

**REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)**

**PREPARATORY SURVEY
FOR EXPRESSWAY PROJECTS
IN
MEGA MANILA REGION**

NAIA EXPRESSWAY PROJECT (Phase II)

**FINAL REPORT
MAIN TEXT**

NOVEMBER 2012

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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MITSUBISHI RESEARCH INSTITUTE, INC.
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NAIAX

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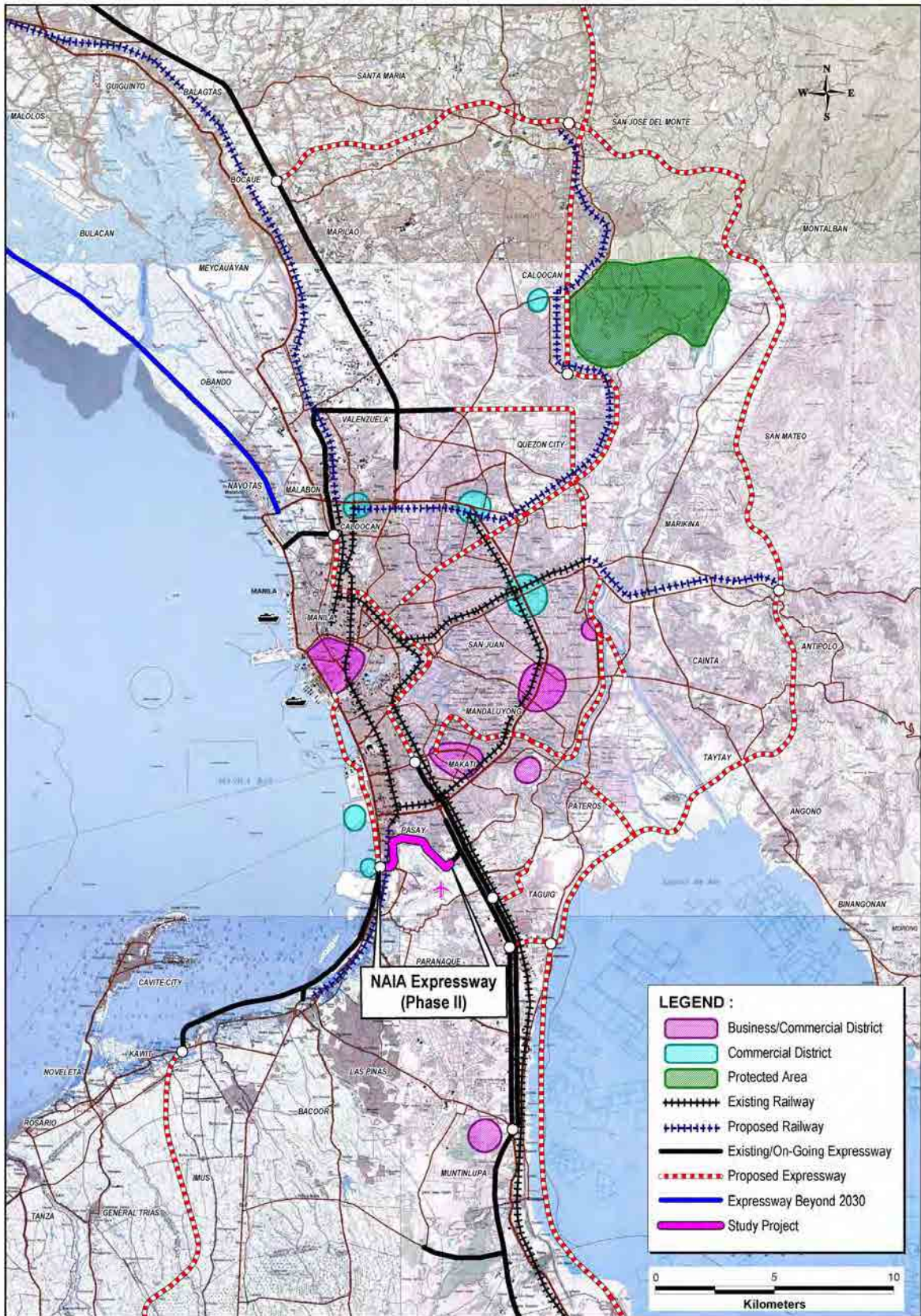
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LOCATION MAP OF THE STUDY AREA

TABLE OF CONTENTS

Executive Summary

1	BACKGROUND OF THE PROJECT.....	S-1
2	NECESSITY OF THE PROJECT	S-1
3	OBJECTIVE OF THE PROJECT	S-1
4	TECHNICAL ISSUES OF NAIAX.....	S-2
4.1	NAIA Navigational Clearance	S-2
4.2	West End Alternatives	S-4
4.3	Alternatives at Park ‘n Fly Building Area.....	S-6
4.4	Alternatives at Interface between NAIAX Phase-1 and Phase-2.....	S-6
4.5	Alignment at MMDA Monument.....	S-9
4.6	Ramp Layout Study	S-10
4.7	Toll Collection System.....	S-12
5	TRAFFIC DEMAND FORECAST	S-14
5.1	Existing Traffic Volume	S-14
5.2	Willingness to Pay to NAIAX.....	S-14
5.3	Toll Rate vs. Revenue	S-15
5.4	Traffic Assignment Result and Toll Revenue.....	S-16
6	SCOPE OF THE PROJECT	S-20
6.1	Outline of the Project.....	S-20
6.2	Design Standard.....	S-22
7	PROJECT COST (Confidential).....	S-23
8	ECONOMIC EVALUATION (Confidential).....	S-24
8.1	Assumption and Indicators of Economic Analysis (Confidential).....	S-24
8.2	Results of Economic Analysis (Confidential).....	S-25
8.3	Economical Project Sensitivity (Confidential)	S-25
9	PPP SCHEME.....	S-26
10	FINANCIAL EVALUATION	S-27
10.1	Parameters for Financial Analysis (Confidential).....	S-27
10.2	Project Implementation Schedule (Confidential).....	S-29
10.3	Results of Financial Analysis (Confidential)	S-30
11	ENVIRONMENTAL AND SOCIAL CONSIDERATION.....	S-32
11.1	Scoping Results of Environmental Impacts by NAIAX PHASE-2	S-32
11.2	Environmental Monitoring Plan.....	S-36
11.3	Resettlement Action Plan	S-37
11.4	Implementation Schedule.....	S-39
12	PROJECT EFFECT	S-39
13	SUPPLEMENTAL WORK.....	S-42
13.1	Grade Separation Alternative Study.....	S-42
13.2	Further NAIAX Alignment Alternative Study	S-44
13.3	C-5 Extension Alignment Alternatives	S-45
13.4	Alternative Analysis between NAIAX, Grade Separation and C-5 Extension	S-46
13.5	Recommendation	S-47

Main Report

CHAPTER 1	INTRODUCTION.....	1-1
1.1	BACKGROUND OF THE PROJECT.....	1-1
1.2	OBJECTIVES OF THE PROJECT.....	1-1
1.3	NECESSITY OF THE PROJECT.....	1-2
1.4	PROJECT RATIONAL.....	1-3
1.5	CURRENT ROAD INFRASTRUCTURE SECTOR AND ITS DEVELOPMENT PLAN RELATED TO THE PROJECT.....	1-7
1.6	PAST AND FUTURE PLAN OF OTHER DONOR'S PROJECT RELATED TO PPP POLICIES.....	1-8
1.7	RELATION BETWEEN OTHER JICA ODA LOAN PROJECTS AND OTHER DONOR PROJECTS.....	1-9
1.8	LESSON AND COUNTERMEASURE FROM THE SIMILAR PAST PROJECT.....	1-11
1.9	DPWH ORGANIZATION AND CURRENT O & M COMPANY.....	1-18
1.10	SOCIO-ECONOMIC CONDITION OF THE STUDY AREA.....	1-21
CHAPTER 2	OUTLINE OF 2010 FEASIBILITY STUDY.....	2-1
2.1	EXPRESSWAY CONFIGURATION.....	2-1
2.2	TECHNICAL ISSUES.....	2-4
CHAPTER 3	RECOMMENDED SOLUTIONS FOR TECHNICAL ISSUES.....	3-1
3.1	NAIA NAVIGATIONAL CLEARANCE.....	3-1
3.1.1	NAIA Navigational Clearance Requirements.....	3-1
3.1.2	Alternative River alignment and Domestic Road Alignment.....	3-7
3.1.3	Alternatives Along Domestic Road.....	3-9
3.2	WEST END ALTERNATIVES.....	3-19
3.2.1	LRT Line-1 Cavite Extension Plan.....	3-19
3.2.2	Alternatives.....	3-19
3.3	ALTERNATIVES AT PARK 'N FLY BUILDING AREA.....	3-33
3.3.1	Park 'n Fly Building.....	3-33
3.3.2	Expressway Alignment Alternatives.....	3-33
3.4	ALTERNATIVES AT INTERFACE BETWEEN PHASE-1 AND PHASE-2.....	3-36
3.4.1	NAIA Expressway Phase I.....	3-36
3.4.2	Phase I and Phase II Connection Alternatives.....	3-36
3.4.3	Evaluation of Alternatives.....	3-46
3.5	ALIGNMENT AT MMDA MONUMENT.....	3-48
3.5.1	Monument at Circulo del Mundo.....	3-48
3.5.2	Alternative Alignment at Monument Section.....	3-48
3.6	RAMP LAYOUT.....	3-54
3.6.1	2010 FS Ramp Layout.....	3-54
3.6.2	Estimated Ramp Traffic.....	3-60
3.7	DESIGN STANDARDS.....	3-63
3.7.1	Design Speed.....	3-63
3.7.2	Typical Cross Section.....	3-63
3.8	VERTICAL CLEARANCE FOR AT-GRADE ROADS AND EXPRESSWAY.....	3-67
3.8.1	Vertical Clearance Standards of Various Countries.....	3-67
3.8.2	Recommendation.....	3-67
3.9	NUMBER OF TRAFFIC LANES OF AT-GRADE ROADS.....	3-67
3.10	TOLL COLLECTION SYSTEM.....	3-75
3.10.1	Closed System (2010 FS).....	3-75
3.10.2	Open System.....	3-76
3.10.3	Comparison of Toll Collection System.....	3-78
3.11	PEDESTRIAN OVERPASS BRIDGES.....	3-79

3.12	ECONOMICAL SPAN LENGTH FOR THE STANDARD EXPRESSWAY SECTION	3-81
3.13	REGULATION OF OVER-LOADING	3-83
CHAPTER 4 TRAFFIC STUDY.....		
4.1	PRESENT TRAFFIC CONDITION.....	4-1
4.1.1	Traffic Count.....	4-1
4.1.2	Travel Time Survey.....	4-5
4.2	PREPARATION OF PRESENT OD MATRIX	4-10
4.3	FUTURE TRAFFIC DEMAND FORECAST.....	4-13
4.3.1	Future OD Estimation by High-standard Highway Study	4-13
4.3.2	Future OD Estimation of related NAIA Traffic	4-20
4.3.3	Future OD of Related NAIA Traffic	4-20
4.4	WILLINGNESS-TO-PAY (WTP) SURVEY.....	4-21
4.5	ESTIMATION OF TRAFFIC ON EXPRESSWAY.....	4-30
4.5.1	Traffic Assignment Model	4-30
4.5.2	Toll Rate vs. Revenue	4-33
4.5.3	Impact of other Road Projects.....	4-35
4.5.4	Road Network Assumptions	4-37
4.5.5	Traffic Assignment Result and Toll Revenue.....	4-37
CHAPTER 5 PROJECT SCOPE OF WORK.....		
5.1	MINIMUM EXPRESSWAY CONFIGURATION	5-1
5.1.1	Project Component of the Project	5-1
5.1.2	Minimum Expressway Configuration of Phase II.....	5-1
5.2	MINIMUM DESIGN STANDARDS	5-6
5.2.1	Geometric Design Standards.....	5-6
5.2.2	Minimum Design Standards for Structure	5-15
5.3	PRELIMINARY DESIGN OF PLAN AND PROFILE.....	5-18
5.3.1	Topographic Map Used	5-18
5.3.2	Horizontal Alignment Study	5-18
5.3.3	Vertical Alignment Study	5-27
5.3.4	Preliminary Design of Ramp Terminal.	5-32
5.3.5	Preliminary Design of At-Grade Roads	5-43
5.4	STRUCTURE TYPE STUDY.....	5-49
5.4.1	General.....	5-49
5.4.2	Bridge Type at Individual Section.....	5-50
5.5	PRELIMINARY DESIGN OF PAVEMENT STRUCTURE.....	5-70
5.6	PRELIMINARY DESIGN OF DRAINAGE.....	5-70
5.7	TOLL BARRIER AND TOLL BOOTH.....	5-70
5.7.1	Toll Booth Layout	5-70
5.7.2	Toll Barrier Layout.....	5-71
5.8	ROW REQUIREMENT BASED ON PRELIMINARY DESIGN	5-72
5.9	RISKS.....	5-83
CHAPTER 6 PROJECT COST ESTIMATE.....		
(Confidential)		
CHAPTER 7 ENVIRONMENT AND SOCIAL CONSIDERATION		
7.1	LEGAL/POLICY FRAMEWORK	7-1
7.1.1	Philippines Legal/Policy Framework.....	7-1
7.1.2	JICA Guidelines and Philippine Social and Environmental Consideration	7-6
7.1.3	Institutional Arrangements.....	7-43
7.1.4	Study Methodology (Procedure).....	7-49
7.2	STUDY AREA.....	7-57

7.2.1	Environmental Study Area	7-57
7.2.2	The Project Affected Areas	7-60
7.2.3	Project Rationale.....	7-66
7.2.4	State of Natural Environment	7-68
7.2.5	Socio-Economic Conditions	7-72
7.2.6	Environmental Quality.....	7-95
7.3	ENVIRONMENTAL IMPACTS.....	7-99
7.3.1	Study Methodology (Procedure).....	7-99
7.3.2	Scoping Results.....	7-102
7.3.3	Prediction and Assessment of Impacts.....	7-108
7.3.4	Assessment of Alternatives (In-Terms of Impacts)	7-120
7.3.5	Mitigation Measures	7-123
7.3.6	Environmental Management Plan.....	7-130
7.3.7	Environmental Monitoring Plan	7-136
7.4	RESETTLEMENT ACTION PLAN.....	7-138
7.4.1	NAIAX Project Resettlement Policy	7-138
7.4.2	Inventory of Loss	7-138
7.4.3	Resettlement Measure.....	7-142
7.4.4	Relocation Plan	7-144
7.4.5	Phasing of Relocation	7-152
7.4.6	Restoration of PAPs to their Pre-Project Socio-Economic Condition	7-153
7.4.7	Grievance Redress Mechanism.....	7-154
7.4.8	Implementation Arrangements.....	7-154
7.4.9	Implementation Schedule.....	7-155
7.4.10	Financial Arrangements (Confidential).....	7-156
7.4.11	Monitoring and Evaluation	7-157
7.5	ECC STATUS	7-159
CHAPTER 8 ECONOMIC EVALUATION.....		8-1
(Confidential)		
CHAPTER 9 FINANCIAL ANALYSIS.....		9-1
(Confidential)		
CHAPTER 10 PROJECT EFFECTS.....		10-1
10.1	INTRODUCTION	10-1
10.2	QUANTIFIABLE EFFECTS.....	10-1
10.3	UNQUANTIFIABLE EFFECTS.....	10-5
CHAPTER 11 PREPARATION OF BID DOCUMENTS.....		11-1
11.1	RELATED LAWS AND REGULATIONS	11-1
11.2	TECHNICAL RISKS OF THE PROJECT	11-3
11.3	BRIEF HISTORY OF BID DOCUMENTS PREPARATION	11-4
11.4	COMPOSITION OF BID DOCUMENTS.....	11-5
11.5	MAJOR DIFFERENCES BETWEEN ORIGINAL AND PRESENT PROVISIONS	11-5
11.6	TIME FRAME FOR BIDDING.....	11-5
11.7	DRAFT BID EVALUATION CRITERIA	11-14
11.7.1	Introduction.....	11-14
11.7.2	Pre-Qualification Criteria.....	11-16
11.7.3	Qualification Documents	11-20
11.7.4	Opening and Evaluation of Qualification Documents: Days 1-10.....	11-22
11.7.5	Documents Comprising the Bid	11-26
11.7.6	Opening and Evaluation of Bids	11-29
11.7.7	Post-Qualification of Bidder with the Lowest Complying Bid (LCB): Days 13-14... ..	11-35

11.8	NEDA ICC EVALUATION	11-35
CHAPTER 12	SUPPLEMENTAL WORK.....	12-1
12.1	GRADE SEPARATION ALTERNATIVE STUDY	12-1
12.2	FURTHER NAIAX ALIGNMENT ALTERNATIVE STUDY	12-3
12.3	C-5 EXTENSION ALIGNMENT ALTERNATIVES	12-4
12.4	ALTERNATIVE ANALYSIS BETWEEN NAIAX, GRADE SEPARATION AND C-5 EXTENSION	12-5
12.5	RECOMMENDATION	12-6
CHAPTER 13	DPWH'S CURRENT PLAN OF NAIAX	13-1
13.1	PRESENT STATUS OF NAIAX	13-1
13.2	PRESENT SCHEME OF NAIAX	13-1

List of Figure

Executive Summary

FIGURE 4-1	TECHNICAL ISSUES OF NAIAX PHASE-2	S-2
FIGURE 4.1-1	RECOMMENDED PLAN FOR NAIA NAVIGATION CLEARANCE	S-4
FIGURE 4.4-1	NAIAX PHASE-1 AND PHASE-2 CONNECTION ALTERNATIVES	S-7
FIGURE 4.6-1	SCHEMATIC NAIAX RAMP LAYOUT	S-11
FIGURE 4.6-2	TRAFFIC PROJECTION ON REVISED RAMP LAYOUT	S-11
FIGURE 4.7-1	ALTERNATIVE OF TOLL COLLECTION SYSTEM.....	S-13
FIGURE 5.1-1	TRAFFIC VOLUME OF ROADS SURROUNDING NAIA AIRPORT	S-14
FIGURE 5.1-2	AMOUNTS OF TOLL MOTORISTS WILLING TO PAY TO USE ENTIRE EXPRESSWAY FOR THEIR OTHER TRIPS	S-15
FIGURE 5.3-1	TOLL RATE VS. REVENUE	S-15
FIGURE 5.4-1	NAIAX TRAFFIC PROJECTION (YEAR 2015, 30 PESO CASE).....	S-16
FIGURE 5.4-2	NAIAX TRAFFIC PROJECTION (YEAR 2020, 30 PESO CASE).....	S-17
FIGURE 5.4-3	NAIAX TRAFFIC PROJECTION (YEAR 2030, 30 PESO CASE).....	S-17
FIGURE 5.4-4	NAIAX TRAFFIC PROJECTION (YEAR 2015, 40 PESO CASE).....	S-18
FIGURE 5.4-5	NAIAX TRAFFIC PROJECTION (YEAR 2020, 40 PESO CASE).....	S-18
FIGURE 5.4-6	NAIAX TRAFFIC PROJECTION (YEAR 2030, 40 PESO CASE).....	S-19
FIGURE 6.1-1	MINIMUM EXPRESSWAY CONFIGURATION	S-21
FIGURE 6.1-2	HEIGHT LIMIT ALONG ANDREWS AVE. AND DOMESTIC ROAD AND AVAILABLE NET HEIGHT	S-22
FIGURE 6.2-1	TYPICAL CROSS SECTION OF NAIAX PHASE-2	S-23
FIGURE 9-1	PPP MODALITY (BTO WITH GOVERNMENT FINANCIAL SUPPORT).....	S-27
FIGURE 10.2-1	IMPLEMENTATION SCHEDULE (Confidential)	S-29
FIGURE 11.3-1	LOCATION OF LOTS WITH PROCLAIMED FOR USE AS RELOCATION SITE	S-38
FIGURE 11.4-1	RESETTLEMENT SCHEDULE	S-39
FIGURE 12.1-1	COMPARISON OF TRAVEL TIME AND AVERAGE TRAVEL SPEED BETWEEN ORDINARY ROAD AND EXPRESSWAY	S-40
FIGURE 12.1-2	SAVINGS IN VEHICLE TRAVEL HOUR/DAY (WITH – WITHOUT PROJECT)	S-40
FIGURE 13.1-1	LOCATION OF CRUCIAL INTERSECTION ALONG NAIAX PHASE-2	S-42
FIGURE 13.1-2	SCHEMATIC DESIGN OF GRADE SEPARATION (Confidential).....	S-43
FIGURE 13.3-1	C-5 EXTENSION ALIGNMENT ALTERNATIVES	S-45

