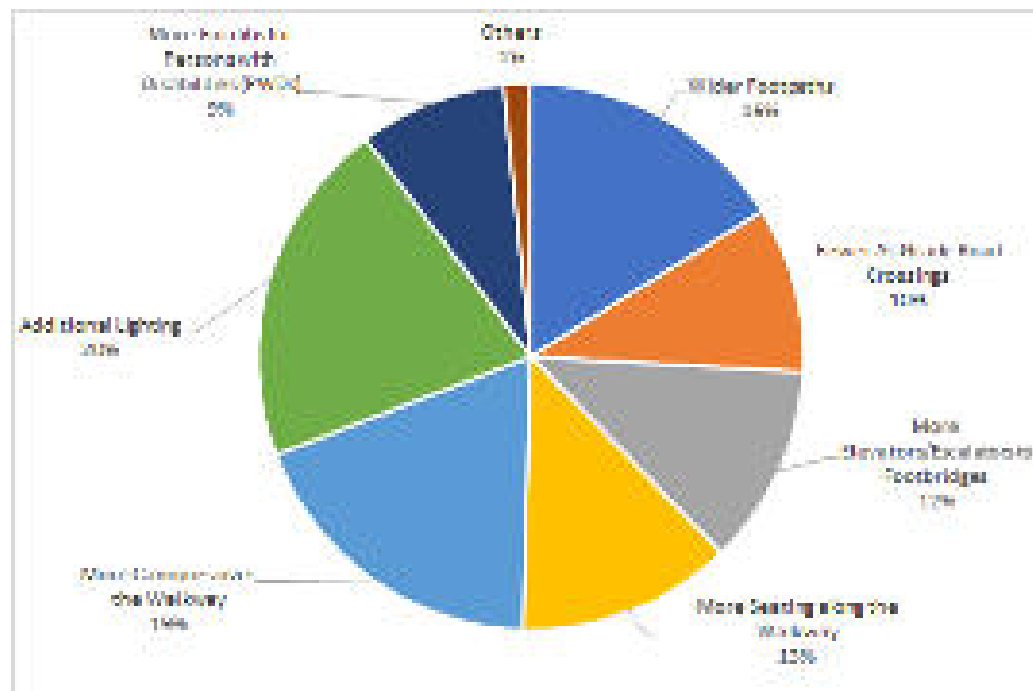
Taft



Balintawak



Common Station



Cubao

Stated Gender	Wider Footpath	Fewer At-Grade Road Crossings	More Escalators to Pedestrian Bridge	More Seating along Walkway	More Covered Walkways	More Lighting	More PWD Facilities	Others
Male	309	183	53	241	258	279	242	234
% of Male	34%	20%	6%	26%	28%	31%	27%	26%
Female	267	158	44	248	259	285	257	248
% of Female	28%	16%	5%	26%	27%	30%	27%	26%
Transgender	9	7	4	8	11	2	7	5
None of the Above	2	0	1	3	3	4	1	3
No Answer	15	13	3	14	10	35	12	12
Total	602	361	105	514	541	605	519	502
% of Total	30%	18%	5%	25%	27%	30%	26%	25%

Guadalupe

Stated Gender	Wider Footpath	Fewer At-Grade Road Crossings	Slip Resistant, Flat, and Even Surfaces	More Seating along Walkway	More Covered Walkways	More Lighting	More PWD Facilities	Better Signage / Wayfinding
Male	173	95	63	171	217	190	205	135
% of Male	31%	17%	11%	30%	38%	34%	36%	24%
Female	214	105	71	208	220	201	250	138
% of Female	36%	18%	12%	35%	37%	34%	42%	23%
Transgender	0	0	0	1	2	0	0	1
None of the Above	2	1	1	2	3	2	3	1
No Answer	7	5	1	6	10	7	13	6
Total	396	206	136	388	452	400	471	281
% of Total	33%	17%	11%	32%	37%	33%	39%	23%

Taft

Stated Gender	Wider Footpath	Less Road Crossing	Slip Resistant, Flat, and Even Surfaces	More Seating along Walkway	More Covered Walkways	More Lighting	More PWD Facilities	Better Signage/Wayfinding
Male	440	176	84	270	468	363	349	125
% of Male	47%	19%	9%	29%	50%	39%	37%	13%
Female	511	299	136	363	500	424	437	189
% of Female	45%	26%	12%	32%	44%	38%	39%	17%
Transgender	3	1	1	2	1	2	1	2
None of the Above	2	0	0	1	2	2	1	1
No Answer	21	12	4	20	25	9	13	4
Total	977	488	225	656	996	800	801	321
% of Total	46%	23%	11%	31%	47%	37%	37%	15%

Balintawak

Stated Gender	Wider Footpath	Fewer At-Grade Road Crossings	More Escalators to Pedestrian Bridge	More Seating along Walkway	More Covered Walkways	More Lighting	More PWD Facilities	Others
Male	325	187	125	197	348	375	321	151
% of Male	44%	25%	17%	27%	47%	51%	44%	20%
Female	460	236	151	272	459	499	425	200
% of Female	48%	25%	16%	28%	48%	52%	44%	21%
Transgender	1	0	0	0	1	0	3	0
None of the Above	0	0	0	2	1	1	1	1
No Answer	17	12	4	12	20	17	13	12
Total	803	435	280	483	829	892	763	364
% of Total	46%	25%	16%	28%	48%	51%	44%	21%

Common Station

Stated Gender	Additional Lighting	More Canopies over the Walkway	Wider Footpaths	More Seating along the Walkway	More Elevators/ Escalators to Footbridges	Fewer At-Grade Road Crossings	More Facilities for Persons with Disabilities (PWDs)	Others
Male	591	524	451	361	307	269	236	45
% of Male	49.60%	48.30%	48.30%	48.90%	44.70%	47.10%	46.50%	48.90 %
Female	601	561	482	377	380	302	271	47
% of Female	50.40%	51.70%	51.70%	51.10%	55.30%	52.90%	53.50%	51.10 %
Total	1192	1085	933	738	687	571	507	92
% of Total	42%	38%	32%	26%	24%	20%	18%	3%

Appendix H

Certificate of Non-Coverage (CNC) for
Balintawak, Cubao, Guadalupe and Taft Stations

Appendix I

Traffic Performance Calculation

Table I.1 Traffic Performance Calculation – Balintawak Station

Year 2019				Year 2020 (During Construction)																		Year 2022							
Existing				Scenario 1 (Maintain # of Lanes)						Scenario 2 (Reduce # of Lanes)						Scenario 3 (Traffic Re-Route to W. Service Road)						Scenario 1 (Maintain # of Lanes)						Scenario 2 (Reduce # of Lanes)	
Road Segment ID	PM Peak Demand ^C	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^A	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^A	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B
2	A3	A4 = A2/A1	A5 = A3/A1	-	B1	B2	B3	B4 = B2/B1	B5 = B3/B1	-	C1	C2	C3	C4 = C2/C1	C5 = C3/C1	-	D1	D2	D3	D4 = D2/D1	D5 = D3/D1	-	E1	E2	E3	E4 = E2/E1	E5 = E3/E1	-	F1
30	4,093	0.81	0.54	6	7,387	6,190	4,133	0.84	0.56	5	6,112	6,190	4,133	1.01	0.68	-	-	-	-	-	-	6	7,609	6,278	4,192	0.82	0.55	5	6,112
30	4,093	0.81	0.54	6	7,393	6,190	4,133	0.84	0.56	5	6,118	6,190	4,133	1.01	0.68	-	-	-	-	-	-	6	7,616	6,278	4,192	0.82	0.55	5	6,118
30	4,093	0.81	0.54	6	7,297	6,190	4,133	0.85	0.57	5	6,041	6,190	4,133	1.02	0.68	-	-	-	-	-	-	6	7,520	6,278	4,192	0.83	0.56	5	6,041
30	4,093	0.81	0.54	6	7,323	6,190	4,133	0.85	0.56	5	6,061	6,190	4,133	1.02	0.68	-	-	-	-	-	-	6	7,546	6,278	4,192	0.83	0.56	5	6,061
47	4,038	0.80	0.53	6	7,297	6,106	4,077	0.84	0.56	5	6,041	6,106	4,077	1.01	0.67	-	-	-	-	-	-	6	7,488	6,192	4,135	0.83	0.55	5	6,041
30	4,093	0.81	0.54	6	7,297	6,190	4,133	0.85	0.57	5	6,041	6,190	4,133	1.02	0.68	-	-	-	-	-	-	6	7,488	6,278	4,192	0.84	0.56	5	6,041
45	2,567	0.51	0.34	6	7,336	3,883	2,592	0.53	0.35	5	6,071	3,883	2,592	0.64	0.43	-	-	-	-	-	-	6	7,558	3,937	2,629	0.52	0.35	5	6,071
27	2,889	0.53	0.35	6	7,711	4,369	2,917	0.57	0.38	5	6,950	4,369	2,917	0.63	0.42	-	-	-	-	-	-	6	8,300	4,431	2,959	0.53	0.36	5	6,950
27	2,889	1.16	0.78	3	3,542	4,369	2,917	1.23	0.82	2	2,328	4,369	2,917	1.88	1.25	2	2,328	2,656	1,773	1.14	0.76	3	3,695	4,431	2,959	1.20	0.80	2	2,328
31	755	0.49	0.33	2	2,143	1,142	763	0.53	0.36	1	931	1,142	763	1.23	0.82	1	931	571	381	0.61	0.41	2	2,315	1,158	774	0.50	0.33	1	931
9	133	0.08	0.06	2	2,108	201	134	0.10	0.06	1	915	201	134	0.22	0.15	-	-	-	-	-	-	2	2,206	204	136	0.09	0.06	1	915
47	4,038	0.80	0.53	6	7,329	6,106	4,077	0.83	0.56	5	6,066	6,106	4,077	1.01	0.67	-	-	-	-	-	-	6	7,552	6,192	4,135	0.82	0.55	5	6,066
47	4,038	0.80	0.53	6	7,329	6,106	4,077	0.83	0.56	5	6,066	6,106	4,077	1.01	0.67	-	-	-	-	-	-	6	7,552	6,192	4,135	0.82	0.55	5	6,066
02	1,270	0.51	0.34	3	3,455	1,920	1,282	0.56	0.37	2	2,208	1,920	1,282	0.87	0.58	-	-	-	-	-	-	3	3,663	1,948	1,300	0.53	0.35	2	2,208
02	1,270	0.51	0.34	3	3,544	1,920	1,282	0.54	0.36	2	2,600	1,920	1,282	0.74	0.49	-	-	-	-	-	-	3	3,725	1,948	1,300	0.52	0.35	2	2,600
32	1,357	0.51	0.34	3	3,631	2,052	1,370	0.57	0.38	2	2,700	2,052	1,370	0.76	0.51	-	-	-	-	-	-	3	3,754	1,041	695	0.28	0.19	2	2,700
60	1,108	0.41	0.28	3	3,545	1,676	1,119	0.47	0.32	2	2,330	1,676	1,119	0.72	0.48	-	-	-	-	-	-	3	3,760	850	567	0.23	0.15	2	2,330
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2,375	1,697	1,133	0.71	0.48	-	-	-	-	-	-	-	-