Main Report

FIGURE 1.4-1	PROPOSED HSH NETWORK	1-6
FIGURE 1.7-1	LOCATION MAP OF LRT-1 EXTENSION	1-10
FIGURE 1.9-1	ORGANIZATION CHART OF DPWH.....	1-19
FIGURE 1.10-1	GDP AND GRDP GROWTH RATE	1-26
FIGURE 2.1-1	EXPRESSWAY CONFIGURATION PROPOSED BY THE 2010 FS.....	2-2
FIGURE 2.1-2	SCHEMATIC RAMP LAYOUT.....	2-3
FIGURE 2.2-1	LOCATION AREA OF TECHNICAL ISSUES	2-4
FIGURE 3.1.1-1 (1)	NAIA NAVIGATIONAL CLEARANCE.....	3-2
FIGURE 3.1.1-1 (2)	LONGITUDINAL AND TRANSVERSE SECTION	3-3
FIGURE 3.1.1-2	HEIGHT LIMIT ALONG ANDREWS AVE. AND DOMESTIC ROAD AND AVAILABLE NET HEIGHT	3-4
FIGURE 3.1.1-3	CONTROLS FOR VERTICAL ALIGNMENT PLANNING AND EXPRESSWAY	3-5
FIGURE 3.1.1-4	LAND DEVELOPMENT CONDITION.....	3-6
FIGURE 3.1.3-1 (A)	ALTERNATIVE-1 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)	3-10
FIGURE 3.1.3-1 (B)	ALTERNATIVE-1 AT NAIA NAVIGATIONAL CLEARANCE (CROSS SECTION)	3-11
FIGURE 3.1.3-2 (A)	ALTERNATIVE-2 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)	3-12
FIGURE 3.1.3-2 (B)	ALTERNATIVE-2 AT NAIA NAVIGATIONAL CLEARANCE (CROSS SECTION)	3-13
FIGURE 3.1.3-3 (A)	ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)	3-14
FIGURE 3.1.3-3 (B)	ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE (CROSS SECTION)	3-15
FIGURE 3.1.3-4 (A)	ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)	3-17
FIGURE 3.1.3-4 (B)	ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE 6-LANE AT-GRADE (CROSS SECTION)	3-18
FIGURE 3.2.1-1	LRT LINE-1 CAVITE EXTENSION AND LAND OWNERSHIP.....	3-20
FIGURE 3.2.1-2 (1)	LRT LINE-1 CAVITE EXTENSION LINE MIA STATION OVER NAIA (MIA) ROAD EAST EXTENSION.....	3-21
FIGURE 3.2.1-2 (2)	HORIZONTAL LOCATION OF MIA STATION	3-22
FIGURE 3.2.2-1	VERTICAL CLEARANCE OF CONTROL OF ALTERNATIVE-1	3-23
FIGURE 3.2.2-2 (1)	ALTERNATIVE-1 (A) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PLAN)	3-24
FIGURE 3.2.2-2 (2)	ALTERNATIVE-1 (A) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE)	3-25
FIGURE 3.2.2-2 (3)	ALTERNATIVE-1 (A) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE)	3-26
FIGURE 3.2.2-3 (1)	ALTERNATIVE-1 (B) INTERCHANGE PLAN END AT MACAPAGAL BLVD PLAN	3-27
FIGURE 3.2.2-3 (2)	ALTERNATIVE-1 (B) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE).....	3-28
FIGURE 3.2.2-3 (3)	ALTERNATIVE-1(B) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE).....	3-29

FIGURE 3.2.2-4 (1) ALTERNATIVE-2 INTERCHANGE PLAN END AT ROXAS BLVD (PLAN).....	3-30
FIGURE 3.2.2-4 (2) ALTERNATIVE-2 INTERCHANGE PLAN END AT ROXAS BLVD (PROFILE).....	3-31
FIGURE 3.3.2-1 ALTERNATIVE-1 MAIN ALIGNMENT TO AFFECT THE PARK ‘N FLY BUILDING	3-34
FIGURE 3.3.2-2 ALTERNATIVE-2 MAIN ALIGNMENT TO AVOID THE PARK N’ FLY BUILDING	3-35
FIGURE 3.4.1-1 CURRENT CONDITION AT PHASE I AND PHASE II CONNECTION.....	3-37
FIGURE 3.4.1-2 PROFILE OF EXISTING MAP	3-38
FIGURE 3.4.2-1 PHASE I AND PHASE II CONNECTION ALTERNATIVES	3-39
FIGURE 3.4.2-2 ALTERNATIVE-2(A) ON-RAMP FROM TERMINAL 3.....	3-40
FIGURE 3.4.2-3 ALTERNATIVE-2 (B) AVOID AIRFORCE HEADQUARTER.....	3-41
FIGURE 3.4.2-4 (1) ALTERNATIVE-2 (B) AVOID AIRFORCE HEAD QUARTER (PROFILE MAIN ALIGNMENT).....	3-42
FIGURE 3.4.2-4 (2) ALTERNATIVE-2 (B) AVOID AIRFORCE HEAD QUARTER (PROFILE RAMP).....	3-43
FIGURE 3.4.2-5 ALTERNATIVE-3 USE OF EXISTING ON-RAMP	3-44
FIGURE 3.4.2-6 ALTERNATIVE-3 USE OF EXISTING ON-RAMP (TYPICAL CROSS SECTION).....	3-45
FIGURE 3.5.1-1 MONUMENT AT CIRCULO DEL MUNDO	3-49
FIGURE 3.5.2-1 ALTERNATIVE-1: TWO-DIRECTION COMBINED EXPRESSWAY	3-50
FIGURE 3.5.2-2 ALTERNATIVE-2: EXPRESSWAY SPLITED BY DIRECTION.....	3-51
FIGURE 3.5.2-3 IMAGE OF ALTERNATIVE-1	3-53
FIGURE 3.6.1-1 SCHEMATIC NAIAX RAMP LAYOUT (2010 FS).....	3-55
FIGURE 3.6.1-2 ISSUE OF OFF RAMP TO NAIA TERMINAL 1 AND 2 (2010 FS).....	3-56
FIGURE 3.6.1-3 SCHEMATIC DRAWING AT 3RD LEVEL OFF-RAMP AND THE INTERSECTION.....	3-57
FIGURE 3.6.1-4 ALTERNATIIVE -2 RAMP LAYOUT (ALIGNMENT TO AVOID THE PARK ‘N FLY	3-58
FIGURE 3.6.1-5 ISSUE OF OFF RAMP TO NAIA TERMINAL 3 (2010 FS)	3-59
FIGURE 3.6.2-1 TRAFFIC PROJECTION (2010 FS RAMP LAYOUT).....	3-61
FIGURE 3.6.2-2 TRAFFIC PROJECTION (WITHOUT AURORA ON-RAMP AND OFF-RAMP NEAR PARK ‘N FLY BLDG.....	3-62
FIGURE 3.7.1-1 HORIZONTAL RADIUS ADOPTED BY PHASE-1 AND 2010 FS.....	3-64
FIGURE 3.7.2-1 NAIA EXPRESSWAY PHASE II – TYPICAL CROSS SECTION.....	3-66
FIGURE 3.9-1 NUMBER OF TRAFFIC LANES AT-GRADE ROADS	3-68
FIGURE 3.9-2 (1) CROSS SECTION OF SALES STREET	3-69
FIGURE 3.9-2 (2) CROSS SECTION OF ANDREWS AVENUE-2 (TERMINAL 3)	3-70
FIGURE 3.9-2 (3) CROSS SECTION OF ANDREWS AVENUE-1	3-71
FIGURE 3.9-2 (4) CROSS SECTION OF DOMESTIC ROAD-1	3-72
FIGURE 3.9-2 (5) CROSS SECTION OF DOMESTIC ROAD-2.....	3-73
FIGURE 3.9-2 (6) CROSS SECTION OF NAIA ROAD.....	3-74
FIGURE 3.10.1-1 CLOSED SYSTEM PROPOSED BY 2010 FS	3-75
FIGURE 3.10.2-1 OPEN SYSTEM TYPE-2.....	3-76

FIGURE 3.10.2-2	OPEN SYSTEM TYPE-3	3-76
FIGURE 3.10.2-3	OPEN SYSTEM TYPE-4A	3-77
FIGURE 3.10.2-4	OPEN SYSTEM TYPE-4B	3-77
FIGURE 3.11-1	LOCATION MAP OF PEDESTRIAN OVERPASS BRIDGE.....	3-79
FIGURE 3.13-1	ONE EXAMPLE OF OVER-LOADING REGULATION AT TOLL BARRIERS (MEX IN JAPAN)	3-84
FIGURE 3.13-2	ONE EXAMPLE OF WIM AND IMAGES RECORDED BY WIN SYSTEM (MEX IN JAPAN).....	3-85
FIGURE 4.1.1-1	TRAFFIC VOLUME OF ROADS SURROUNDING NAIA AIRPORT	4-1
FIGURE 4.1.1-2	ROXAS -NAIA INTERSECTION	4-2
FIGURE 4.1.1-3	NAIA-DOMESTIC INTERSECTION	4-2
FIGURE 4.1.1-4	NAIA-NINOY AQUINO AVE.	4-2
FIGURE 4.1.1-5	SALES ROAD-WEST SERVICE ROAD INTERSECTION.....	4-2
FIGURE 4.1.1-6	HOURLY VARIATION OF TRAFFIC AT AIRPORT TERMINALS	4-3
FIGURE 4.1.1-7	HOURLY VARIATION OF TRAFFIC AT AIRPORT TERMINALS	4-3
FIGURE 4.1.1-8	HOURLY VARIATION OF TRAFFIC AT	4-3
FIGURE 4.1.1-9	HOURLY VARIATION OF TRAFFIC AT SALES ROAD.....	4-3
FIGURE 4.1.1-10	HOURLY VARIATION OF TRAFFIC AT ANDREW’S AVENUE (NEAR AURORA ROAD).....	4-3
FIGURE 4.1.1-11	HOURLY VARIATION OF TRAFFIC AT ANDREW’S AVENUE (NEAR AURORA ROAD).....	4-3
FIGURE 4.1.1-12	HOURLY VARIATION OF TRAFFIC AT ANDREW’S AVENUE (NEAR DOMESTIC ROAD).....	4-4
FIGURE 4.1.1-13	HOURLY VARIATION OF TRAFFIC AT ANDREW’S AVENUE (NEAR DOMESTIC ROAD).....	4-4
FIGURE 4.1.1-14	HOURLY VARIATION OF TRAFFIC AT NAIA ROAD	4-4
FIGURE 4.1.1-15	HOURLY VARIATION OF TRAFFIC AT NAIA ROAD	4-4
FIGURE 4.1.1-16	TRAFFIC COMPOSITION AT NAIA TERMINALS’ MAIN GATES.....	4-5
FIGURE 4.1.1-17	TRAFFIC COMPOSITION AT ROADS WHERE THE FUTURE NAIA EXPRESSWAY RUNS OVER	4-5
FIGURE 4.1.2-1	TRAVEL SPEED FROM ROXAS BOULEVARD TO SLEX	4-6
FIGURE 4.1.2-2	TRAVEL TIME FROM ROXAS BLVD. TO SLEX	4-7
FIGURE 4.1.2-3	TRAVEL TIME FROM SLEX TO ON-RAMP AND OFF-RAMP.....	4-7
FIGURE 4.1.2-4	TRAVEL SPEED FROM ROXAS BLVD. TO SLEX.....	4-8
FIGURE 4.1.2-5	TRAVEL SPEED FROM SLEX TO ON-RAMP AND OFF-RAMP	4-8
FIGURE 4.1.2-6	ROAD NETWORK OF NAIA AIPORT	4-9
FIGURE 4.2-1	PROCESS OF PREPARATION OF PRESENT OD MATRIX	4-10
FIGURE 4.2-2	PROCEDURE FOR PREPARATION OF PRESENT AND FUTURE TRAFFIC.....	4-11
FIGURE 4.2-3	COMPARISON OF OBSERVED AND ASSIGNED TRAFFIC VOLUME (VEH/DAY).....	4-12
FIGURE 4.3.1-1	FUTURE OD MATRIX ESTIMATION PROCEDURE	4-13
FIGURE 4.3.1-2	VERIFICATION OF TRIP GENERATION AND ATTRACTION MODEL (PASSENGER TRIPS).....	4-15

FIGURE 4.3.1-3	VERIFICATION OF TRIP GENERATION AND ATTRACTION MODEL (CARGO MOVEMENT).....	4-16
FIGURE 4.3.1-4	STRUCTURE OF MODAL SPLIT MODEL.....	4-17
FIGURE 4.3.1-5	MODAL SHARES OF JEEPNEY TRIPS TO TOTAL PUBLIC TRANSPORT TRIPS	4-18
FIGURE 4.3.1-6	MODAL SHARE IN 2009, 2020 AND 2030	4-19
FIGURE 4.3.1-7	MODAL SHARES BY ZONE.....	4-19
FIGURE 4.4-1	NAIAX WILLINGNESS TO PAY SURVEY QUESTIONNAIRE.....	4-22
FIGURE 4.4-2	CAR OWNERSHIP DISTRIBUTION	4-24
FIGURE 4.4-3	OCCUPATION OF RESPONDENTS	4-24
FIGURE 4.4-4	MONTHLY INCOME	4-25
FIGURE 4.4-5	ORIGIN OF RESPONDENTS	4-25
FIGURE 4.4-6	TRAVEL TIME TO NAIA.....	4-26
FIGURE 4.4-7	TRAVEL TIME TO NAIA BY ORIGIN	4-26
FIGURE 4.4-8	ACCESS ROAD USED TO AIRPORT	4-26
FIGURE 4.4-9	PERCENTAGE OF WILLING AND NOT WILLING TO PAY	4-27
FIGURE 4.4-10	AMOUNT OF TOLL FEE MOTORIST WILLING TO PAY UNTIL NAIA.....	4-27
FIGURE 4.4-11	AMOUNT OF TOLL FEE MOTORIST WILLING TO PAY UNTIL NAIA PER TERMINAL.....	4-27
FIGURE 4.4-12	PERCENTAGE OF WILLING AND NOT WILLING TO PAY	4-28
FIGURE 4.4-13	AMOUNTS OF TOLL MOTORISTS WILLING TO PAY TO USE ENTIRE EXPRESSWAY FOR THEIR OTHER TRIPS.....	4-28
FIGURE 4.4-14	AVERAGE FEES WILLING TO PAY PER INCOME GROUP	4-29
FIGURE 4.4-15	DISTRIBUTION OF TOLL FEE PREFERENCE PER INCOME GROUP	4-30
FIGURE 4.5.1-1	TRAFFIC ASSIGNMENT PROCEDURE.....	4-31
FIGURE 4.5.1-2	SPEED – FLOW RELATIONSHIP	4-31
FIGURE 4.5.2-1	NAIAX CONVERSION RATE COMPARISON OF ASSIGNMENT AND WTP SURVEY.....	4-33
FIGURE 4.5.2-2	TOLL RATE VS. REVENUE (2015)	4-34
FIGURE 4.5.3-1	LOCATION MAP OF OTHER ROAD PROJECTS	4-36
FIGURE 4.5.5-1	TRAFFIC PROJECTION (30 PESO CASE) (YEAR 2015)	4-39
FIGURE 4.5.5-2	TRAFFIC PROJECTION (30 PESO CASE) (YEAR 2020)	4-40
FIGURE 4.5.5-3	TRAFFIC PROJECTION (30 PESO CASE) (YEAR 2030)	4-41
FIGURE 4.5.5-4	TRAFFIC PROJECTION (40 PESO CASE) (YEAR 2015)	4-43
FIGURE 4.5.5-5	TRAFFIC PROJECTION (40 PESO CASE) (YEAR 2020)	4-44
FIGURE 4.5.5-6	TRAFFIC PROJECTION (40 PESO CASE) (YEAR 2030)	4-45
FIGURE 5.1.2-1	MINIMU EXPRESSWAY CONFIGURATION	5-2
FIGURE 5.1.2-2	NUMBER OF TRAFFIC LANES AT-GRADE ROADS	5-3
FIGURE 5.1.2-3	HEIGHT LIMIT ALONG ANDREWS AVE. AND DOMESTIC ROAD AND AVAILABLE NET HEIGHT	5-5
FIGURE 5.2.1-1	TYPICAL CROSS SECTION	5-9
FIGURE 5.3.2-1	Sta.0+000 TO Sta.0+700.....	5-19
FIGURE 5.3.2-2	CROSS SECTION AT EXISTING OFF RAMP SECTION.....	5-19
FIGURE 5.3.2-3	Sta.0+700 TO Sta.1+500.....	5-20

FIGURE 5.3.2-4	Sta.1+500 TO Sta.2+000 (MMDA LANDMARK)	5-21
FIGURE 5.3.2-5	LANDMARK AT CIRCULO DEL MUNDO.....	5-22
FIGURE 5.3.2-6	PERSPECTIVE VIEW OF LANDMARK AND RECOMMENDED EXPRESSWAY ALIGNMENT	5-22
FIGURE 5.3.2-7	ELECTRICAL SUB-STATION FOR MIAA	5-23
FIGURE 5.3.2-8	Sta.2+000 TO Sta.2+800.....	5-23
FIGURE 5.3.2-9	Sta.2+800 to Sta.3+300 (LRT DEPOT)	5-24
FIGURE 5.3.2-10	Sta.3+300 TO Sta.3+950 (DOMESTIC ROAD)	5-25
FIGURE 5.3.2-11	Sta.3+950 TO Sta.4+500 (PARK 'N FLY AND PARANAQUE RIVER)	5-26
FIGURE 5.3.2-12	Sta.4+500 to Sta.4+913 (NAIA ROAD TO ROXAS BLVD).....	5-26
FIGURE 5.3.2-13	CROSS SECTION OF NAIA ROAD	5-27
FIGURE 5.3.3-1	VERTICAL HEIGHT REQUIREMENT.....	5-28
FIGURE 5.3.3-2	NAVIGATIONAL CLEARANCE VERIFIED POINTS	5-30
FIGURE 5.3.3-3	TYPE OF BRIDGE FOR MAIN ALIGNMENT.....	5-31
FIGURE 5.3.4-1	SCHEMATIC NAIAX RAMP LAYOUT.....	5-32
FIGURE 5.3.4-2	RAMP TERMINAL SPEED CHANGE LANE DESIGN.....	5-33
FIGURE 5.3.4-3	ANDREWS AVENUE ON RAMP (1).....	5-34
FIGURE 5.3.4-4	ANDREWS AVENUE ON RAMP (2).....	5-35
FIGURE 5.3.4-5	ANDREWS AVENUE OFF RAMP	5-37
FIGURE 5.3.4-6	ANDREWS AVENUE OFF RAMP LANE LAYOUT	5-36
FIGURE 5.3.4-7	DOMESTIC ROAD OFF RAMP (1) AND (2).....	5-38
FIGURE 5.3.4-8	NAIA ROAD OFF RAMP (1) AND (2) (CONTINUE)	5-38
FIGURE 5.3.4-9	NAIA ROAD ON RAMP	5-39
FIGURE 5.3.4-10	RAMP LAYOUT AT END OF EXPRESSWAY.....	5-39
FIGURE 5.3.4-11	HORIZONTAL CONTROL POINTS OF A AND B RAMP.....	5-40
FIGURE 5.3.4-12	HORIZONTAL CONTROL POINTS OF C AND D RAMP	5-41
FIGURE 5.3.4-13	RAMP TERMINAL CROSS SECTIONAL CONFIGURATION	5-42
FIGURE 5.3.5-1	AT-GRADE ROAD PLAN (ANDREWS AVENUE)	5-44
FIGURE 5.3.5-2	AT-GRADE ROAD PLAN (ANDREWS AVENUE NEAR MMDA LANDMARK).....	5-45
FIGURE 5.3.5-3	AT-GRADE ROAD PLAN (DOMESTIC ROAD).....	5-46
FIGURE 5.3.5-4	AT-GRADE ROAD PLAN (ROXAS BOULEVARD-1).....	5-47
FIGURE 5.3.5-4	AT-GRADE ROAD PLAN (ROXAS BOULEVARD-2).....	5-48
FIGURE 5.4.2-1	INDEX MAP FOR BRIDGE TYPE.....	5-51
FIGURE 5.4.2-2 (1/12)	CROSS SECTION	5-53
FIGURE 5.4.2-2 (2/12)	CROSS SECTION	5-54
FIGURE 5.4.2-2 (3/12)	CROSS SECTION	5-55
FIGURE 5.4.2-2 (4/12)	CROSS SECTION	5-56
FIGURE 5.4.2-2 (5/12)	CROSS SECTION	5-57
FIGURE 5.4.2-2 (6/12)	CROSS SECTION	5-58
FIGURE 5.4.2-2 (7/12)	CROSS SECTION	5-59
FIGURE 5.4.2-2 (8/12)	CROSS SECTION	5-60
FIGURE 5.4.2-2 (9/12)	CROSS SECTION	5-61