Distributor.

ent and number of lanes are different as each road segment may have a different road type and road width for each lane. Furthermore, curbside and non-curbside lanes have different road capacities. For example, a typical 3.5m PD road has the folur for the non-curbside lane. Typical 3.5m LD road has the following capacities: (i) 1,025 pcu/hour for the curbside lane and (ii) 1,325 pcu/hour for the non-curbside lanes.

traffic count surveys for this study or the MUCEP traffic model. Typically major roads such as EDSA are covered in the MUCEP model, while minor side streets are based on traffic counts.

Table I.2 Traffic Performance Calculation – Common Station (Long-Term)

Road Segment ID	Road Type _A	Year 2019						Year 2023 (During Construction)										Year 2024												
		Existing						Scenario 1 (Maintain # of Lanes)					Scenario 2 (Reduce # of Lanes)					Scenario 1 (Maintain # of Lanes)					Scenario 2 (Reduce # of Lanes)							
		# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand _C	PM Peak Demand _C	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio
Formulas	-	A1	A2	A3	A4 =	A5 =	-	B1	B2	B3	B4 =	B5 =	-	C1	C2	C3	C4 =	C5 =	-	D1	D2	D3	D4 =	D5 =	-	E1	E2	E3	E4 =	E5 =

						A2/ A1	A3/ A1					B2/ B1	B3/ B1											D2/ D1	D3/ D1					E2/ E1	E3/ E1
A1	PD	6	8,200	3,64 6	3,95 0	0.4 4	0.4 8	6	7,718	3,72 4	4,03 4	0.4 8	0.5 2	5	6,950	3,72 4	4,03 4	0.5 4	0.5 8	6	8,200	3,75 0	4,06 2	0.4 6	0.5 0	5	6,950	3,75 0	4,06 2	0.5 4	0.5 8
A2	LD	2	2,375	423	458	0.1 8	0.1 9	2	2,292	432	467	0.1 9	0.2 0	1	1,250	432	467	0.3 5	0.3 7	2	2,375	435	471	0.1 8	0.2 0	1	1,250	435	471	0.3 5	0.3 8
A3	LD	2	2,375	474	514	0.2 0	0.2 2	2	2,350	484	525	0.2 1	0.2 2	1	1,250	484	525	0.3 9	0.4 2	2	2,375	488	528	0.2 1	0.2 2	1	1,250	488	528	0.3 9	0.4 2
A4	PD	6	8,200	3,27 2	3,54 4	0.4 0	0.4 3	6	8,300	3,34 1	3,62 0	0.4 0	0.4 4	5	6,950	3,34 1	3,62 0	0.4 8	0.5 2	6	8,200	3,36 5	3,64 5	0.4 1	0.4 4	5	6,950	3,36 5	3,64 5	0.4 8	0.5 2
B1	PD	3	4,000	1,17 7	1,27 5	0.2 9	0.3 2	2 ^D	2,297	1,20 2	1,30 2	0.5 2	0.5 7	1	1,300	1,20 2	1,30 2	0.9 2	1.0 0	2 ^E	2,463	787	852	0.3 2	0.3 5	1	1,350	787	852	0.5 8	0.6 3
B2	PD	3	4,000	1,20 3	1,30 3	0.3 0	0.3 3	2 ^D	2,340	1,22 9	1,33 1	0.5 3	0.5 7	1	1,350	1,22 9	1,33 1	0.9 1	0.9 9	2 ^E	2,463	1,23 7	1,34 1	0.5 0	0.5 4	1	1,350	1,23 7	1,34 1	0.9 2	0.9 9
B3	PD	4	5,400	1,53 9	1,66 8	0.2 9	0.3 1	3 ^D	3,646	1,57 2	1,70 3	0.4 3	0.4 7	2	2,700	1,57 2	1,70 3	0.5 8	0.6 3	5 ^E	6,215	1,02 9	1,11 5	0.1 7	0.1 8	4	5,500	1,02 9	1,11 5	0.1 9	0.2 0
B4	PD	3	4,000	1,17 6	1,27 4	0.2 9	0.3 2	3 ^D	3,431	1,20 1	1,30 2	0.3 5	0.3 8	1	1,350	1,20 1	1,30 2	0.8 9	0.9 6	3 ^E	3,708	786	852	0.2 1	0.2 3	2	2,750	786	852	0.2 9	0.3 1