FIGURE 5.4.2-2 (10/12) CROSS SECTION	5-62
FIGURE 5.4.2-2 (11/12) CROSS SECTION.....	5-63
FIGURE 5.4.2-2 (12/12) CROSS SECTION	5-64
FIGURE 5.4.2-3 (1/4) RAMP CROSS SECTION	5-66
FIGURE 5.4.2-3 (2/4) RAMP CROSS SECTION	5-67
FIGURE 5.4.2-3 (3/4) RAMP CROSS SECTION	5-68
FIGURE 5.4.2-3 (4/4) RAMP CROSS SECTION	5-69
FIGURE 5.7.1-1 LAYOUT OF TOLL BOOTH (PHASE I)	5-71
FIGURE 5.7.1-2 LAYOUT OF TOLL BOOTH (TOLL BARRIER).....	5-71
FIGURE 5.7.2-1 LAYOUT OF TOLL BARRIER	5-72
FIGURE 5.8-1 (1/10) ROW REQUIREMENT	5-73
FIGURE 5.8-1 (2/10) ROW REQUIREMENT	5-74
FIGURE 5.8-1 (3/10) ROW REQUIREMENT	5-75
FIGURE 5.8-1 (4/10) ROW REQUIREMENT	5-76
FIGURE 5.8-1 (5/10) ROW REQUIREMENT	5-77
FIGURE 5.8-1 (6/10) ROW REQUIREMENT	5-78
FIGURE 5.8-1 (7/10) ROW REQUIREMENT	5-79
FIGURE 5.8-1 (8/10) ROW REQUIREMENT	5-80
FIGURE 5.8-1 (9/10) ROW REQUIREMENT	5-81
FIGURE 5.8-1 (10/10) ROW REQUIREMENT	5-82
FIGURE 7.1.3-1 ORGANIZATION CHART OF DENR	7-44
FIGURE 7.1.4-1 EIA PROCEDURE OF DENR/BEM.....	7-51
FIGURE 7.2.1-1 PROJECT LOCATION MAP	7-58
FIGURE 7.2.1-2 PRIMARY IMPACT AREA	7-59
FIGURE 7.2.1-3 SECONDARY IMPACT AREA	7-60
FIGURE 7.2.2-1 PARCELLARY MAP INDICATING LAND OWNERSHIP	7-61
FIGURE 7.2.2-2 LAND USE MAP OF THE PROJECT AREA	7-62
FIGURE 7.2.2-3 AFFECTED AREAS ALONG SALES STREET.....	7-63
FIGURE 7.2.2-4 AFFECTED AREAS ALONG ANDREWS AVENUE FRONTING NAIA III....	7-64
FIGURE 7.2.2-5 AFFECTED AREAS ALONG ANDREWS AVENUE AT BARANGAY 185....	7-64
FIGURE 7.2.2-6 AFFECTED AREAS ALONG ANDREWS AVENUE AND DOMESTIC ROAD INTERSECTION.....	7-65
FIGURE 7.2.2-7 AFFECTED AREAS ALONG DOMESTIC ROAD AND BARANGAY 191....	7-65
FIGURE 7.2.2-8 AFFECTED AREAS ALONG NAIA ROAD AND CAVITE COASTAL ROAD	7-66
FIGURE 7.2.3-1 DAILY TRAFFIC VOLUME AND AVERAGE SPEED AT MIAA COMPLEX	7-67
FIGURE 7.2.4-1 RIVER SYSTEM OF THE CATCHMENT.....	7-69
FIGURE 7.2.4-2 FLOOD DISCHARGE LOCATION MAP.....	7-69
FIGURE 7.2.4-3 TOPOGRAPHIC MAP OF THE REGION	7-70
FIGURE 7.2.4-4 GEOLOGICAL MAP OF THE REGION.....	7-71
FIGURE 7.2.5-1 PASAY CITY PARK STRIP PLAN.....	7-82
FIGURE 7.2.5-2 LAND-OWNERSHIP MAP OF THE PROJECT AREA	7-83

FIGURE 7.2.6-1	MONITORING LOCATION OF AIR AND NOISE LEVEL (SURVEYED IN 2011).....	7-96
FIGURE 7.4.4-1	LOCATION MAP OF VARIOUS PROCLAMATIONS COVERED TCT 6735	7-147
FIGURE 7.4.4-2	ABANDONED FORMER BUREAU OF LAND TRANSPORTATION BUILDING WHICH IS NOW USED AS THE PNP AVIATION SECURITY GROUP K-9 OFFICE. THE COMPOUND CAN SERVE AS A RELOCATION SITE FOR THE INFORMAL SETTLER PAPS WHOSE COLONY IS ADJACENT TO THE STRUCTURE.....	7-150
FIGURE 7.4.4-3	OPEN SPACE AT THE NORTHWEST CORNER OF THE FORMER CALIFORNIA BUS LINE COMPOUND THAT MAY BE USED AS RELOCATION SITE FOR THE NAIAX DISPLACED HOUSEHOLDS SUCH AS THOSE FROM BARANGAY 191 AND TAMBO	7-150
FIGURE 7.4.4-4	EMPTY LOT BEHIND THE PETRON GAS STATION ALONG AIRPORT ROAD AND ADJACENT TO BARANGAY 191 WHICH CAN SERVE AS A RELOCATION SITE FOR NAIAX PAPS	7-151
FIGURE 7.4.9-1	RESETTLEMENT SCHEDULE	7-156
FIGURE 10.2-1	LOCATION OF COMPARED SECTIONS.....	10-1
FIGURE 10.2-2	TRAVEL TIME FROM ROXAS BLVD. TO SLEX (ROUTE 1)	10-2
FIGURE 10.2-3	TRAVEL TIME FROM SLEX TO TERMINAL 1 AND 2 (ROUTE 2).....	10-2
FIGURE 10.2-4	COMPARISON OF AVERAGE TRAVEL TIME BETWEEN ORDINARY ROAD AND EXPRESSWAY	10-3
FIGURE 10.2-5	COMPARISON OF AVERAGE TRAVEL SPEED BETWEEN ORDINARY ROAD AND EXPRESSWAY	10-3
FIGURE 10.2-6	SAVINGS IN VEHICLE TRAVEL HOUR/DAY (WITH PROJECT – WITHOUT PROJECT)	10-4
FIGURE 10.2-7	PEAK HOUR TRAVEL TIME IN 2015 (ROXAS TO SLEX).....	10-5
FIGURE 11.7.1-1	PRE-QUALIFICATION AND BID EVALUATION PROCESS.....	11-15
FIGURE 12.1-1	LOCATION OF CRUCIAL INTERSECTION ALONG NAIAX PHASE-2	12-1
FIGURE 12.1-2	SCHEMATIC DESIGN OF GRADE SEPARATION (Confidential).....	12-2
FIGURE 12.3-1	C-5 EXTENSION ALIGNMENT ALTERNATIVES	12-4
FIGURE 13.2-1	REVISED NAIAX CONFIGURATION	13-2

List of Table

Executive Summary

TABLE 4.1-1	ALTERNATIVES FOR NAVIGATION CLEARANCE (Confidential).....	S-3
TABLE 4.1-2	ALTERNATIVES FOR HEIGHT LIMIT REQUIREMENT	S-4
TABLE 4.2-1	COMPARISON FOR NAIAX PHASE-2 ENDPOINT OF INTERCHANGE (Confidential).....	S-5
TABLE 4.3-1	ALTERNATIVE STUDY AT PARK N' FLY BUILDING (Confidential).....	S-6
TABLE 4.4-1	COMPARISON OF ALTERNATIVES OF NAIAX PHASE-1 AND PHASE-2 CONNECTION.....	S-8
TABLE 4.5-1	ALTERNATIVE STUDY AT MMDA LANDMARK (Confidential).....	S-9
TABLE 4.6-1	ISSUE OF RAMP LAYOUT ON NAIAX 2010 FS	S-10
TABLE 4.7-1	COMPARISON OF TOLL COLLECTION SYSTEM.....	S-12
TABLE 5.2-1	AMOUNT OF TOLL MOTORISTS WILLING TO PAY/ TO USE ENTIRE NAIAX	S-15
TABLE 5.4-1	TRAFFIC VOLUME AND REVENUE (NAIAX PHASE-2).....	S-16
TABLE 6.1-1	NUMBER OF TRAFFIC LANES AT-GRADE ROADS	S-20
TABLE 6.2-1	GEOMETRICAL DESIGN STANDARD OF NAIAX PHASE-2	S-22
TABLE 7-1	ESTIMATED CONSTRUCTION COST OF NAIAX PHASE-2 (Confidential) ..	S-24
TABLE 7-2	ESTIMATED OPERATION AND MAINTENANCE COST OF NAIAZ PHASE-2 (Confidential)	S-24
TABLE 8.1-1	UNIT VOC BY FOUR (4) VEHICLE TYPES IN 2011 (Confidential)	S-25
TABLE 8.1-2	UNIT TRAVEL TIME COST BY PCU IN 2011 (Confidential)	S-25
TABLE 8.2-1	RESULTS OF ECONOMIC ANALYSIS (Confidential).....	S-25
TABLE 8.3-1	PROJECT SENSITIVITY (CASE 1: TOLL RATE 30 PESO) (Confidential)	S-26
TABLE 8.3-2	PROJECT SENSITIVITY (CASE 2: TOLL RATE 40 PESO) (Confidential)	S-26
TABLE 10.1-1	REQUISITE PARAMETERS FOR FINANCIAL ANALYSIS OF NAIAX PHASE-2 (Confidential)	S-27
TABLE 10.3-1	RESULTS OF FINANCIAL ANALYSIS (GFS INITIAL TOLL RATE AND TOLL RATE ADJUSTMENT (Confidential)	S-30
TABLE 10.3-2	RESULTS OF FINANCIAL ANALYSIS (WITH/WITHOUT SHORT-TERM LOAN) (Confidential)	S-30
TABLE 10.3-3	RESULTS OF FINANCIAL ANALYSIS (RATIO OF EQUITY AND LOAN) (Confidential).....	S-31
TABLE 10.3-4	RESULTS OF FINANCIAL ANALYSIS (GFS PROVISION SCHEDULE) (Confidential).....	S-31
TABLE 10.3-5	RESULTS OF FINANCIAL ANALYSIS (WITH/WITHOUT CORPORATE INCOME TAX HOLIDAY) (Confidential)	S-32
TABLE 11.1-1	MATRIX TABLE FOR ENVIRONMENTAL IMPACT EVALUATION OF NAIAX PROJECT	S-33
TABLE 11.1-2	MATRIX OF SCOPING RESULTS	S-34
TABLE 11.2-1	MATRIX OF THE NAIAX ENVIRONMENTAL MONITORING PLAN	S-36
TABLE 13.2-1	COMPARATIVE ANALYSIS FOR NAIAX FURTHER ANALYSIS (Confidential).....	S-44
TABLE 13.3-1	COMPARATIVE ANALYSIS RESULT OF C-5 EXTENSION ALIGNMENT ALTERNATIVES (Confidential).....	S-45
TABLE 13.4-1	COMPARATIVE ANALYSIS BETWEEN NAIAX, GRADE SEPARATION AND C-5 EXTENSION ALTERNATIVE	S-46

Main Report

TABLE 1.4-1	PROPOSED HSH PROJECTS PRIORITY	1-6
TABLE 1.5-1	TARGET OUTCOMES OVER THE MEDIUM TERM	1-7
TABLE 1.5-2	(2011-2016) PUBLIC INVESTMENT PROGRAM SUMMARY	1-7
TABLE 1.8-1	MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS	1-12
TABLE 1.9-1	TOLL EXPRESSWAY COMPANY	1-20
TABLE 1.9-2	TOLL EXPRESSWAY'S TOLL COLLECTION SYSTEM AND TRAFFIC CONTROL SYSTEM.....	1-20
TABLE 1.10-1	LAND AREA OF METRO MANILA COMPONENT CITY /MUNICIPALITY	1-21
TABLE 1.10-2	LAND USE OF METRO MANILA	1-22
TABLE 1.10-3	COMPARATIVE PRESENTATION OF THE PHILIPPINE POPULATION FROM 1995 TO 2007	1-22
TABLE 1.10-4	COMPARATIVE PRESENTATION OF THE COUNTRY'S AVERAGE ANNUAL POPULATION GROWTH RATE FROM 1960 TO 2007	1-23
TABLE 1.10-5	TOTAL POPULATION AND ANNUAL POPULATION GROWTH RATES BY REGION BASED ON POPULATION CENSUSES 1995, 2000, AND 2007	1-23
TABLE 1.10-6	TOTAL POPULATION, TOTAL NO. OF BARANGAYS, POPULATION DENSITY AND ANNUAL POPULATION GROWTH RATES IN METRO MANILA	1-25
TABLE 1.10-7	INDUSTRIAL STRUCTURE OF THE ECONOMY, 2007	1-26
TABLE 1.10-8	ECONOMIC GROWTH RATE (2002-2007).....	1-27
TABLE 1.10-9	PER CAPITA GRDP IN CURRENT PRICE.....	1-27
TABLE 1.10-10	PER CAPITA GRDP IN CONSTANT PRICE	1-28
TABLE 1.10-11	NUMBER OF ESTABLISHMENTS AND EMPLOYMENTS BY REGION/PROVINCE: LUZON.....	1-28
TABLE 2.2-1	SUMMARY OF TECHNICAL ISSUES	2-4
TABLE 3.1.2-1	COMPARISON OF TWO (2) ALTERNATIVES (Confidential)	3-8
TABLE 3.1.3-1	COMPARISON OF THREE (3) ALTERNATIVES	3-9
TABLE 3.2.2-1	COMPARISON FOR OF END POINT OF NAIAX PHASE-2 (Confidential)....	3-32
TABLE 3.3.2-1	COMPARISON OF TWO ALTERNATIVES.....	3-33
TABLE 3.4.3-1	COMPARISON OF ALTERNATIVES 1 TO 3.....	3-47
TABLE 3.5.2-1	ALTERNATIVE STUDY AT MMDA LANDMARK (Confidential).....	3-52
TABLE 3.7.2-1	NAIA EXPRESSWAY PHASE II – TYPICAL CROSS SECTION.....	3-65
TABLE 3.9-1	NUMBER OF TRAFFIC LANES OF AT-GRADE ROADS	3-68
TABLE 3.10.1-1	NUMBER OF TOLL BOOTH PROPOSED BY 2010 FS	3-75
TABLE 3.10.3-1	COMPARISON OF TOLL COLLECTION SYSTEM	3-78
TABLE 3.12-1	COST COMPARISON OF SPAN LENGTH FOR PC GIRDER	3-82
TABLE 4.1.2-1	CURRENT CONDITION OF MAJOR ACCESS ROADS TO NAIA.....	4-9
TABLE 4.2-1	SUMMARY OF OD TABLE (2010)	4-10
TABLE 4.2-2	COMPARISON OF OBSERVED (SURVEY DATA)	4-12
TABLE 4.3.1-1	GENERATION/ATTRACTION MODELS (PASSENGER TRIPS).....	4-14
TABLE 4.3.1-2	GENERATION/ATTRACTION MODELS (CARGO MOVEMENT)	4-14
TABLE 4.3.1-3	CONVERSION RATE.....	4-18
TABLE 4.3.1-4	TOTAL VEHICLE TRIPS	4-18
TABLE 4.3.2-1	ANNUAL GROWTH RATE OF NAIA RELATED	4-20
TABLE 4.3.3-1	SUMMARY OF OD TABLE (2015)	4-20
TABLE 4.3.3-2	SUMMARY OF OD TABLE (2020)	4-20
TABLE 4.3.3-3	SUMMARY OF OD TABLE (2030)	4-21
TABLE 4.4-1	SAMPLE SIZE	4-23
TABLE 4.4-2	TRANSPORT MODE TO AIRPORT	4-23
TABLE 4.4-3	SEX DISTRIBUTION	4-23

TABLE 4.4-4	AGE DISTRIBUTION	4-23
TABLE 4.4-5	AMOUNT OF TOLL FEE MOTORISTS ARE WILLING TO PAY UNTIL NAIAX EXPRESSWAY	4-27
TABLE 4.4-6	AMOUNT OF TOLL MOTORISTS WILLING TO PAY/ TO USE ENTIRE NAIAX EXPRESSWAY	4-28
TABLE 4.5.1-1	FREE SPEED AND CAPACITY BY ROAD TYPE	4-32
TABLE 4.5.1-2	PASSENGER CAR UNIT (PCU)	4-32
TABLE 4.5.1-3	TIME EVALUATION VALUE BY VEHICLE TYPE.....	4-33
TABLE 4.5.2-1	PRESENT TOLL RATE	4-34
TABLE 4.5.3-1	IMPACT OF OTHER ROAD PROJECTS	4-35
TABLE 4.5.5-1	ESTIMATED VOLUME AND REVENUE (30 PESO CASE) (CLASS 1).....	4-38
TABLE 4.5.5-2	ESTIMATED VOLUME AND REVENUE (40 PESO CASE) (CLASS 1).....	4-42
TABLE 5.1.2-1	NUMBER OF TRAFFIC LANES OF AT-GRADE ROADS	5-3
TABLE 5.2.1-1	GEOMETRIC DESIGN STANDARDS FOR NAIAX PHASE-II: MAIN EXPRESSWAY ALIGNMENT	5-7
TABLE 5.2.1-2	GEOMETRIC DESIGN STANDARDS FOR NAIAX PHASE-II: RAMPS	5-8
TABLE 5.2.1-3	MINIMUM RADII FOR DESIGN SUPER ELEVATION RATES, EMAX = 6.0%	5-10
TABLE 5.2.1-4	MINIMUM SPIRAL CURVE LENGTH.....	5-11
TABLE 5.2.1-5	DECELERATION LENGTH.....	5-12
TABLE 5.2.1-6	ACCELERATION LENGTH	5-12
TABLE 5.2.1-7 (1)	SPEED CHANGE LANE ADJUSTMENT FACTORS AS A FUNCTION OF GRADE	5-13
TABLE 5.2.1-7 (2)	SPEED CHANGE LANE ADJUSTMENT FACTORS AS A FUNCTION OF GRADE	5-13
TABLE 5.3.3-1	VERTICAL CONTROL POINTS	5-27
TABLE 5.3.3-2	VERIFICATION OF NAVIGATIONAL HEIGHT LIMIT.....	5-29
TABLE 5.3.4-1	RAMP TERMINAL TYPE	5-33
TABLE 5.3.4-2	RECOMMENDED MAIN ALIGNMENT GEOMETRY AT RAMP TERMINAL (V = 60KMH)	5-33
TABLE 5.3.5-1	NUMBER OF LANES TO BE MAINTAINED	5-43
TABLE 5.4.2-1	BRIDGE FEATURES AT EACH LOCATION TYPE.....	5-52
TABLE 5.4.2-2	BRIDGE TYPE: RAMP	5-65
TABLE 5.7.1-1	NUMBER OF TOLL BOOTH.....	5-70
TABLE 5.9-1	RISK ALLOCATION MATRIX	5-84
TABLE 7.1.1-1	THE GOVERNED LAW ON ENVIRONMENTAL RELATED LAWS.....	7-1
TABLE 7.1.1-2	LIST OF ENVIRONMENTAL RELATED LAWS AND DECREE	7-1
TABLE 7.1.2-1	COMPLETENESS OF EIS BASED ON CURRENT DENR/BEM AND JICA OUTLINES	7-7
TABLE 7.1.2-2	GAP ANALYSIS BETWEEN WORLD BANK/JICA SOCIAL SAFEGUARD POLICIES	7-19
TABLE 7.1.2-3	ENTITLEMENT MATRIX.....	7-41
TABLE 7.1.4-1	SUMMARY OF THE REQUIRED DOCUMENTS, THE PROCESSING, ENDORISING AND DECIDING AUTHORITIES FOR ECC/CNC APPLICATIONS AND TIME FRAME FOR EACH PROJECT CATEGORY ..	7-52
TABLE 7.2.4-1	FLORA SPECIES INVENTORY	7-72
TABLE 7.2.5-1	LAND AREA OF METRO MANILA COMPONENT CITY /MUNICIPALITY.....	7-73
TABLE 7.2.5-2	LAND USE OF METRO MANILA*	7-74
TABLE 7.2.5-3	COMPARATIVE PRESENTATION OF THE PHILIPPINE POPULATION FROM 1995 TO 2007	7-74
TABLE 7.2.5-4	COMPARATIVE PRESENTATION OF THE COUNTRY'S AVERAGE ANNUAL POPULATION GROWTH RATE FROM 1960 TO 2007	7-74