Notes:

^A PD = Primary Distributor, LD = Local Distributor.

^B Road capacities for each road segment and number of lanes are different as each road segment may have a different road type and road width for each lane. Furthermore, curbside and non-curbside lanes have different road capacities. For example, a typical 3.5m PD road has the following capacities: (i) 1,200 pcu/hour for the curbside lane; and (ii) 1,300 pcu/hour for the non-curbside lane. Typical 3.5m LD road has the following capacities: (i) 1,025 pcu/hour for the curbside lane and (ii) 1,325 pcu/hour for the non-curbside lanes.

^C Traffic volumes are based on recent traffic count surveys for this study or the MUCEP traffic model. Typically major roads such as EDSA are covered in the MUCEP model, while minor side streets are based on traffic counts.

^E During the footbridge construction, it is assumed that the North Ave. / Mindanao Ave. Underpass and North Ave. / Mindanao Ave. Flyover are concurrently constructed. Construction of these projects would affect the width of the inner lanes, while the footbridge construction would affect the outer lanes due to the portal configuration of the 8m bridge. Based on the most recent drawings for the Underpass and Flyover, two lanes will be retained in sections B1 and B2, and three lanes in sections B3 and B4.

^F After construction of the footbridge and the noted flyover and underpass, two lanes will be retained on B1 and B2, five lanes on B3 and three lanes on B4, respectively. This is thus assumed to be the base case for the after construction period in 2024

Table I.3 Traffic Performance Calculation – Cubao Station (Long-Term)