TABLE 7.2.5-5	TOTAL POPULATION AND ANNUAL POPULATION GROWTH RATES BY REGION BASED ON POPULATION CENSUSES 1995, 2000, AND 2007	7-75
TABLE 7.2.5-6	TOTAL POPULATION, TOTAL NO. OF BARANGAYS, POPULATION DENSITY AND ANNUAL POPULATION GROWTH RATES	7-76
TABLE 7.2.5-7	PARAÑAQUE CITY POPULATION	7-77
TABLE 7.2.5-8	TOTAL POPULATION OF THE BARANGAYS TRAVERSED	7-77
TABLE 7.2.5-9	CLASSIFICATION OF COMMERCIAL ESTABLISHMENTS	7-79
TABLE 7.2.5-10	PROFILE OF GENERAL MERCHANDIZING AND RETAIL	7-79
TABLE 7.2.5-11	LISTING OF AFFECTED MIAA COMMERCIAL LESSEE FACILITIES.....	7-86
TABLE 7.2.5-12	PROJECT AFFECTED FAMILIES HOUSE-HOLD SIZES	7-87
TABLE 7.2.5-13	RESIDENCY HISTORY OF RESPONDENTS	7-88
TABLE 7.2.5-14	ETHNICITY OF RESPONDENTS	7-88
TABLE 7.2.5-15	EDUCATIONAL ATTAINMENT OF RESPONDENTS	7-89
TABLE 7.2.5-16	GENDER OF HOUSEHOLD HEADS.....	7-89
TABLE 7.2.5-17	PRIMARY SOURCE OF INCOME OF PAFS	7-90
TABLE 7.2.5-18	SECONDARY SOURCE OF INCOME OF PAFS.....	7-91
TABLE 7.2.5-19	ANNUAL HOUSEHOLD INCOME OF PAFS	7-91
TABLE 7.2.5-20	ANNUAL HH EXPENDITURES OF PAFS	7-92
TABLE 7.2.5-21	STRUCTURE OWNERSHIP.....	7-92
TABLE 7.2.5-22	LIGHTING SOURCE.....	7-93
TABLE 7.2.5-23	POTABLE WATER SUPPLY SOURCE.....	7-94
TABLE 7.2.5-24	TOILET FACILITIES.....	7-94
TABLE 7.2.5-25	LEADING CAUSES OF MORBIDITY IN PASAY CITY (1995).....	7-95
TABLE 7.2.6-1	MONITORING RESULTS OF AIR QUALITY IN DRY SEASON.....	7-96
TABLE 7.2.6-2	MONITORING RESULTS OF AIR QUALITY IN WET SEASON	7-97
TABLE 7.2.6-3	MONITORING RESULTS OF NOISE LEVEL IN DRY SEASON.....	7-97
TABLE 7.2.6-4	MONITORING RESULTS OF NOISE LEVEL IN WET SEASON	7-98
TABLE 7.2.6-5	COMPARISON OF NOISE LEVEL STANDARD.....	7-98
TABLE 7.2.6-6	WATER QUALITY OF PARAÑAQUE RIVER	7-99
TABLE 7.2.6-7	WATER QUALITY OF PARAÑAQUE RIVER	7-99
TABLE 7.3.1-1	COMPLEMENTAL STUDY ITEMS	7-100
TABLE 7.3.2-1	MATRIX TABLE FOR ENVIRONMENTAL IMPACT EVALUATION ON NAIAX PROJECT	7-103
TABLE 7.3.2-2	MATRIX OF SCOPING RESULTS	7-104
TABLE 7.3.3-1	LIST OF CONSTRUCTION WORKS AND MATERIALS	7-113
TABLE 7.3.3-2	PREDICTED CO2 EMISSION CAUSED BY THE	7-116
TABLE 7.3.3-3	TRAFFIC VOLUME IN THE TARGET YEARS	7-117
TABLE 7.3.3-4	COMPARISON OF WITH AND WITHOUT PROJECT.....	7-117
TABLE 7.3.3-5	CO2 EMISSION	7-117
TABLE 7.3.4-1	COMPARISON OF TWO (2) ALTERNATIVES (Confidential)	7-120
TABLE 7.3.4-2	COMPARISON FOR NAIAX PHASE 2 END POINT OF INTERCHANGE (Confidential)	7-122
TABLE 7.3.6-1	MATRIX OF PROPOSED NAIAX'S ENVIRONMENTAL MANAGEMENT PLAN	7-131
TABLE 7.3.7-1	MATRIX OF THE NAIAX 'S ENVIRONMENTAL MONITORING PLAN (Confidential)	7-136
TABLE 7.4.2-1	LOST OF LAND	7-139
TABLE 7.4.2-2	AFFECTED RESIDENTIAL STRUCTURES	7-139
TABLE 7.4.2-3	AFFECTED TIMBER TREES	7-140
TABLE 7.4.2-4	INVENTORY OF AFFECTED FRUIT-BEARING TREES	7-140
TABLE 7.4.2-5	INVENTORY OF AFFECTED ORNAMENTAL PLANTS	7-141
TABLE 7.4.4-1	PRESIDENTIAL PROCLAMATIONS FOR SOCIALIZED HOUSING WITHIN THE MIAA COMPLEX.....	7-145

TABLE 7.4.10-1	RESETTLEMENT COST (Confidential).....	7-157
TABLE 10.2-1	COMPARISON OF TRAFFIC VOLUME (WITH AND WITHOUT PROJECT) AT THE ORDINARY ROAD.....	10-4
TABLE 10.2-2	VEHICLE TRAVEL DISTANCE.....	10-5
TABLE 11.1-1	PPP RELATED LAWS AND REGULATIONS.....	11-1
TABLE 11.5-1	NAIAX BIDDING DOCUMENTS: MAJOR DIFFERENCES BETWEEN ORIGINAL AND PRESENT PROVISIONS.....	11-6
TABLE 11.6-1	DRAFT TIME FRAME FOR BIDDING AND PROJECT IMPLEMENTATION.....	11-12
TABLE 11.6-2	DRAFT BIDDING PROCESS STIPULATED IN THE BID DOCUMENT (AS OF JULY 3, 2011).....	11-13
TABLE 11.7.4-1	PRESENCE/ABSENCE OF QUALIFICATION DOCUMENTS PER BIDDER.....	11-23
TABLE 11.7.4-2	EVALUATION OF QUALIFICATION DOCUMENTS PER BIDDER.....	11-24
TABLE 11.7.4-3	SUMMARY OF EVALUATION OF QUALIFICATION DOCUMENTS OF ALL BIDDERS.....	11-25
TABLE 11.7.6.1-1	EVALUATION OF BID LETTER INCLUDING BID SECURITY (ENVELOPE NO. 1) PER BIDDER.....	11-30
TABLE 11.7.6.1-2	SUMMARY OF EVALUATION OF BID LETTERS OF ALL BIDDERS.....	11-31
TABLE 11.7.6.2-1	PRESENCE/ABSENCE OF TECHNICAL PROPOSAL DOCUMENTS (ENVELOPE 2) PER BIDDER.....	11-31
TABLE 11.7.6.2-2	SUMMARY OF EVALUATION OF TECHNICAL PROPOSAL PER BIDDER.....	11-32
TABLE 11.7.6.2-3	SUMMARY OF EVALUATION OF TECHNICAL PROPOSALS OF ALL BIDDERS.....	11-33
TABLE 11.7.6.3-1	SUMMARY OF EVALUATION OF FINANCIAL PROPOSAL PER BIDDER.....	11-34
TABLE 11.7.6.3-2	SUMMARY OF EVALUATION OF FINANCIAL PROPOSALS OF ALL BIDDERS.....	11-34
TABLE 11.7.6.3-3	RANKING OF BID AMOUNTS OF COMPLYING FINANCIAL PROPOSALS.....	11-35
TABLE 12.2-1	COMPARATIVE ANALYSIS FOR NAIAX FURTHER ANALYSIS (Confidential).....	12-3
TABLE 12.3-1	COMPARATIVE ANALYSIS RESULT OF C-5 EXTENSION ALIGNMENT ALTERNATIVES (Confidential).....	12-4
TABLE 12.4-1	COMPARATIVE ANALYSIS BETWEEN NAIAX, GRADE SEPARATION AND C-5 EXTENSION ALTERNATIVE (Confidential).....	12-5

ACRONYMS AND ABBREVIATIONS

ADB	: Asian Development Bank	MIAA	: Manila International Airport Authority
B/C	: Benefit/Cost Ratio	MMDA	: Metro Manila Development Agency
BCDA	: Bases Conversion Development Authority	MRT	: Mass Rail Transit
BLT	: Build-Lease-Transfer	MRTC	: Metro Rail Transit Corporation
BOT	: Build-Operate and Transfer	NCR	: National Capital Region
CAAP	: Civil Aviation Authority of the Philippines	NDC	: National Development Corporation
CDCP	: Construction Development Corporation of the Philippines	NEDA	: National Economic Development Authority
CLEx	: Central Luzon Expressway	NGO	: Non-Governmental Organization
DBFO	: Design, Build, Finance and Operate	NLEx	: North Luzon Expressway
DBP	: Development Bank of the Philippines	NPER	: Net Public Expenditure Reduction
DENR	: Department of Environment and Natural Resources	NPV	: Net Present Value
DBM	: Department of Budget and Management	O&M	: Operation and Maintenance
DOF	: Department of Finance	ODA	: Official Development Assistance
DOTC	: Department of Transportation and Communications	OSG	: Office of the Solicitor General
DPWH	: Department of Public Works and Highways	PD	: Presidential Decree
DTI	: Department of Trade and Industry	PEA	: Philippine Estate Authority
EIA	: Environmental Impact Assessment	PEGR	: Philippines-Australia Partnership for Economic Governance Reform
EIRR	: Economic Internal Rate of Return	PIP	: Public Investment Plan
EIS	: Environmental Impact Statement	PMO-	: Project Management Office for
EO	: Executive Order	BOT	: Build-Operate-Transfer
FIRR	: Financial Internal Rate of Return	PNCC	: Philippine National Construction Company
GDP	: Gross Domestic Product	PNR	: Philippine National Railways
GFS	: Government Financing Support	PPA	: Philippine Port Authority
GOCCs	: Government-Owned and Controlled Corporations	PPP	: Public-Private Partnership
GOJ	: Government of Japan	R.A.	: Republic Act
GRP	: Government of the Republic of the Philippines	RAP	: Resettlement Action Plan
HSH	: High Standard Highway	ROW	: Right of Way
ICC	: Investment Coordinating Committee	SC	: Steering Committee
IEE	: Initial Environmental Examination	SCTEx	: Subic-Clark-Tarlac Expressway
IFC	: International Finance Corporation of World Bank Group	SLEx	: South Luzon Expressway
IRR	: Internal Rate of Return	SPC	: Special Purpose Company
JICA	: Japan International Cooperation Agency	STAR	: Southern Tagalog Arterial Road
KOICA	: Korean International Cooperation Agency	STOA	: Supplemental Toll Operation Agreement
LAPRAP	: Land Acquisition Plan and Resettlement Action Plan	TCA	: Toll Concession Agreement
LGUs	: Local Government Units	TOA	: Toll Operation Agreement
LRTA	: Light Rail Transit Authority	TOC	: Toll Operation Certificate
MARINA	: Maritime Industry Authority	TOR	: Terms of Reference
MRG	: Minimum Revenue Guarantee	TPLEx	: Tarlac-Pangasinan-La Union Expressway
		TRB	: Toll Regulatory Board
		TWG	: Technical Working Group
		USAID	: United States Agency for International Development
		WACC	: Weighted Average of Capital Cost
		WB	: World Bank

EXECUTIVE SUMMARY

1 BACKGROUND OF THE PROJECT

The NAIAX project is located mostly in Pasay City with a small section falling within Paranaque City, all within Metro-Manila.

The NAIAX improves access of NAIA airport to Metro Manila and Southern Luzon Expressway/Skyway. Both expressways contribute to the investment climate improvements of Metro Manila and Southern Industrial Area by increasing capacity and efficiency of transportation and solving the congestion in the area.

The NAIAX meets the policy “Medium Term Plan 2011-2016” of DPWH which aims to ease the congestion of Metro Manila. The project also exploits PPP schemes which new Aquino Administration seeks to strengthen the country’s financial state.

In 2010, JICA-assisted High Standard Highway Network Development Master Plan (hereinafter referred to “HSH Master Plan Study”) formulated the expressway network in the 200 km radius sphere from Metro Manila. The Study recommended NAIAX as one of eight first priority projects.

In 2010, JICA-assisted Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Projects (hereinafter referred to as “PPP Infra Projects”). This Study prioritized PPP expressway projects in accordance with the criteria established which are based on the necessity and urgency of project, profitability of the project and implementability of the project. Phase-2 of NAIAX was ranked no. 3 out of 10 priority projects.

2 NECESSITY OF THE PROJECT

The necessity of NAIAX is summarized as follows:

- NAIAX is a long-term solution for drastic increase of traffic carrying capacity along NAIAX Corridor.
- NAIAX mainly serves for NAIA Terminals related traffic.
- NAIA is the gateway of international/domestic investors, businessmen, and tourists.
- With NAIAX, image of the country will be improved and more investors will be attracted for investment, which will contribute to improvement of international competitiveness.
- NAIAX will reduce traffic congestion of at-grade roads.

3 OBJECTIVE OF THE PROJECT

NAIA has three (3) passenger terminals. NAIAX Phase I was implemented as the conventional public project to provide easier access to NAIA Terminal III. The NAIAX Phase-2 is an extension of Phase-1 and the objectives of the project are as follows:

- To provide easier access to NAIA Terminals which are the international gateway to the Philippines
- To reduce traffic congestion of roads related to NAIA terminals.
- NAIAX will connect the existing Skyway, Manila-Cavite Coastal Expressway as well as proposed NLEx-SLEx Connector Expressway and CALAX, and provide easier access between international cargo terminals (NAIA, Manila International Ports, Batangas

International Port) and southern industrial areas in Cavite. NAIAX will contribute to improvement of international/domestic investment environment and economic development.

4 TECHNICAL ISSUES OF NAIAX

The feasibility study of NAIAX Phase-2 was completed in 2010. However, there are still technical issues to be solved prior to the bidding as follows:

- Navigation clearance of NAIA
- Possible conflict with LRT Line-1 South Extension
- Availability of land at the west end ramps
- Vertical clearance at the bridge connecting two buildings over Pres. Diosdado Macapagal Boulevard
- Monument constructed at the roundabout near the entrance to Terminal III. The expressway will go over the round-about.
- Connecting method with NAIAX Phase – 1. Some structure of Phase 1 may have to be removed, or ROW acquisition of Air Base maybe needed.
- New pedestrian bridge is under construction. The expressway profile needs to be amended.
- Needs to review arrangement of on and off ramps and Toll collection system

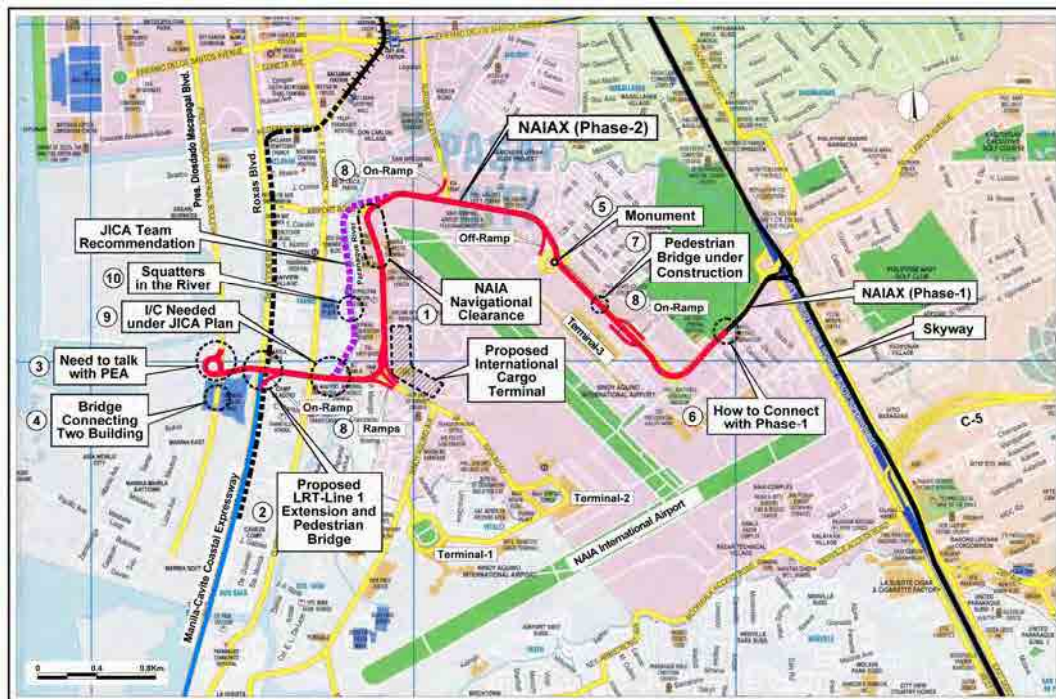


FIGURE 4-1 TECHNICAL ISSUES OF NAIAX PHASE-2

4.1. NAIA Navigational Clearance

To ensure that the proposed vertical alignment of NAIAX satisfies the requirement of NAIA navigational clearance, the vertical and horizontal alignment of NAIAX was reviewed. In order to ensure the above vertical clearance, two route alignments were studied. **TABLE 4.1-1** shows the comparison table of Alternatives and Alternative-2 was recommended in result.

TABLE 4.1-1 ALTERNATIVES FOR NAVIGATIONAL CLEARANCE

<p>(Confidential)</p>

Since the alignment along the domestic road is recommended, three alternatives were furthermore studied in due consideration of height limit requirement of NAIA. Among engineering evaluation, the Alternative-3 was recommended.

TABLE 4.1-2 ALTERNATIVES FOR HEIGHT LIMIT REQUIREMENT

	Alternative-1	Alternative-2	Alternative-3
Expressway Alignment	West side of Domestic Road	East side (airport side) of Domestic Road	Center of domestic Road
ROW Acquisition	West side: 11.5 m. East side: 1.1 m.	West side: 11.5 m. East side: 3.5 m.	West side: 10.5 m. East side: 1.0 m.
Impact to Large Buildings	No large buildings are affected.	No large buildings are affected.	No large buildings are affected.
Accessibility to Abutting Area	West side area: by 1-lane road East side area by 2x2=4 lane road.	West side area: by 2x2=4 lane road East side area by 1-lane road	West side area: by 2-lane road East side area by 2 lane road.
Accessibility to NAIA Terminal-4	By 2x2=4 lane road	By 1-lane road. U-turn area needs to be provided between Section (A) and Section (B)	By 2-lane road. U-turn area needs to be provided between Section A and (B) and Section (B) and (C).
Recommendation	Access to West area is not good. Not recommended.	Access to East area and NAIA Terminal-4 is not good. Not recommended.	Best option to provide access to both West and East areas and NAIA Terminal-4. Recommended.

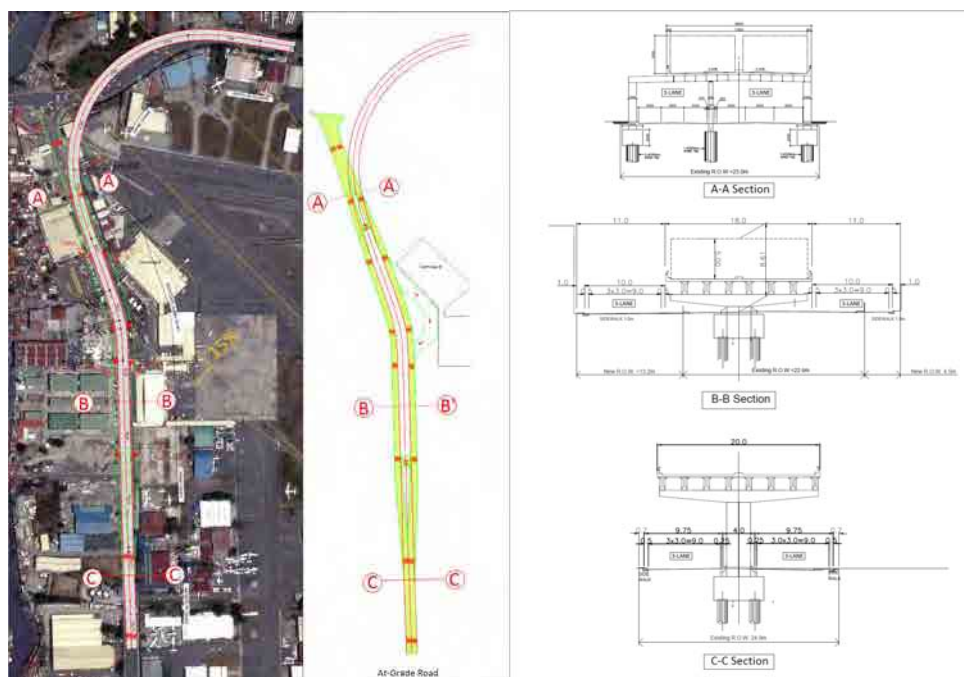


FIGURE 4.1-1 RECOMMENDED PLAN FOR NAIA NAVIGATIONAL CLEARANCE

4.2. West End Alternatives

On the alignment of the west end of NAIAX phase-2, The LRT Line-1 Cavite extension and MIA station has been planned. Thus, the alignment alternatives of the west end point of NAIAX phase-2 were studied in order to avoid the conflict with the LRT extension plan. The Alternative 3, NAIAX ends at Roaxas Blvd. was recommended as shown in **Table 4.2-1**.

TABLE 4.2-1 COMPARISON FOR NAIAX PHASE-2 END POINT OF INTERCHANGE

(Confidential)

S-5

4.3. Alternatives at Park 'n Fly Building Area

The NAIAX has a possibility to inference with the Park'n Fly Building where land lease by MIAA. Two alternatives are studied as the **TABLE 4.3-1**, the alternative two was recommended.

TABLE 4.3-1 ALTERNATIVES STUDYAT PARK 'N FLY BUILDING

<p>(Confidential)</p>

4.4. Alternatives at Interface between NAIAX Phase-1 and Phase-2

NAIA Phase-1 was completed in 2010.. The NAIAX Phase-2 must be extended from this condition. Available space is 19.0 m at Section A and 18.78 m at Section B. The connection alternatives are schematically shown in **FIGURE 4.4-1** and the comparison of alternative were studied as shown in **TABLE 4.4-1**.

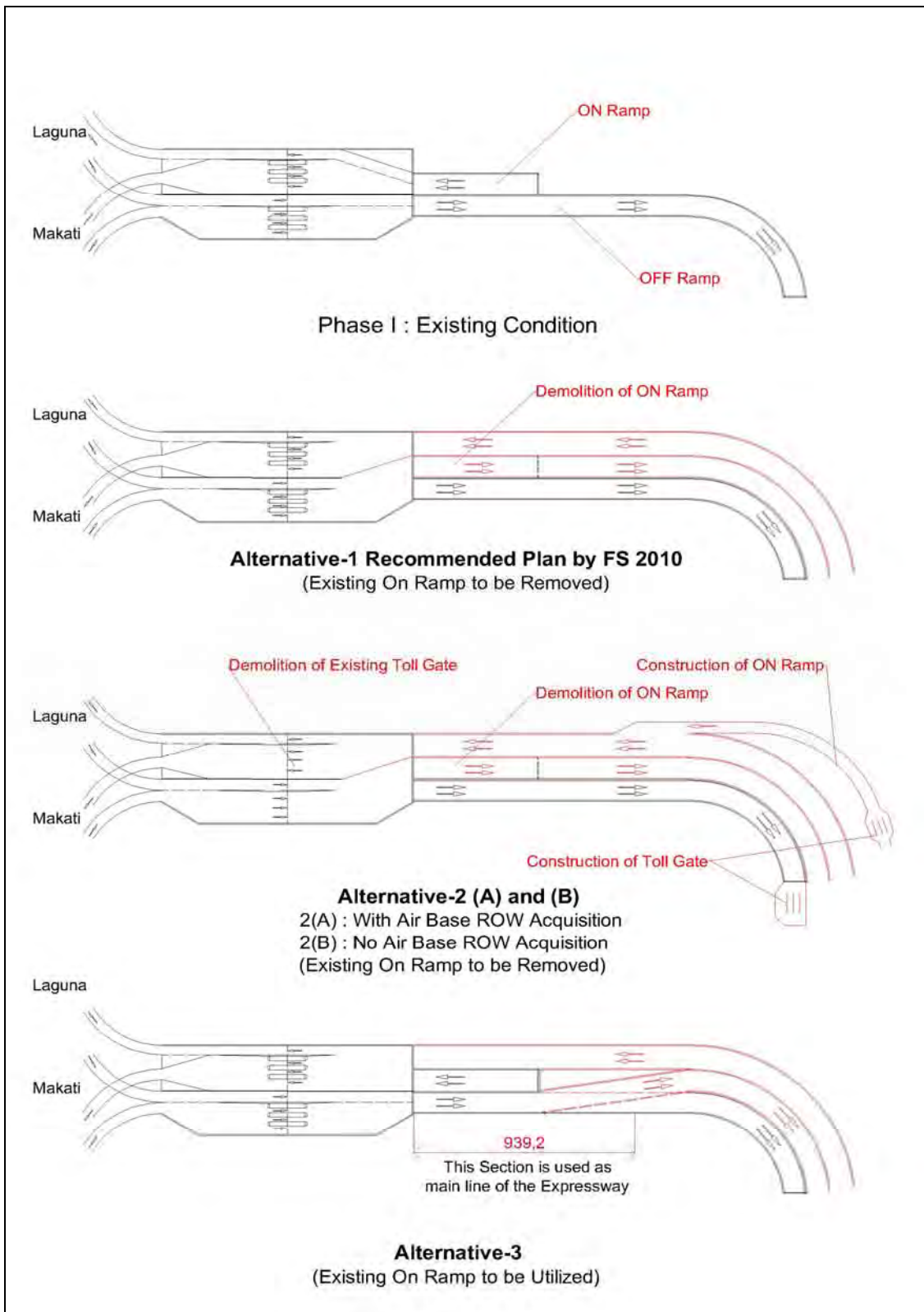


FIGURE 4.4-1 NAIAX PHASE-1 AND PHASE-2 CONNECTION ALTERNATIVES

TABLE 4.4-1 COMPARISON OF ALTERNATIVES OF NAIAX PHASE-1 AND PHASE-2 CONNECTION

	Alternative-1 Recommended plan by FS in 2010	Alternative-2(A) Improved Plan of Alternative-1	Alternative-2(B) Modification of Alternative-2(B)	Alternative-3 To utilize Existing On-ramp
Feature	<ul style="list-style-type: none"> Existing on-ramp to be removed. Available space is used for the expressway (2-lane x 2 direction = 4-lane) 	<ul style="list-style-type: none"> Existing on-ramp to be removed. Available space is used for the expressway (2-lane x 2 direction = 4-lane) Removed on-ramp is constructed at the NAIA Terminal III exit. 	<ul style="list-style-type: none"> In order to avoid acquisition of Villamor Air Base Headquarter, the expressway alignment partly utilizes the space over the existing off-ramp. Thus, the expressway has to go up and shifted toward the existing off-ramp, then go down again. 	<ul style="list-style-type: none"> A part of the existing off-ramp (2-lane, 6 m) is used as the main carriageway of the expressway. Number of existing toll booths will not be enough to accommodate the expressway traffic. Distance from toll booths to on-ramp is too short to maneuver main traffic and on-ramp traffic
On-ramp location and Accessibility	<p>Poor</p> <ul style="list-style-type: none"> Removed on-ramp is constructed along Andrews Ave. Exit traffic from Terminal III needs to go around the at-grade road and make a U-turn at the round-about with the monument to enter the expressway. 	<p>Good</p> <ul style="list-style-type: none"> Traffic from NAIA Terminal III can enter directly to the on-ramp. 	<p>Fair</p> <ul style="list-style-type: none"> Traffic from NAIA Terminal III can enter directly to the on-ramp. Removed on-ramp is constructed at the NAIA Terminal III. Since the expressway is located at high elevation, this ramp needs to be long which makes it difficult to get traffic from NAIA Terminal III. 	<p>Good</p> <ul style="list-style-type: none"> Traffic from NAIA Terminal III can enter directly to the on-ramp.
Main Route Alignment	<p>Good</p> <ul style="list-style-type: none"> Vertical alignment is the same as the Phase-1 section. 	<p>Good</p> <ul style="list-style-type: none"> Vertical alignment is the same as the Phase-1 section. 	<p>Poor</p> <ul style="list-style-type: none"> The expressway has to go up and shifted toward the existing off-ramp, then go down again. 	<p>Fair</p> <ul style="list-style-type: none"> Horizontal alignment for main traffic is not so well.
Land Acquisition	<p>Good</p> <ul style="list-style-type: none"> No land acquisition 	<p>Fair</p> <ul style="list-style-type: none"> Villamor Air Base Headquarter land is affected (width = 4 m, Length = 250 m). No building affected. 	<p>Good</p> <ul style="list-style-type: none"> No land acquisition 	<p>Good</p> <ul style="list-style-type: none"> No land acquisition
Environment	<p>Poor</p> <ul style="list-style-type: none"> Exit traffic from Terminal III needs to go around the at-grade road and make a U-turn at the round-about with the monument to enter the expressway. Traffic must take long trip compared with other alternatives. 	<p>Good</p> <ul style="list-style-type: none"> Traffic from NAIA Terminal III can directly enter the on-ramp 	<p>Good</p> <ul style="list-style-type: none"> Traffic from NAIA Terminal III can directly enter the on-ramp 	<p>Good</p> <ul style="list-style-type: none"> Traffic from NAIA Terminal III can go directly enter the on-ramp
Cost	<ul style="list-style-type: none"> Cheapest 	<ul style="list-style-type: none"> Almost Same as Alternative-1 	<p>Expensive</p> <ul style="list-style-type: none"> Complicated substructure is required resulting in high cost. 	<p>Expensive</p> <ul style="list-style-type: none"> Though off-ramp will not be removed, the complicated structure will be required, resulting in high cost.
Recommendation	Not recommended.	Recommended	Not recommended	Not recommended

4.5. Alignment at MMDA Monument

A monument was built by MMDA at Circulo del Mundo along Andrews Ave. The two (2) alternative alignments were studied and evaluated as shown in **TABLE 4.5-1**.

TABLE 4.5-1 ALTERNATIVE STUDY AT MMDA LANDMARK

<p>(Confidential)</p>

4.6. Ramp Layout Study

The 2010 FS Ramp Layout as shown in **FIGURE 4.6-1** had some technical issues. The engineering study related to the location, traffic volume accessibility has been carried out. In the result, based on the original ramp plan with Seven (7) on (entrance)-ramps and seven (7) off (exit)-ramps, it was proposed that two ramps, No. 5 and 8, were removed.

TABLE 4.6-1 ISSUES OF RAMP LAYOUT ON NAIAX 2010 FS

Ramp Number	Issues									
(1) Ramp No. 10 (off-ramp from 3 rd level to the ground level)	<ul style="list-style-type: none"> • End of ramp is located too close to the intersection (only 65 m). • Intersection traffic queue will be extended to up to the end of the ramp, thus free exit of traffic on this ramp will be affected. • There will be definitely conflict of traffic (through traffic and left-turn traffic, which will cause traffic congestion and traffic accidents. • Recommended to extend this ramp towards NAIA Terminal 1 and 2. 									
(2) Ramp No. 11 (off-ramp from 2 nd level to the ground level) Is this ramp needed?	<ul style="list-style-type: none"> • This ramp ends within the intersection. • Since traffic which utilize this ramp has very short travel distance, resulting in low traffic demand, recommended to be removed. Travel distance which utilizes this ramp; Ramp (3) to Ramp (11) = 1.4 km. Ramp (4) to Ramp (11) = 1.2 km. 									
(3) Ramp No. 2 (on-ramp from Aurora Blvd.) Is this ramp needed?	<ul style="list-style-type: none"> • <u>Travel distance and traffic demand which utilizes this ramp is;</u> <table border="1" data-bbox="606 1075 1372 1243"> <thead> <tr> <th></th> <th>Travel Distance</th> <th>Traffic Demand (2015)</th> </tr> </thead> <tbody> <tr> <td>Ramp (2) ~ Ramp (10)</td> <td>1.9 km.</td> <td>1,761</td> </tr> <tr> <td>Ramp (2) ~ Ramp (12) & (13)</td> <td>2.6 km.</td> <td>53</td> </tr> </tbody> </table> • Traffic demand is not so high, and ROW acquisition is required, thus recommended to be removed. 		Travel Distance	Traffic Demand (2015)	Ramp (2) ~ Ramp (10)	1.9 km.	1,761	Ramp (2) ~ Ramp (12) & (13)	2.6 km.	53
	Travel Distance	Traffic Demand (2015)								
Ramp (2) ~ Ramp (10)	1.9 km.	1,761								
Ramp (2) ~ Ramp (12) & (13)	2.6 km.	53								
(4) Ramp No. 6 (on-ramp from Terminal 3)	<ul style="list-style-type: none"> • To utilize this ramp from Terminal 3 to Skyway, traffic must go around the at-grade road, since the existing on-ramp is proposed to be removed. • Under the above condition, exit traffic from Terminal 3 will be discouraged to utilize this ramp. • It is recommended that this ramp should be located at the exit of Terminal 3. (This is studied in section 3.4. Alternatives at Connection Point of Phase-1 and Phase-2.) 									

The Estimated ramp traffic volume based on the revised ramp lay out (ramp (5) and ramp (8) are removed) is shown in **FIGURE 4.6-2**.

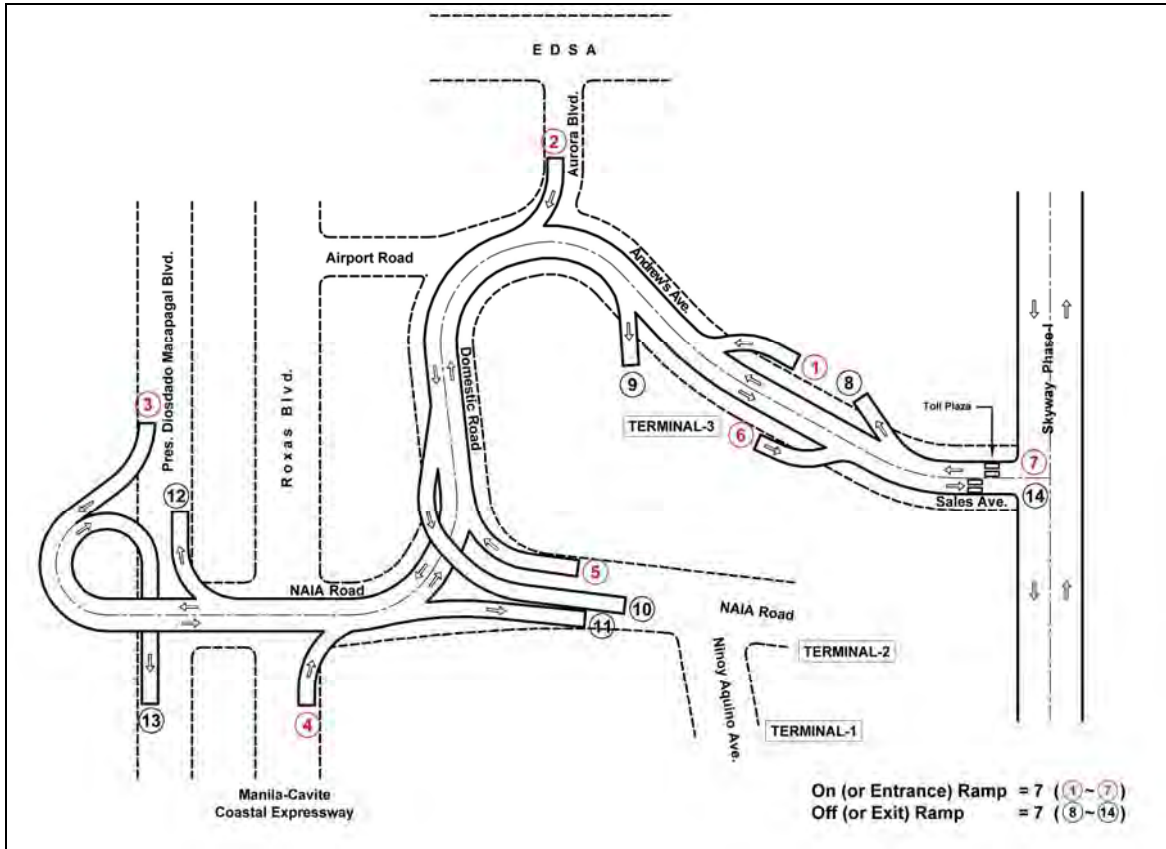


FIGURE 4.6-1 SCHEMATIC NAIAX RAMP LAYOUT (2010 FS)

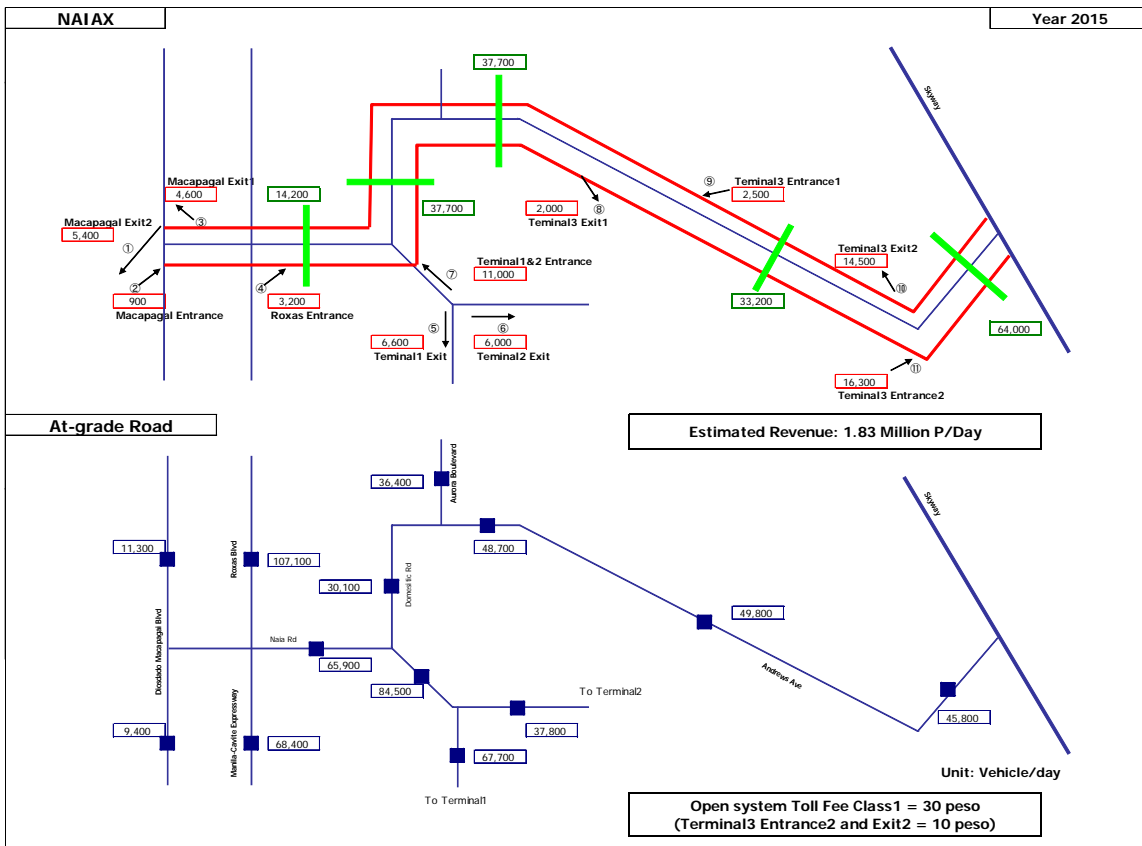


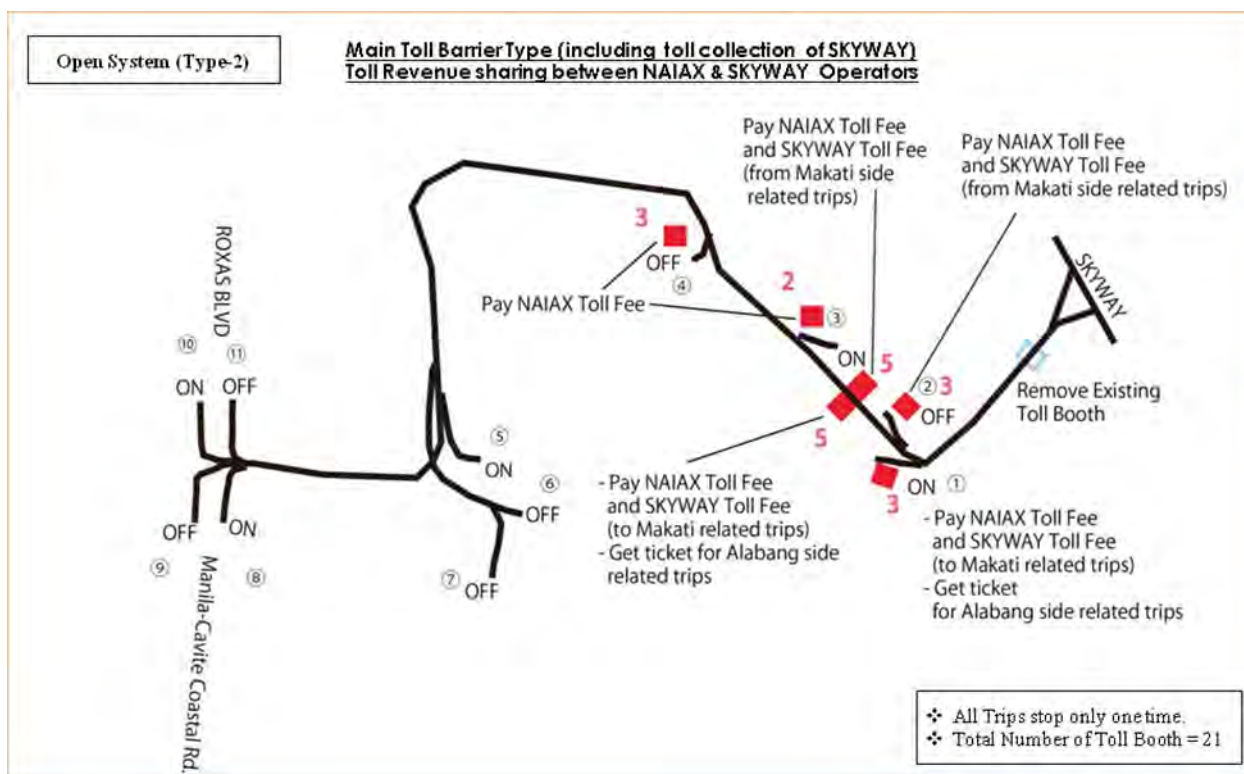
FIGURE 4.6-2 TRAFFIC PROJECTION ON REVISED RAMP LAYOUT

4.7. Toll Collection System

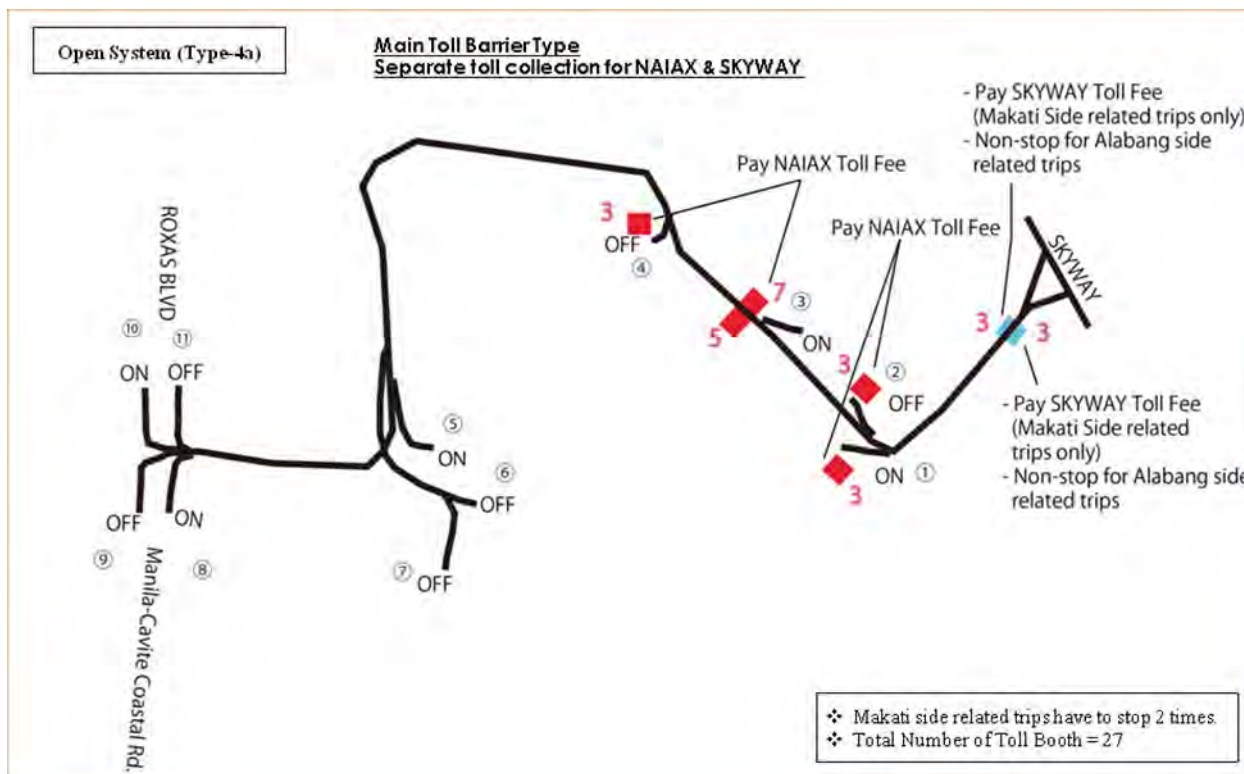
Based on the original toll collection system in the 2010 FS, additionally Four Alternative plans were studied. The Type-2 and Type 4, Open systems were recommended.