Year 2019				Year 2020 (During Construction)																	Year 2022								
Existing				Scenario 1 (Maintain # of Lanes)						Scenario 2 (Reduce # of Lanes)						Scenario 3 (Contra-Flow Lane on Aurora Blvd)					Scenario 1 (Maintain # of Lanes)						Scenario 2 (Reduce # of Lanes)		
AM Peak Demand ^c	PM Peak Demand ^c	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) _A	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) _B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) _B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) _B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) _B
2	A3	A4 = A2/A1	A5 = A3/A1	-	B1	B2	B3	B4 = B2/B1	B5 = B3/B1	-	C1	C2	C3	C4 = C2/C1	C5 = C3/C1	-	D1	D2	D3	D4 = D2/D1	D5 = D3/D1	-	E1	E2	E3	E4 = E2/E1	E5 = E3/E1	-	F1
48	3,558	0.57	0.94	3	3,499	1,301	2,156	0.37	0.62	2	2,299	1,301	2,156	0.57	0.94	-	-	-	-	-	-	3	3,677	1,760	2,915	0.48	0.79	2	2,299
48	3,558	0.57	0.94	3	3,499	1,301	2,156	0.37	0.62	2	2,299	1,301	2,156	0.57	0.94	-	-	-	-	-	-	3	3,677	1,760	2,915	0.48	0.79	2	2,299
62	3,416	0.55	0.91	3	3,511	1,250	2,070	0.36	0.59	2	2,308	1,250	2,070	0.54	0.90	-	-	-	-	-	-	3	3,708	1,690	2,799	0.46	0.75	2	2,308
28	3,359	0.54	0.89	3	3,499	1,229	2,035	0.35	0.58	2	2,299	1,229	2,035	0.53	0.88	-	-	-	-	-	-	3	3,677	1,661	2,752	0.45	0.75	2	2,299
28	3,359	0.54	0.89	3	3,507	1,229	2,035	0.35	0.58	2	2,305	1,229	2,035	0.53	0.88	-	-	-	-	-	-	3	3,722	1,661	2,752	0.45	0.74	2	2,305
28	3,359	0.51	0.84	3	3,683	1,229	2,035	0.33	0.55	2	2,750	1,229	2,035	0.45	0.74	-	-	-	-	-	-	3	4,150	1,661	2,752	0.40	0.66	2	2,750
28	3,359	0.54	0.90	3	3,499	1,229	2,035	0.35	0.58	2	2,299	1,229	2,035	0.53	0.88	-	-	-	-	-	-	3	3,714	1,661	2,752	0.45	0.74	2	2,299
46	3,224	0.51	0.85	3	3,502	1,179	1,953	0.34	0.56	2	2,302	1,179	1,953	0.51	0.85	-	-	-	-	-	-	3	3,699	1,595	2,641	0.43	0.71	2	2,302
46	3,224	0.51	0.85	3	3,502	1,179	1,953	0.34	0.56	2	2,302	1,179	1,953	0.51	0.85	-	-	-	-	-	-	3	3,699	1,595	2,641	0.43	0.71	2	2,302
46	3,224	0.52	0.86	3	3,658	1,179	1,953	0.32	0.53	2	2,750	1,179	1,953	0.43	0.71	-	-	-	-	-	-	3	3,745	1,595	2,641	0.43	0.71	2	2,750
46	3,224	0.52	0.85	3	3,681	1,179	1,953	0.32	0.53	2	2,750	1,179	1,953	0.43	0.71	-	-	-	-	-	-	3	3,773	1,595	2,641	0.42	0.70	2	2,750
46	3,224	0.50	0.83	3	3,499	1,179	1,953	0.34	0.56	2	2,299	1,179	1,953	0.51	0.85	-	-	-	-	-	-	3	3,683	1,595	2,641	0.43	0.72	2	2,299
46	3,224	0.50	0.83	3	3,499	1,179	1,953	0.34	0.56	2	2,299	1,179	1,953	0.51	0.85	-	-	-	-	-	-	3	3,683	1,595	2,641	0.43	0.72	2	2,299
46	3,224	0.50	0.83	3	3,714	1,179	1,953	0.32	0.53	2	2,750	1,179	1,953	0.43	0.71	-	-	-	-	-	-	3	3,875	1,595	2,641	0.41	0.68	2	2,750
2	1,511	0.22	0.37	3	3,671	921	1,526	0.25	0.42	2	2,750	921	1,526	0.33	0.55	-	-	-	-	-	-	3	4,100	934	1,547	0.23	0.38	2	2,750
2	1,511	0.22	0.37	3	3,517	921	1,526	0.26	0.43	2	2,312	921	1,526	0.40	0.66	-	-	-	-	-	-	3	3,732	934	1,547	0.25	0.41	2	2,312
2	1,511	0.23	0.39	3	3,459	921	1,526	0.27	0.44	-	-	-	-	-	-	2	2,536	921	1,526	0.36	0.60	3	3,674	934	1,547	0.25	0.42	2	2,536
9	1,323	0.29	0.48	2	2,750	807	1,336	0.29	0.49	-	-	-	-	-	-	2	2,586	807	1,336	0.31	0.52	2	2,750	818	1,355	0.30	0.49	1	2,586
9	1,323	0.19	0.32	3	3,572	807	1,336	0.23	0.37	2	2,349	807	1,336	0.34	0.57	-	-	-	-	-	-	3	3,788	818	1,355	0.22	0.36	2	2,349
48	3,558	0.52	0.87	3	3,588	1,301	2,156	0.36	0.60	2	2,700	1,301	2,156	0.48	0.80	-	-	-	-	-	-	3	3,772	1,760	2,915	0.47	0.77	2	2,700
62	3,416	0.53	0.88	3	3,671	1,250	2,070	0.34	0.56	2	2,750	1,250	2,070	0.45	0.75	-	-	-	-	-	-	3	3,881	1,690	2,799	0.44	0.72	2	2,750
9	1,323	0.15	0.24	4	4,977	807	1,336	0.16	0.27	3	4,100	807	1,336	0.20	0.33	-	-	-	-	-	-	4	5,500	818	1,355	0.15	0.25	3	4,100
2	1,511	0.18	0.30	4	5,014	921	1,526	0.18	0.30	3	4,150	921	1,526	0.22	0.37	-	-	-	-	-	-	4	5,014	934	1,547	0.19	0.31	3	4,150
46	3,224	0.49	0.81	3	4,000	1,179	1,953	0.29	0.49	2	2,750	1,179	1,953	0.43	0.71	-	-	-	-	-	-	3	4,000	1,595	2,641	0.40	0.66	2	2,750
28	3,359	0.49	0.82	3	3,799	1,229	2,035	0.32	0.54	2	2,750	1,229	2,035	0.45	0.74	-	-	-	-	-	-	3	4,100	1,661	2,752	0.41	0.67	2	2,750
7	1,652	0.15	0.24	5	6,326	1,007	1,668	0.16	0.26	4	5,550	1,007	1,668	0.18	0.30	-	-	-	-	-	-	5	6,776	1,021	1,691	0.15	0.25	4	5,550
3	1,496	0.17	0.29	4	4,894	912	1,510	0.19	0.31	3	4,100	912	1,510	0.22	0.37	-	-	-	-	-	-	4	5,500	925	1,532	0.17	0.28	3	4,100
46	3,224	0.41	0.69	3	4,700	2,752	4,558	0.59	0.97	-	-	-	-	-	-	-	-	-	-	-	-	3	4,700	2,392	3,962	0.51	0.84	-	-
28	3,359	0.43	0.71	3	4,700	2,867	4,748	0.61	1.01	-	-	-	-	-	-	-	-	-	-	-	-	3	4,700	2,492	4,127	0.53	0.88	-	-
62	3,416	0.44	0.73	3	4,700	2,916	4,829	0.62	1.03	-	-	-	-	-	-	-	-	-	-	-	-	3	4,700	2,534	4,198	0.54	0.89	-	-
48	3,558	0.46	0.76	3	4,700	3,037	5,030	0.65	1.07	-	-	-	-	-	-	-	-	-	-	-	-	3	4,700	2,640	4,372	0.56	0.93	-	-