TABLE 4.7-1 COMPARISON OF TOLL COLLECTION SYSTEM

Toll collection System	No. of Toll Booth	Characteristics of the System	Recommendation
Type-1: Closed System (2010 FS Plan)	39	<ul style="list-style-type: none"> Toll fee in proportion to travel distance can be applied. All trips must stop 2 times, which discourages usage of expressway. Control of overloaded trucks is practically difficult. Toll collection transaction time is longer. Higher operation cost. 	Not Recommended
Type-2: Open System	21	<ul style="list-style-type: none"> Flat toll rate Toll collection of both NAIAX and Skyway, thus toll revenue sharing between NAIAX and Skyway Operators need to be agreed. All trips stop only 1 time, thus convenient for expressway users. Facility of toll booths of NAIAX Phase-1 can be transferred to other toll booths. Toll collection transaction time at main toll barrier and NAIA Terminal 3 related toll booths is longer. Control of overloaded trucks is difficult. Least ROW acquisition. Least operation cost. 	Recommended , if both operators of NAIAX and Skyway agree on revenue sharing system.
Type-3: Open System	25	<ul style="list-style-type: none"> Flat toll rate. Separate toll collection for NAIAX and Skyway. All trips stop 1 time except Makati-side related traffic. Toll booth location for No. 8 & 10 and for No. 5 requires additional ROW acquisition. Control of overloaded trucks is practically difficult. Second least operation cost. 	Not recommended, because of toll booth location for No. 8 and 10 and for No. 5 which requires additional ROW acquisition.
Type-4a: Open System	27	<ul style="list-style-type: none"> Similar to Type-2 Separate toll collection for NAIAX and Skyway. All trips stop 1 time except Makati-side related traffic. 	Recommended , when toll revenue sharing between operators of NAIAX and Skyway can not be reached.
Type-4b: Open System	21	<ul style="list-style-type: none"> Similar to Type-4a No toll collection at No.1 and No. 2 (or NAIA Terminal 3 related traffic) 	Not recommended, since this reduces toll revenue.



(TYPE 2 OPEN SYSTEM, RCOMMENDED)



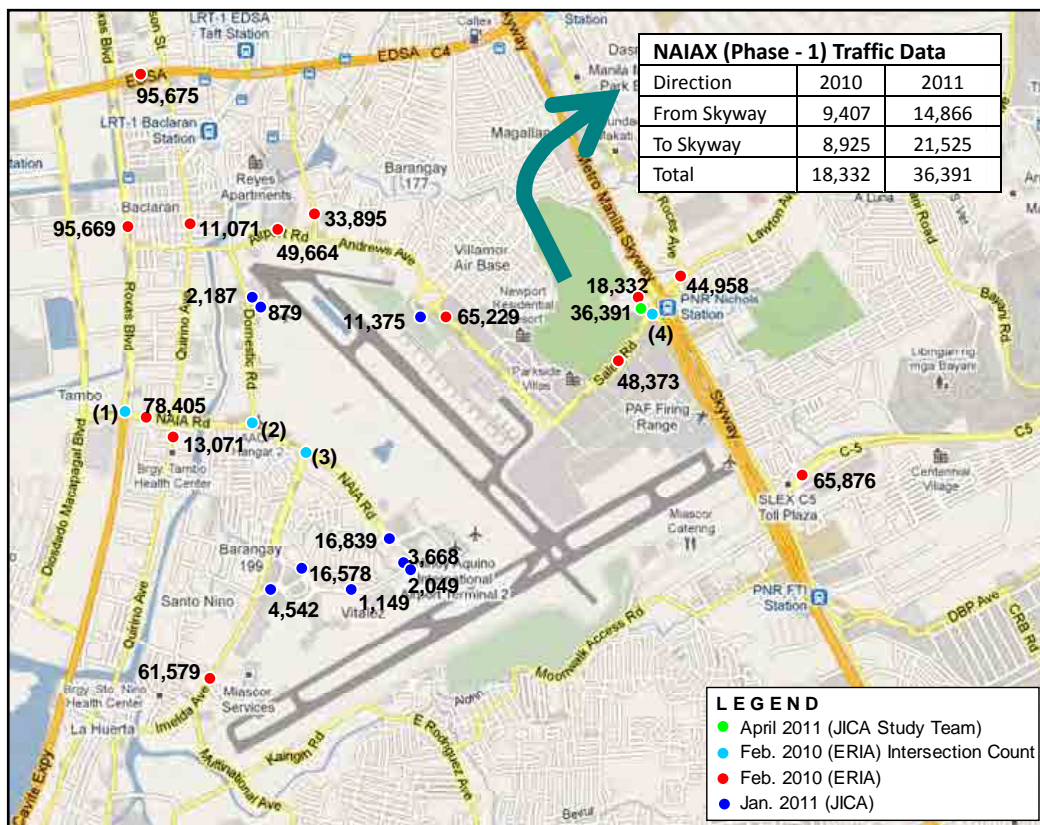
(TYPE 4-A OPEN SYSTEM, RCOMMENDED)

FIGURE 4.7-1 ALTERNATIVE OF TOLL COLLECTION SYSTEM

5 TRAFFIC DEMAND FORECAST

5.1. Existing Traffic Volume

Traffic volume of roads surrounding the NAIA airport is shown in **FIGURE 5.1-1**. As seen in the figure, there is high number of vehicles to the corridor where the future expressway runs over – 48,373 at Sales Road, 65,229 at Andrew’s Avenue, 78,405 at NAIA Road (Seaside Drive). Data denotes the number of vehicles. Recorded traffic at NAIA Phase-1 in 2010 is 18,332 vehicles in both directions. This number increases to 36,391 this year with 60% of traffic moving in the direction of Skyway.



Note: Feb 2010 data (NAIA - FS by ERIA), Jan. 2011 (Study on Airport Strategy for Greater Capital Region by JICA). Both data are in ADT (Average Daily Traffic).

FIGURE 5.1-1 TRAFFIC VOLUME OF ROADS SURROUNDING NAIA AIRPORT

5.2. Willingness to Pay to NAIAX

Those willing to pay to use the expressway have the following preference: 27.2% are willing to pay 20 pesos; 40.4% are willing to pay 30 pesos; 26.2% are willing to pay 50 pesos; 6.2% are willing to pay 80 pesos.

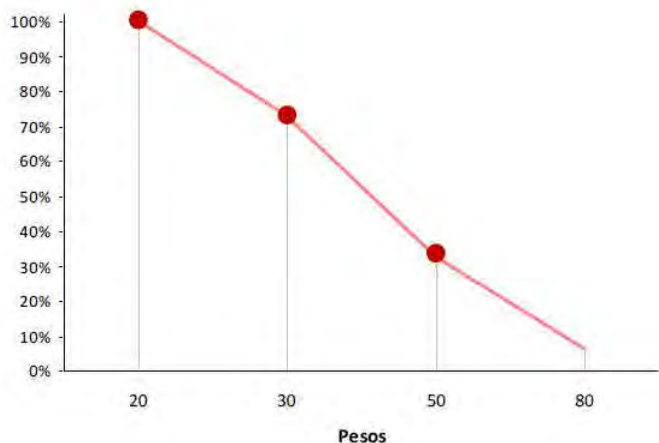


TABLE 5.2-1 AMOUNT OF TOLL MOTORISTS WILLING TO PAY/ TO USE ENTIRE NAIA

(P)	Sample	Share (%)	Amount (%)
20	180	27.1%	100.0%
30	268	40.4%	72.9%
50	174	26.2%	32.4%
80	41	6.2%	
Total	663	100.0%	6.2%

FIGURE 5.2-1 AMOUNTS OF TOLL MOTORISTS WILLING TO PAY TO USE ENTIRE EXPRESSWAY FOR THEIR OTHER TRIPS

5.3. Toll Rate vs. Revenue

The estimated traffic volume and expected amount of revenue generated from the expressway is shown in **FIGURE 5.3-1**. Amount of revenue per day will be 1.75 million for 30 pesos toll fee, 1.79 million for 40 pesos toll fee, and 1.54 million for 50 pesos toll fee.

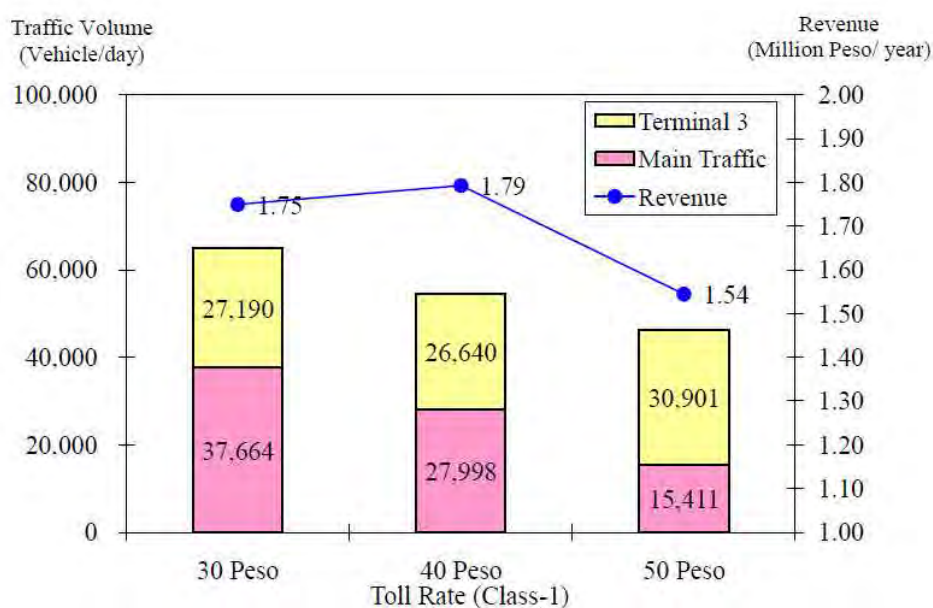


FIGURE 5.3-1 TOLL RATE VS. REVENUE (2015)

Traffic assignment is conducted on 30 pesos toll rate and 40 pesos toll rate for Class – 1.

- Average willingness to pay for NAIAX is 31.6 peso and 70% of respondent are willing to pay for more than 30 peso.
- Although maximum amount of revenue is 40 peso case, the difference with 30 peso case is not that substantial.

- Toll rate of NAIAX (P6/km = 30peso/5km, 40 Peso case is P8/km,) is almost the same with the present Skyway’s toll rate and it will be acceptable rate.
- In order to maximize the revenue, 40 peso case is desirable. In order to be more attractive to motorists, 30 peso case is desirable.

5.4. Traffic Assignment Result and Toll Revenue

Traffic Volume of two alternative cases, 30 peso and 40 peso were projected.

TABLE 5.4-1 TRAFFIC VOLUME AND REVENUE (NAIAX PHASE-2)

Case	Vehicle Class	Year 2015	Year 2020	Year 2030
30 Peso Case	Class 1	51,878	54,343	64,725
	Class 2	10,730	17,216	23,832
	Class 3	2,246	5,121	7,026
	Total	64,854	76,680	95,583
	Revenue			
40 Peso Case	Class 1	43,450	43,066	49,697
	Class 2	9,156	17,902	22,699
	Class 3	2,032	5,200	6,701
	Total	54,638	66,168	79,097
	Revenue			

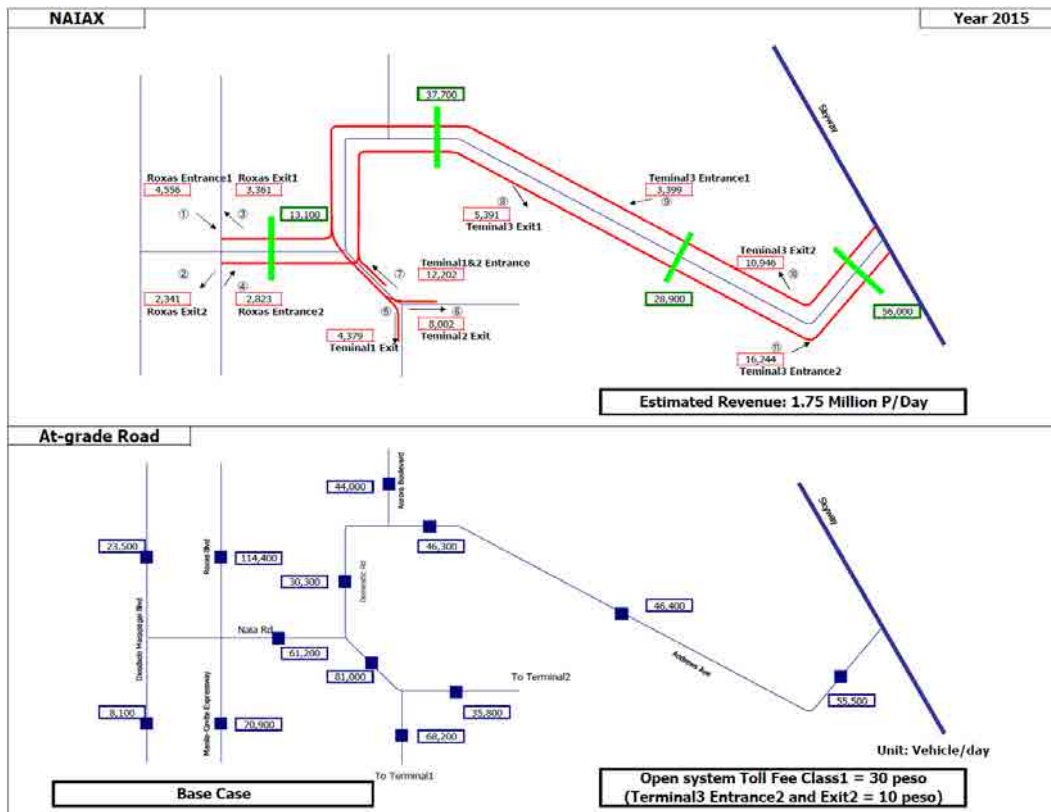


FIGURE 5.4-1 NAIAX TRAFFIC PROJECTION (YEAR 2015, 30 PESO CASE)

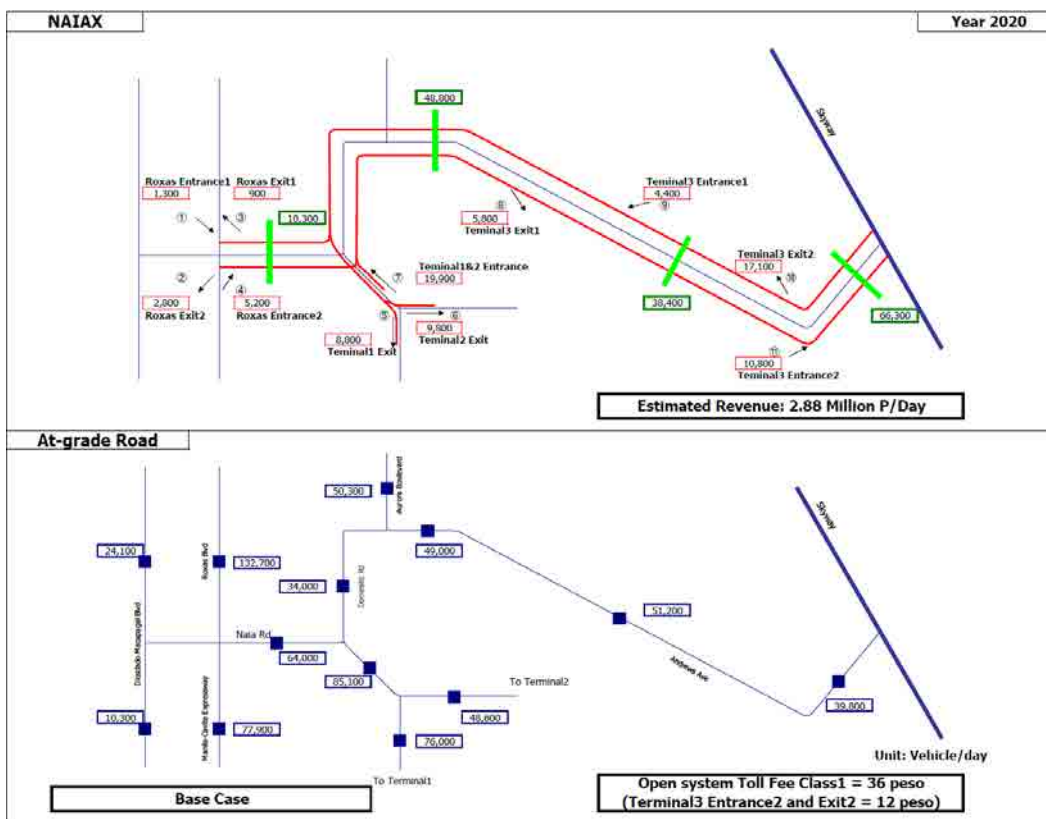


FIGURE 5.4-2 NAIAX TRAFFIC PROJECTION (YEAR 2020, 30 PESO CASE)

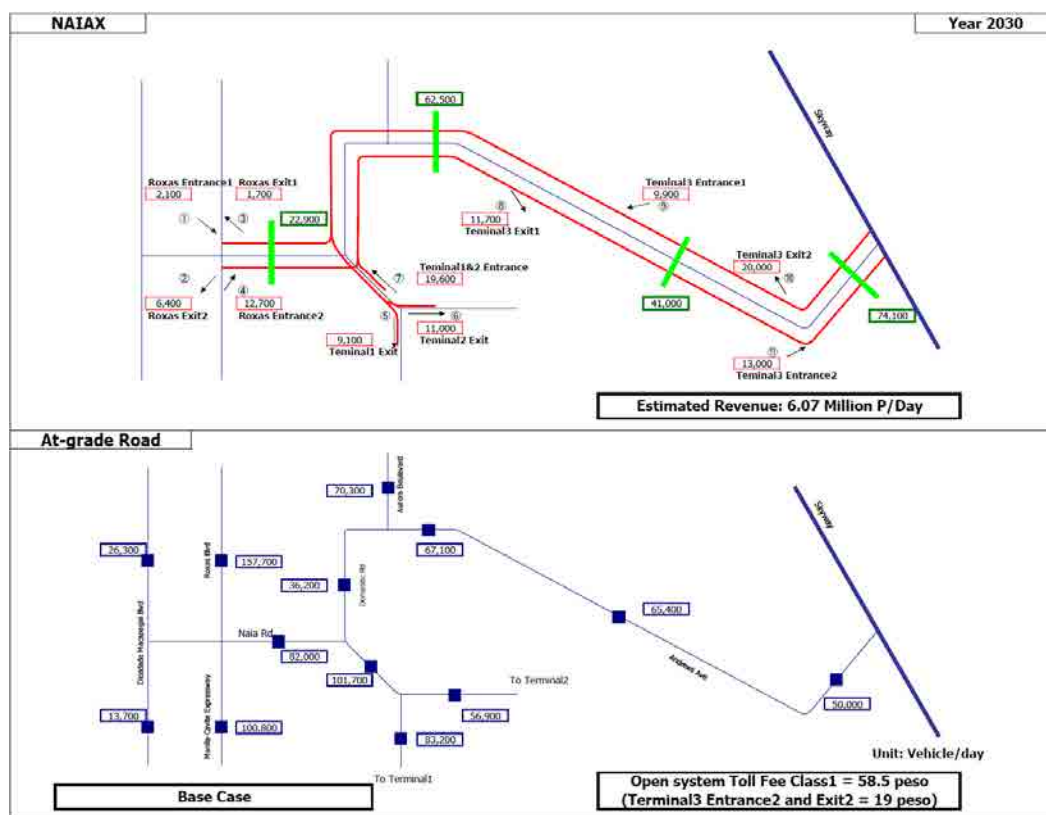


FIGURE 5.4-3 NAIAX TRAFFIC PROJECTION (YEAR 2030, 30 PESO CASE)