Distributor.

and number of lanes are different as each road segment may have a different road type and road width for each lane. Furthermore, curbside and non-curbside lanes have different road capacities. For example, a typical 3.5m PD road has the following capacity for the non-curbside lane. Typical 3.5m LD road has the following capacities: (i) 1,025 pcu/hour for the curbside lane and (ii) 1,325 pcu/hour for the non-curbside lanes.

traffic count surveys for this study or the MUCFEP traffic model. Typically major roads such as EDSA are covered in the MUCFEP model, while minor side streets are based on traffic counts.

Table I.4 Traffic Performance Calculation – Guadalupe Station

Road Segment ID	Road Type ^A	Year 2019						Year 2020 (During Construction)										Year 2022													
		Existing						Scenario 1 (Maintain # of Lanes)					Scenario 2 (Reduce # of Lanes)					Scenario 1 (Maintain # of Lanes)					Scenario 2 (Reduce # of Lanes)								
		# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand ^C	PM Peak Demand ^C	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio
Formulas	-	A1	A2	A3	A4 = A2/A1	A5 = A3/A1	-	B1	B2	B3	B4 = B2/B1	B5 = B3/B1	-	C1	C2	C3	C4 = C2/C1	C5 = C3/C1	-	D1	D2	D3	D4 = D2/D1	D5 = D3/D1	-	E1	E2	E3	E4 = E2/E1	E5 = E3/E1	
A1	PD	5	6,800	5,008	5,568	0.74	0.82	5	6,171	5,057	5,622	0.82	0.91	4	5,086	5,057	5,622	0.99	1.11	5	6,325	5,129	5,702	0.81	0.90	4	5,550	5,129	5,702	0.92	1.03
A2	PD	2	2,750	501	557	0.18	0.20	2	2,296	506	562	0.22	0.24	1	1,300	506	562	0.39	0.43	2	2,419	513	570	0.21	0.24	1	1,350	513	570	0.38	0.42
A3	PD	5	6,776	5,008	5,568	0.74	0.82	5	6,117	5,057	5,622	0.83	0.92	4	5,032	5,057	5,622	1.00	1.12	5	6,332	5,129	5,702	0.81	0.90	4	5,550	5,129	5,702	0.92	1.03
A4	PD	5	6,776	5,008	5,568	0.74	0.82	5	6,110	5,057	5,622	0.83	0.92	4	5,026	5,057	5,622	1.01	1.12	5	6,326	5,129	5,702	0.81	0.90	4	5,550	5,129	5,702	0.92	1.03
A5	PD	5	6,321	5,008	5,568	0.79	0.88	5	6,032	5,057	5,622	0.84	0.93	4	4,948	5,057	5,622	1.02	1.14	5	6,248	5,129	5,702	0.82	0.91	4	5,500	5,129	5,702	0.93	1.04
A6	PD	5	6,776	5,228	5,813	0.77	0.86	5	6,177	5,279	5,870	0.85	0.95	4	5,092	5,279	5,870	1.04	1.15	5	6,392	5,354	5,953	0.84	0.93	4	5,550	5,354	5,953	0.96	1.07
A7	PD	5	6,800	5,228	5,813	0.77	0.85	5	6,221	5,279	5,870	0.85	0.94	4	5,500	5,279	5,870	0.96	1.07	5	6,800	5,354	5,953	0.79	0.88	4	5,550	5,354	5,953	0.96	1.07
A8	PD	5	6,800	5,228	5,813	0.77	0.85	5	6,106	5,279	5,870	0.86	0.96	4	5,022	5,279	5,870	1.05	1.17	5	6,322	5,354	5,953	0.85	0.94	4	5,550	5,354	5,953	0.96	1.07
A9	PD	5	6,800	5,228	5,813	0.77	0.85	5	6,252	5,279	5,870	0.84	0.94	4	5,500	5,279	5,870	0.96	1.07	5	6,800	5,354	5,953	0.79	0.88	4	5,550	5,354	5,953	0.96	1.07
A10	PD	5	6,366	5,228	5,813	0.82	0.91	5	6,151	5,279	5,870	0.86	0.95	4	5,066	5,279	5,870	1.04	1.16	5	6,366	5,354	5,953	0.84	0.94	4	5,550	5,354	5,953	0.96	1.07
B1	PD	5	6,289	5,228	5,813	0.83	0.92	5	6,289	5,279	5,870	0.84	0.93	4	5,500	5,279	5,870	0.96	1.07	5	6,289	5,354	5,953	0.85	0.95	4	5,500	5,354	5,953	0.97	1.08
B2	PD	4	5,550	5,228	5,813	0.94	1.05	4	5,550	5,279	5,870	0.95	1.06	3	4,150	5,279	5,870	1.27	1.41	4	5,098	5,354	5,953	1.05	1.17	3	4,150	5,354	5,953	1.29	1.43
B3	PD	2	2,569	438	487	0.17	0.19	2	2,242	442	492	0.20	0.22	1	1,157	442	492	0.38	0.43	2	2,396	449	499	0.19	0.21	1	1,350	449	499	0.33	0.37
B4	PD	2	2,569	536	596	0.21	0.23	2	2,242	542	602	0.24	0.27	1	1,157	542	602	0.47	0.52	2	2,396	549	611	0.23	0.25	1	1,350	549	611	0.41	0.45
B5	PD	2	2,569	659	732	0.26	0.28	2	2,260	665	739	0.29	0.33	1	1,176	665	739	0.57	0.63	2	2,414	674	750	0.28	0.31	1	1,350	674	750	0.50	0.56
B6	PD	2	2,458	271	301	0.11	0.12	2	2,458	274	304	0.11	0.12	1	1,350	274	304	0.20	0.23	2	2,305	278	309	0.12	0.13	1	1,300	278	309	0.21	0.24
B7	PD	5	6,325	5,008	5,568	0.79	0.88	5	6,079	5,057	5,622	0.83	0.92	4	4,995	5,057	5,622	1.01	1.13	5	6,233	5,129	5,702	0.82	0.91	4	5,500	5,129	5,702	0.93	1.04

Notes:
^A PD = Primary Distributor, LD = Local Distributor.

^B Road capacities for each road segment and number of lanes are different as each road segment may have a different road type and road width for each lane. Furthermore, curbside and non-curbside lanes have different road capacities. For example, a typical 3.5m PD road has the following capacities: (i) 1,200 pcu/hour for the curbside lane; and (ii) 1,300 pcu/hour for the non-curbside lane. Typical 3.5m LD road has the following capacities: (i) 1,025 pcu/hour for the curbside lane and (ii) 1,325 pcu/hour for the non-curbside lanes.

^C Traffic volumes are based on recent traffic count surveys for this study or the MUCPEP traffic model. Typically major roads such as EDSA are covered in the MUCPEP model, while minor side streets are based on traffic counts.

Table I.5 Traffic Performance Calculation – Taft Station

Road Segment ID	Road Type ^A	Year 2019						Year 2020 (During Construction)										Year 2022													
		Existing						Scenario 1 (Maintain # of Lanes)					Scenario 2 (Reduce # of Lanes)					Scenario 1 (Maintain # of Lanes)					Scenario 2 (Reduce # of Lanes)								
		# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand ^C	PM Peak Demand ^C	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio	# of Lanes	Hourly Road Capacity (PCU) ^B	AM Peak Demand	PM Peak Demand	AM Peak V/C Ratio	PM Peak V/C Ratio
Formulas	-	A1	A2	A3	A4 = A2/A1	A5 = A3/A1	-	B1	B2	B3	B4 = B2/B1	B5 = B3/B1	-	C1	C2	C3	C4 = C2/C1	C5 = C3/C1	-	D1	D2	D3	D4 = D2/D1	D5 = D3/D1	-	E1	E2	E3	E4 = E2/E1	E5 = E3/E1	
A1	PD	5	6,308	4,556	5,335	0.72	0.85	5	6,018	4,601	5,387	0.76	0.90	4	4,795	4,601	5,387	0.96	1.12	5	6,264	4,666	5,463	0.74	0.87	4	5,500	4,666	5,463	0.85	0.99
A2	PD	5	6,308	4,556	5,335	0.72	0.85	5	6,018	4,601	5,387	0.76	0.90	4	4,795	4,601	5,387	0.96	1.12	5	6,264	4,666	5,463	0.74	0.87	4	5,500	4,666	5,463	0.85	0.99
A3	PD	5	6,308	4,556	5,335	0.72	0.85	5	6,018	4,601	5,387	0.76	0.90	4	4,795	4,601	5,387	0.96	1.12	5	6,264	4,666	5,463	0.74	0.87	4	5,500	4,666	5,463	0.85	0.99
A4	PD	5	6,308	4,556	5,335	0.72	0.85	5	6,135	4,601	5,387	0.75	0.88	4	4,888	4,601	5,387	0.94	1.10	5	6,308	4,666	5,463	0.74	0.87	4	5,500	4,666	5,463	0.85	0.99
A5	PD	3	4,000	2,024	2,370	0.51	0.59	3	3,535	2,044	2,393	0.58	0.68	2	2,324	2,044	2,393	0.88	1.03	3	3,751	2,073	2,427	0.55	0.65	2	2,750	2,073	2,427	0.75	0.88
A6	PD	2	2,597	1,953	2,287	0.75	0.88	2	2,236	1,973	2,310	0.88	1.03	1	1,069	1,973	2,310	1.85	2.16	2	2,420	2,000	2,342	0.83	0.97	1	1,350	2,000	2,342	1.48	1.73
A6 ^D	PD	1	2,236	1,953	2,287	1.50	1.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
A7	PD	3	3,997	1,953	2,287	0.49	0.57	3	3,597	1,973	2,310	0.55	0.64	2	2,700	1,973	2,310	0.73	0.86	3	3,751	2,000	2,342	0.53	0.62	2	2,750	2,000	2,342	0.73	0.85
A8	PD	5	6,276	3,189	3,733	0.51	0.59	5	6,246	3,220	3,770	0.52	0.60	4	5,500	3,220	3,770	0.59	0.69	5	6,277	3,265	3,823	0.52	0.61	4	5,500	3,265	3,823	0.59	0.70
A9	PD	5	6,308	3,189	3,733	0.51	0.59	5	6,123	3,220	3,770	0.53	0.62	4	4,878	3,220	3,770	0.66	0.77	5	6,277	3,265	3,823	0.52	0.61	4	5,500	3,265	3,823	0.59	0.70
A10	PD	4	5,007	2,897	3,392	0.58	0.68	4	4,971	2,925	3,425	0.59	0.69	3	4,100	2,925	3,425	0.71	0.84	4	5,008	2,966	3,473	0.59	0.69	3	4,150	2,966	3,473	0.71	0.84
A11	PD	5	6,800	2,897	3,392	0.43	0.50	5	6,800	2,925	3,425	0.43	0.50	4	5,550	2,925	3,425	0.53	0.62	5	6,900	2,966	3,473	0.43	0.50	4	5,550	2,966	3,473	0.53	0.63
A12	LD	3	3,725	362	423	0.10	0.11	3	3,850	365	427	0.09	0.11	2	2,600	365	427	0.14	0.16	3	3,850	370	434	0.10	0.11	2	2,600	370	434	0.14	0.17
A13	PD	4	5,550	4,205	4,924	0.76	0.89	4	4,965	4,246	4,972	0.86	1.00	3	4,100	4,246	4,972	1.04	1.21	4	5,500	4,306	5,042	0.78	0.92	3	4,150	4,306	5,042	1.04	1.21
A14	PD	4	5,550	4,205	4,924	0.76	0.89	4	4,965	4,246	4,972	0.86	1.00	3	4,100	4,246	4,972	1.04	1.21	4	5,500	4,306	5,042	0.78	0.92	3	4,150	4,306	5,042	1.04	1.21
A15	PD	3	3,800	2,292	2,684	0.60	0.71	3	3,508	2,314	2,710	0.66	0.77	2	2,306	2,314	2,710	1.00	1.18	3	3,723	2,347	2,748	0.63	0.74	2	2,750	2,347	2,748	0.85	1.00

A16	PD	3	3,800	2,292	2,684	0.60	0.71	3	3,523	2,314	2,710	0.66	0.77	2	2,316	2,314	2,710	1.00	1.17	3	3,738	2,347	2,748	0.63	0.74	2	2,750	2,347	2,748	0.85	1.00
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Notes:
^A PD = Primary Distributor, LD = Local Distributor.
^B Road capacities for each road segment and number of lanes are different as each road segment may have a different road type and road width for each lane. Furthermore, curbside and non-curbside lanes have different road capacities. For example, a typical 3.5m PD road has the following capacities: (i) 1,200 pcu/hour for the curbside lane; and (ii) 1,300 pcu/hour for the non-curbside lane. Typical 3.5m LD road has the following capacities: (i) 1,025 pcu/hour for the curbside lane and (ii) 1,325 pcu/hour for the non-curbside lanes.
^C Traffic volumes are based on recent traffic count surveys for this study or the MUCPEP traffic model. Typically major roads such as EDSA are covered in the MUCPEP model, while minor side streets are based on traffic counts.