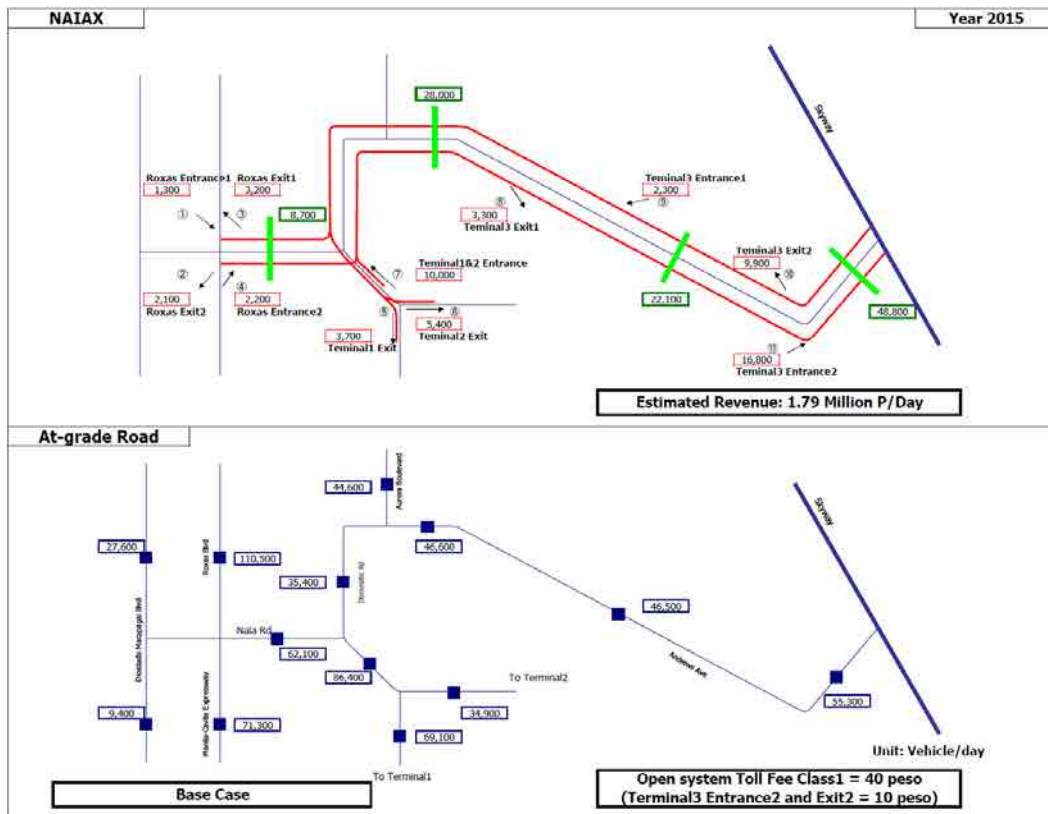


FIGURE 5.4-4 NAIAX TRAFFIC PROJECTION (YEAR 2015, 40 PESO CASE)

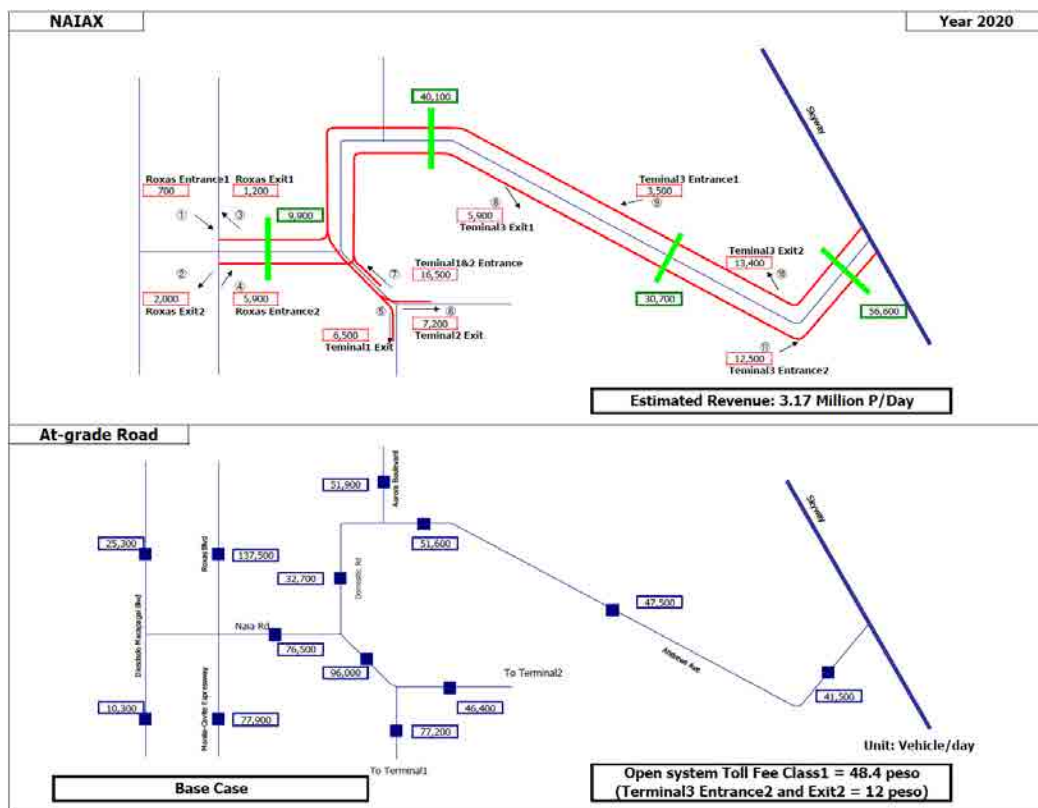


FIGURE 5.4-5 NAIAX TRAFFIC PROJECTION (YEAR 2020, 40 PESO CASE)

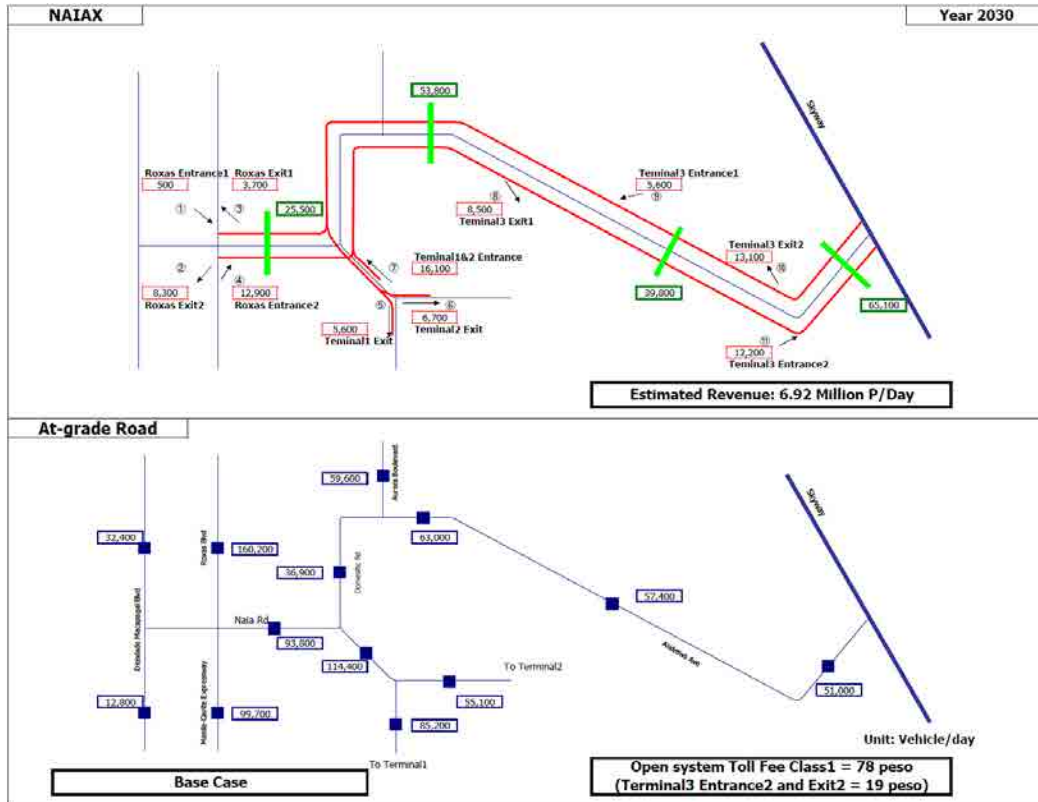


FIGURE 5.4-6 NAIAX TRAFFIC PROJECTION (YEAR 2030, 40 PESO CASE)

6 SCOPE OF THE PROJECT

6.1. Outline of the Project

(1) Expressway Alignment

NAIAX Phase-2 starts at the end point of Phase-1 running over Sales Avenue, Andrews Avenue, Domestic Road, NAIA (MIA) Road and ends at Roxas Boulevard/Manila-Cavite Coastal Expressway.

(2) Ramp Layout

Five (5) new on-ramps and five (5) new off-ramps and one (1) existing off-ramp are provided as shown in **Figure 6.1-1**. One (1) on-ramp constructed under Phase-1 is removed. One (1) overloaded truck/Emergency Exit is provided.

- One (1) on-ramp for NAIA Terminal III exit traffic and one existing off-ramp from Skyway for access to NAIA Terminal III.
- One (1) on-ramp along Andrews Ave. to collect traffic jam from NAIA Terminal III traffic and traffic on Andrews Ave.
- One (1) off-ramp to access to NAIA Terminal I and Terminal II.
- One (1) on-ramp to collect traffic from NAIA Terminal I and Terminal II.
- One (1) on-ramp and one (1) off-ramp from/to Roxas Boulevard.
- One (1) on-ramp and one (1) off-ramp from/to Manila-Cavite Coastal Expressway.
- One (1) existing on-ramp of Phase-1 is recommended to be removed.

(3) Number of traffic lanes of the main expressway and ramps

- Number of traffic lanes of the expressway is four (4) lanes (2-lane x 2-direction).
- Number of traffic lanes of all ramps is one (1) lane.

(4) Number of traffic lanes of at-grade roads during and after expressway construction

Number of traffic lanes of at-grade roads is as shown in **TABLE 6.1-1**.

TABLE 6.1-1 NUMBER OF TRAFFIC LANES OF AT-GRADE ROADS

At-grade Road		Existing No. of Traffic Lanes	No. of Traffic Lanes During Construction	No. of Traffic Lanes After Construction
Sales Avenue	East Bound	3 (Before on-ramp) 2 (After on-ramp)	2	3
	West Bound	3 (Under off-ramp) 2 (Under off-ramp)	2	3
Andrews Avenue (Sales Ave. – Roundabout)	East Bound	3-4	3	3-4
	West Bound	3	3	3
Andrews Avenue (Roundabout – Domestic Road)	East Bound	3	2	3
	West Bound	3	2	3
Domestic Road	North Bound	3	2	3
	South Bound	3	2	3
NAIA (MIA) Road (Domestic Road – Quirino Avenue)	East Bound	4	2	4
	West Bound	4	2	4
NAIA (MIA) Road (Quirino Avenue – Roxas Boulevard)	East Bound	4	2	4
	West Bound	3	2	3

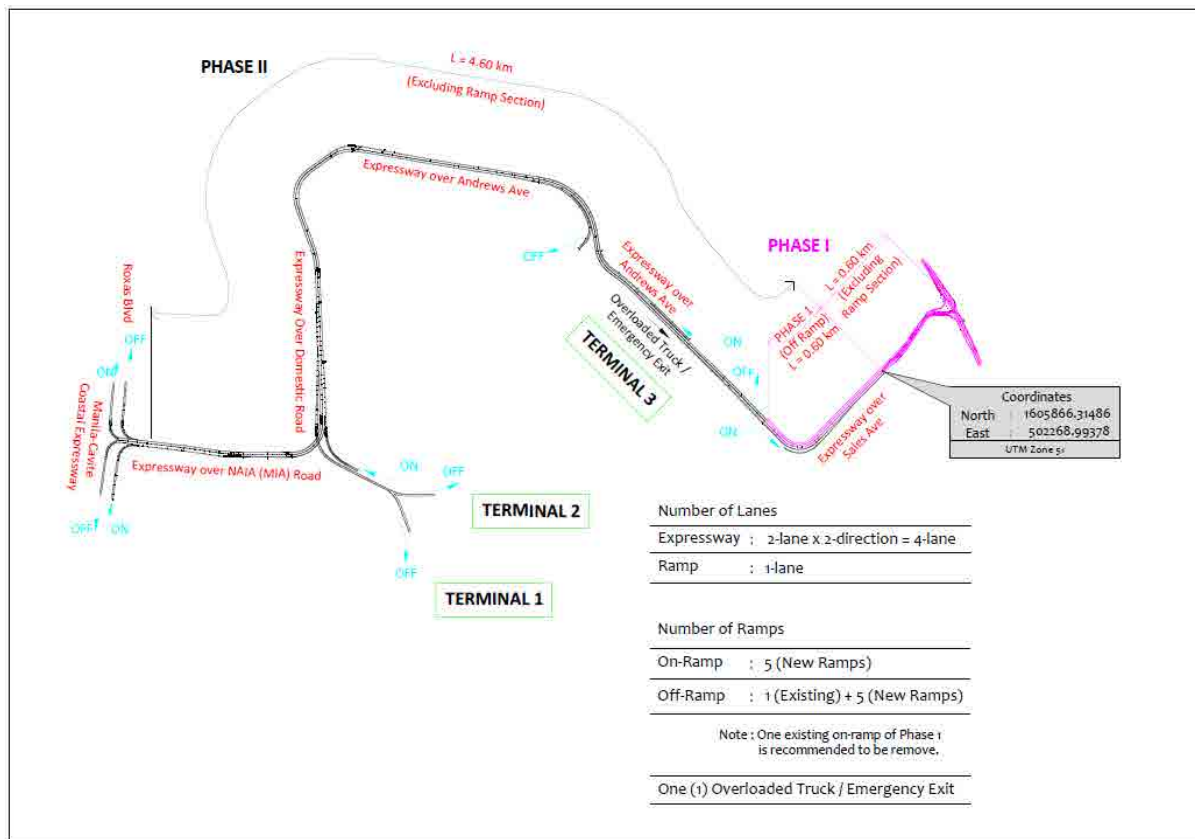


FIGURE 6.1-1 MINIMUM EXPRESSWAY CONFIGURATION

(5) Vertical Clearance for Expressway and At-grade Roads

Vertical clearance for expressway and at-grade roads is as follows;

- Desirable Vertical Clearance: 5.00 m
- Absolute Minimum Vertical Clearance (Note-1): 4.88 m
- Note that applicable only to the section controlled by NAIA Navigational Height Limit.

(6) Pedestrian Overpass Bridge

Existing pedestrian overpass bridges are treated as follows. Minimum vertical clearance on the pedestrian overpass bridge is 2.00 m.

Pedestrian Overpass Bridge along Andrews Avenue:	To remain as is.
Pedestrian Overpass Bridge along Domestic Road:	To be removed and converted to the pedestrian crossing with traffic light.
Pedestrian Overpass Bridge near the Intersection between Domestic Road and NAIA Road:	To be removed and replaced with new one near the intersection.
Pedestrian Overpass Bridge at the Intersection between NAIA Road and Roxas Boulevard:	To remain as is.

(7) NAIA Navigational Height Limit

NAIA navigational height limit is shown in **FIGURE 6.1-2** which shall be confirmed by Civil Aviation Authority of the Philippines (CAAP).

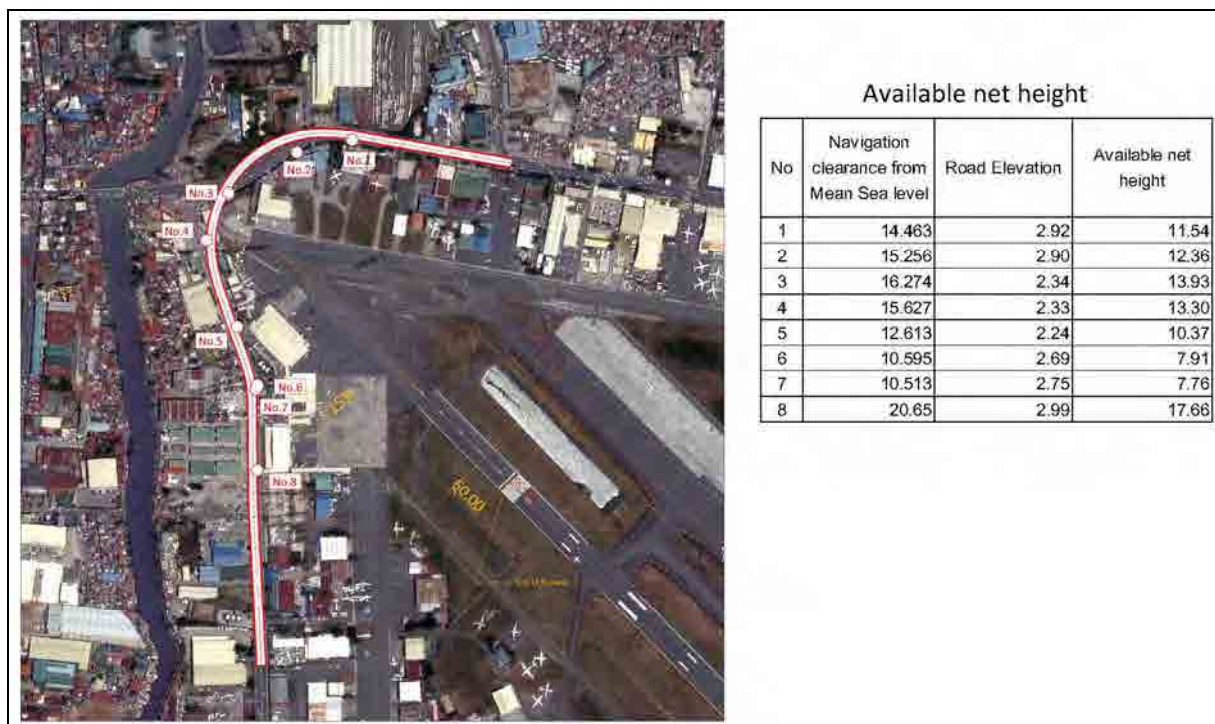


FIGURE 6.1-2 HEIGHT LIMIT ALONG ANDREWS AVE. AND DOMESTIC ROAD AND AVAILABLE NET HEIGHT

6.2. Design Standard

The following standard is mainly used as reference in NAIAX Phase-2 design.

- A Policy on Geometric Design of Highways and Streets, AASHTO 2004
- Highway Safety Design Standards Part 1 Road Safety Design Manual, May 2004, DPWH
- Japan Road Association, Road Structure Ordinance, 2004
- Highway design manual, Metropolitan Expressway Co., Ltd., Japan
- Highway design manual, NEXCO, Japan

TABLE 6.2-1 GEOMETRICAL DESIGN STANDARD OF NAIAX PHASE-2

Category	Item	Unit	Roadway Standard	Ramp way Standard
Basic Element	Design Speed	km/h	60	40
	Design Vehicle	-	SU	SU
	Stopping Sight Distance	m	85 (absolute 75)	50
	Passing Sight Distance	m	410	270
Cross Section Element	Pavement Type	-	Asphalt Concrete	Asphalt Concrete
	Number of lane	nos	4	2
	Lane Wide	m	3.50	3.50
	Median Width	m	1.00	-

Category	Item	Unit	Roadway Standard	Ramp way Standard
	Inner Shoulder Width	m	0.50	0.50
	Outer Shoulder Width	m	1.50 (absolute 0.50)	2.00 (absolute 0.50)
	Normal Cross fall	%	2.00	2.00
	Maximum Super Elevation		6.00	6.00
	Super Elevation	%	Exhibit 3-26	Exhibit 3-26
	Maximum relative Gradients	%	0.60	0.66
Horizontal Alignment	Minimum Radius	m	123	43
	Minimum Transition Curve length	m	30	22
	Minimum Radius not requiring Transition Curve	m	1030 (absolute 500)	525
	Super elevation Run off	%	1/125	1/125
Vertical Alignment	Maximum Vertical Gradient	%	5 (absolute 7)	6 (absolute 7)
	Minimum K Value Crest	%	18.0	6.0
	Minimum K Value Sag	%	18.0	9.0
	Minimum Vertical Curve Length	%	60	60
	Maximum Composition Grade	%	11.5	11.5

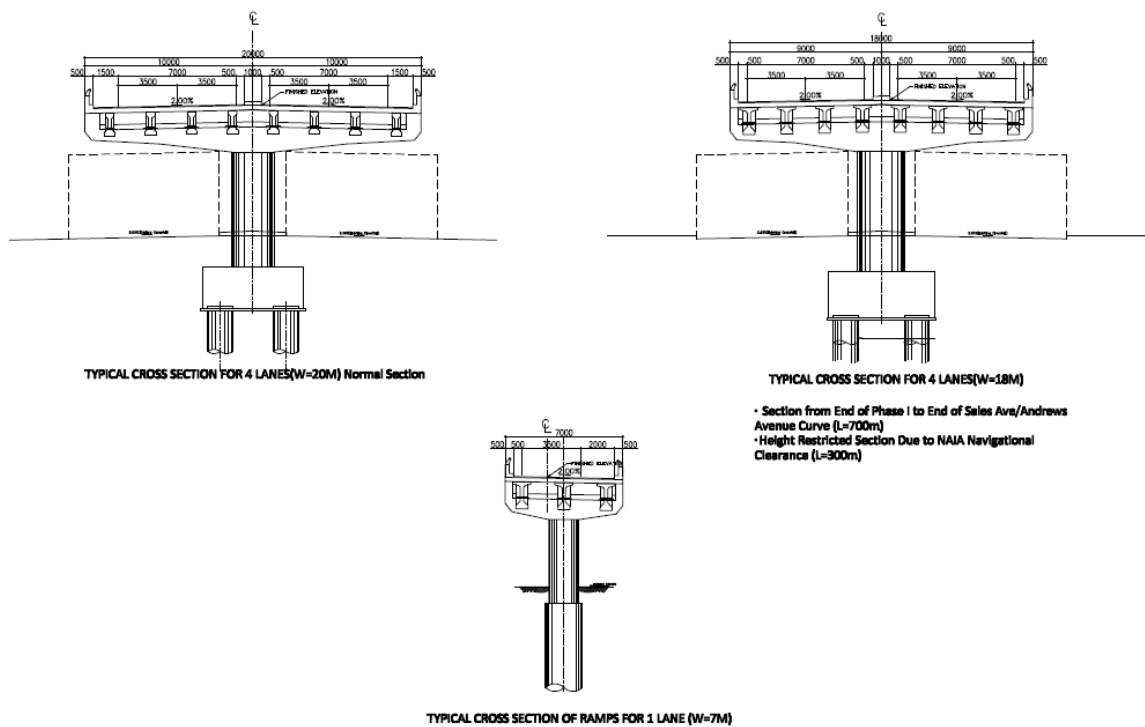


FIGURE 6.2-1 TYPICAL CROSS SECTION of NAIAX PHASE-2

7 PROJECT COST

(Confidential)

TABLE 7-1 ESTIMATED CONSTRUCTION COST OF NAIAX PHASE-2

<p>(Confidential)</p>

TABLE 7-2 ESTIMATED OPERATION AND MAINTENANCE COST OF NAIAX PHASE-2

<p>(Confidential)</p>

8 ECONOMIC EVALUATION

8.1 Assumption and Indicators of Economic Analysis

(Confidential)

TABLE 8.1-1 UNIT VOC BY FOUR (4) VEHICLE TYPES IN 2011

(Confidential)

TABLE 8.1-2 UNIT TRAVEL TIME COST BY PCU IN 2011

(Confidential)

8.2. Results of Economic Analysis

(Confidential)

TABLE 8.2-1 RESULTS OF ECONOMIC ANALYSIS

(Confidential)

8.3. Economical Project Sensitivity

(Confidential)

TABLE 8.3-1 PROJECT SENSITIVITY (Case 1: Toll rate 30 Peso)

(Confidential)

TABLE 8.3-2 PROJECT SENSITIVITY (Case 2: Toll rate 40 Peso)

(Confidential)

9 PPP SCHEME

For NAIAX Phase-2, the adoption of BTO scheme with Government Financial Support is planned by the Philippines government. Therefore, the same PPP modality is assumed in this study as well. The diagram on the assumed PPP modality is shown as **FIGURE 9-1**.

After the completion of the construction of NAIAX Phase-2 implemented by the Concessionaire, the ownership of the NAIAX Phase-2 facility is transferred to the DPWH. However, the Concessionaire is responsible for the operation and maintenance of NAIAX during the Concession period, and it also can gain revenue with the collection of toll fee from the NAIAX users. In accordance with the stipulation of the Philippines BOT Law, the government subsidy up to 50% of the project cost is granted to the Concessionaire as financial support by the government.

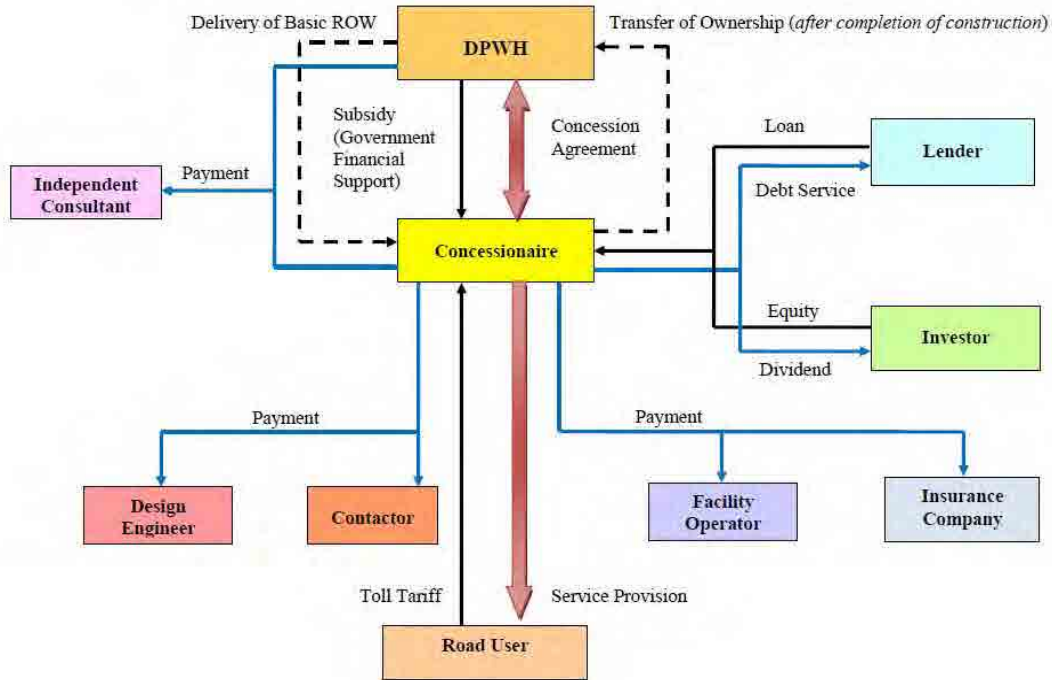


FIGURE 9-1 PPP MODALITY (BTO WITH GOVERNMENT FINANCIAL SUPPORT)

10 FINANCIAL EVALUATION

10.1. Parameters for Financial Analysis

(Confidential)

TABLE 10.1-1 REQUISITE PARAMETERS FOR FINANCIAL ANALYSIS OF NAIAX PHASE-2

(Confidential)

(Confidential)

(Confidential)

10.2. Project Implementation Schedule

(Confidential)

(Confidential)

FIGURE 10.2-1 IMPLEMENTATION SCHEDULE

10.3. Results of Financial Analysis

(1) Variation of GFS, initial toll rate and toll rate adjustment

(Confidential)

**TABLE 10.3-1 RESULTS OF FINANCIAL ANALYSIS
(GFS, INITIAL TOLL RATE AND TOLL RATE ADJUSTMENT)**

<p>(Confidential)</p>

(2) With/Without Short-term loan

(Confidential)

TABLE 10.3-2 RESULTS OF FINANCIAL ANALYSIS (WITH/WITHOUT SHORT-TERM LOAN)

<p>(Confidential)</p>

(3) Variation of the Ratio of Equity and Loan

(Confidential)

TABLE 10.3-3 RESULTS OF FINANCIAL ANALYSIS (RATIO OF EQUITY AND LOAN)

<p>(Confidential)</p>

(4) Consideration of GFS Provision Schedule

(Confidential)

TABLE 10.3-4 RESULTS OF FINANCIAL ANALYSIS (GFS PROVISION SCHEDULE)

<p>(Confidential)</p>

(5) Consideration of corporate income tax holiday

(Confidential)

**TABLE 10.3-5 RESULTS OF FINANCIAL ANALYSIS
(WITH/WITHOUT CORPORATE INCOME TAX HOLIDAY)**

<p>(Confidential)</p>

11 ENVIRONMENTAL AND SOCIAL CONSIDERATION

11.1. Scoping Results of Environmental Impacts by NAIAX PHASE-2

TABLE 11.1-1 and **11.1-2** show the environmental impacts on NAIAX project on each environmental concerns and project activities through the project stage of pre-construction, construction and operation, management after the construction.

TABLE 11.1-1 MATRIX TABLE FOR ENVIRONMENTAL IMPACT EVALUATION ON NAIAX PROJECT

Stage		Pre-Construction	Construction										O&M after construction			
Activities		Field Survey	Recruitment of Job Opportunity	Mobilization of Equipment and Materials	Site Clearance	Setting up Base Camp	Earth works	Piling and Construction of Substructure	Construction of Viaduct & Bridge	Construction of Road	Construction of Complementary Structures	Recruitment of Job Opportunity	Increase of traffic volume	Maintenance of Toll Road	Operation of Toll Road and Gate	
Social Environment	1	Resettlement/Land Acquisition	XXX													
	2	Economic Activities		+		X						+				
	3	Social and Public facilities			X			X	X	X		X		+		
	4	Split of Communities														
	5	Cultural Property														
	6	Water rights and Rights of Common														
	7	Public health Condition											X			
	8	Waste				X	X	X		X	X					
	9	Hazards (Risk)			X	X	X		X		X				+	
Natural Environment	1	Topography and Geology														
	2	Soil Erosion				X		X		X						
	3	Ground water														
	4	Hydrological situation				XX	X	X		X	XX					
	5	Coastal Zone														
	6	Fauna and Flora				X										
	7	Meteorology											X			
	8	Landscape						X	X	X						
Pollution	1	Air Pollution			XX		X		X	X	X		X		++	
	2	Water Pollution					X		X							
	3	Soil Contamination														
	4	Noise and Vibration			XX		X	X	X	X	X		X		X	
	5	Land Subsidence														
	6	Offensive Odor														

Note: +: Positive Impact X: Negative Impact, but its magnitude will not be significant. XX, XXX: Negative Impact, of which special attention has to be paid

TABLE 11.1-2 MATRIX OF SCOPING RESULTS

Name of Proponent		Department of Public Works and Highway (DPWH)			
No	Impacts	Rating		Reasons of Evaluation	
		Impacts Construction			
		During	After		
<i>Social Environment: *Regarding the impacts on "Gender" and "Children's Right", might be related to all criteria</i>					
1	Involuntary Resettlement	A	D	Approximately 50 households (There are individual houses sited on the ground and not condominium type housing. Number of Affected persons is counted approximately 280) are allocated on the expressway alignment route. Within above figures 40 households in Barangay 191 are identified as informal settlers, they have been inhabited for long years with solid concrete and mortar structure units. Other 9 households are settled in Barangay Tambo and detail of their family and life style are under the social survey process. Other than above said households there are small retail shops, nursery school, basket court, Land transportation office and security guard station of Barangay affected and counted approximately 17 cases. Total of 9 cases of Business establishments and ex-post office remained after burned within the property of MIA are partially affected and they have to move back to their original location. Basically the most of expressway ROW is located within the property belonged to MIA and Philippine Air Force etc., The area for construction of interchanges and ramp ways are to be required for new land acquisition.	
2	Local economy such as employment and livelihood, etc.	B-/B+	+	During the construction period, small retail shops and vendor shops which managed especially by women are affected due to reduced numbers of daily customer and as a results their sales accounts may temporally be reduced. Meanwhile employment opportunity for construction labor will be increased. Viaduct structure of the expressway provides shade along the route, but the right to sunlight is not a subject to the problem for local peoples in the tropical region. In operation period of the expressway the traffic volume of the project area will divert to the expressway and smooth traffic along the existing road will encourage vicinity business activities therefore vicinity sales accounts will not be decreased so much but increased. The users of the expressway will have their trip destination with time saving and no traffic jam, and expressway has this service function to them as to be bypass for the project area. Current status of the existing congested traffic environment of the area will be improved and it will be encouraged to stable and active business activities for the vicinity peoples. Transferring and transporting both peoples and goods are to be harmonized as to be contributed local economy.	
6-1	The poor	B-	B+	Some poor class peoples are inhabited; little direct impact is expected by the project. Many opportunities on participation of project related business activities and employment are generated during the construction period. After construction vicinity business activities will be increased due to enhancement of the existing road condition and improved roadside environment, employment opportunities also increased consequently.	
<i>Natural Environment</i>					
14	Soil Erosion	B	D	Almost no earthwork by cutting and embankment is applied; it may not be caused soil erosion impact. The construction work is viaduct and bridge type, abutments of the bridge is situated outside of the river and no pier installed in the water, side protection of abutment is constructed with concrete wall and no earth embankment, so that soil erosion will be not occurred. In some case of excavation activities for pier foundations, piles of excavated earth will cause temporally	
20	Landscape	B	B	Contrast between location of the viaduct and landmark feature will give quality of perceptual impact to the pedestrian. Probably the location of viaduct sited back side of the feature will be sense of stable due to the design figure and motional direction of the feature. Construction activities will cause busy looks during the construction period especially at roundabout of landmark sited near the front of terminal 3.	

21	Global Warming	B	C	<i>The project will contribute to solve increase of traffic volume and traffic congestion in future, increase of CO₂ will affect global warming impact due to traffic volume increased. Currently Metro Manila has a policy to promote tree planting program to contribute global warming phenomena. Through the study of CO₂ emission comparing the case of with project and without project is preparing.</i>
<i>Pollution</i>				
22	Air Pollution	B	C	<i>Air pollution will be expected due to generate vehicle emission and dust by construction activities during the construction period. After construction traffic congestion will be mitigated and less air pollution will be expected than before. However the traffic volume will be increased consequently air pollution become to be worsening unless proper regulations on traffic control vehicle emission gas etc., by the Philippine Government concerned.</i>
23	Water Pollution	B	D	<i>Excavation activities of foundation work of piers may cause temporally impact when local drainage and sewerage system will be affected by construction activities. The existing drainage and sewerage system shall be checked together with LGUs engineer and safety management of construction work shall be prepared for avoiding water pollution problems. After construction the storm drainage system will be improved and no water pollution will be expected. Currently water quality of Paranaque river is polluted and functioned as urban drainage channel.</i>
25	Waste	B	D	<i>Wastes and refuse materials from construction site and workers camp yard are usually generated, these wastes must be checked either dangerous, toxic, spoiled or not, if these risky wastes are identified disposed to the specific place directed by LGU. Basically these wastes can be managed by the contractor during construction period.</i>
26	Noise and Vibration	B	B	<i>Operation activities of construction equipment and vehicles generate certain level of noise and vibration and affect nearby living local peoples. These impacts will be temporally during construction period. After construction numbers of vehicles on the expressway and existing road will cause noise and vibration impacts to the vicinity peoples. Because of high elevation of the viaduct generated noise from the expressway will diffuse in the air, so that noise is not so much level.</i>
30	Accidents	B	C	<i>According to increase numbers of construction vehicle during the construction period, ration of traffic accident will increase. Management of transportation operation in the construction site is one of the important responses for the contractor. After the construction traffic flow will be improved because of improvement of road facilities, so that accident may be reduced. The expressway will be furnished with all standard safety measures. Very little impact is expected.</i>
31	Traffic congestion	B	+	<i>Traffic control management will be required during construction period; an effective road width will be reduced narrow for construction activities, so that traffic congestion will be accelerated. After the construction, traffic volume will be diverted in to the expressway and traffic congestion will be much reduced on the existing road.</i>

Source: The study team

11.2. Environmental Monitoring Plan

The Environmental Monitoring Plan shows the framework on which the NAIAX Project Proponent and the various stakeholders are willing to implement to continuously supervise the environmental protection measures during the Pre-construction/Construction, Operation/Maintenance, and Abandonment periods of the proposed NAIAX Project.

This Environmental Monitoring Plan provides the NAIAX Project Proponent a guideline on monitoring, verification, and making of the necessary corrective actions on the Project's various environmental impacts. In addition, this will also provide the NAIAX Project Proponent some baseline information in recording and examining the long-term effects of the Project's different environmental aspects and corresponding impacts, on which future strategies (i.e. remediation, clean-up activities, etc.) can be formulated and applied. **TABLE 11.2-1** shows the Environmental Monitoring Plan of the proposed Project.

TABLE 11.2-1 MATRIX OF THE NAIAX 'S ENVIRONMENTAL MONITORING PLAN

Concern	Parameter to be Monitored	Sampling Measurement Plan			Responsibility	Estimated Cost
		Method	Frequency	Location		
A. Pre-construction stage						
Affected houses, establishments, and trees	No. of houses and Establishments to be directly affected	Survey	Once	Affected location along the proposed highway alignment	DPWH DPWH Contractor	Part of Feasibility Study Costs
	No. of trees	Terrestrial Survey/ Inventory	Once			
Air Quality	Dust	Visual observation	Once	Immediate vicinity of construction sites	DPWH Contractor	Minimal
	NO ₂ , SO ₂	Air sampler	Once	Identified sampling station	DPWH Contractor	PhP 10,000 per sampling station
	TSP	High volume sampler	Once			
	Noise	Digital sound level meter	Quick sampling			
Water Quality	TSS, Oil& Grease, color	Quick sampling	Quick sampling	The bridge location of identified/affected water bodies	DPWH Contractor	PhP 5,000 per sampling activity
B. Construction stage						
Affected houses, establishments, and trees	No. of houses and Establishments to be directly affected	Survey	Twice (Initial and Confirmatory)	Along the proposed highway alignment	DPWH DPWH Contractor	Part of Feasibility Study Costs
	No. of trees	Terrestrial Survey/ Inventory				
Air Quality	Dust	Visual observation	Daily	Immediate vicinity of construction sites	DPWH Contractor	Minimal
	NO ₂ , SO ₂	Air sampler	Quarterly	Identified sampling station	DPWH Contractor	PhP 10,000 per sampling station
	TSP	High volume sampler	Quarterly			
	Noise	Digital sound level meter	Quick sampling			
Water Quality	TSS, Oil& Grease, color	Quick sampling	Quick sampling	The bridge location of identified/affected water bodies	DPWH Contractor	PhP 5,000 per sampling activity
Solid Wastes	Tons/day, no. of items/day	Visual observation,	Daily	Construction site, office/base camp	DPWH Contractor	Marginal cost
Hazardous	Liters/No. of	Visual inspection/	Monthly	Construction site,		

Concern	Parameter to be Monitored	Sampling Measurement Plan			Responsibility	Estimated Cost
		Method	Frequency	Location		
Wastes	drums (liquids) Kilograms (solids)	weighing		office/base camp		
Occupational Safety	No. of work-related injuries No. of safety man-hours	Log-book registration	Daily	Immediate vicinity of the construction sites, command center		
Public Perception/Acceptability	No. of valid complaints	Consultations with local officials and residents	Variable	Affected barangay/s	To be determined	
C. Operation and Maintenance stage						
Storm water Run-off	BOD, COD, pH, heavy metals, TPH	Quick sampling	Quarterly	Drainage outlets	NAIAX Operator through subcontractor	Php 20,000 per sampling activity
Air Quality	NO ₂ , SO ₂ , TSP	Air sampler High volume sampler	Quarterly	To be determined		
	Noise	Digital sound level meter	Quarterly	To be determined		
Solid Wastes	kgs./day	Visual inspection/ weighing	Daily	Field Operations Center	NAIAX Operator	Part of Operations costs
Hazardous Wastes	Liters/No. of drums (liquids) Kilograms (solids)	Visual inspection/ weighing	Quarterly	Field Operations Center	NAIAX Operator	Minimal, Part of Operations costs
Occupational Safety	No. of work-related injuries No. of safety man-hours	Log-book/database registration	Daily	Field Operations Center	NAIAX Operator	Part of Operations costs
Expressway Safety	No. of vehicular accidents	Log-book/database registration	Daily	Field Operations Center	NAIAX Operator	Part of Operations costs
Public Perception/Acceptability	No. of valid complaints	Consultations with local officials, residents	Variable	Affected barangay/s or concerned citizens	NAIAX Operator	To be determined

11.3. Resettlement Action Plan

The implementation of the NAIAX is expected to yield a number of involuntary resettlement impacts as a result of land acquisition for ROW. Among these social impacts is the displacement from their abode are an estimated 40 informal settler families that are residing beside the Paranaque River at Barangay 191. Refinements to the road alignment had avoided displacing other landed families and barangay offices in Barangay 185. Other affected areas are commercial establishments with expired leases (with MIAA) that have partially affected offices and facilities along the road alignment.

The public consultation meeting involving the affected persons from Barangay 191 had indicated that all of them desire to shift to government relocation site preferably within the city in order to minimize the impact of their dislocation from their present livelihood and support services. **FIGURE 11.3-1** shows the map of the project site indicating the location of the proclaimed relocation site and pictures of the present condition.



FIGURE 11.3-1 LOCATION OF LOTS WITH PROCLAIMED FOR USE AS RELOCATION SITE

11.4. Implementation Schedule

The preparation and implementation of the RAP would take about one year and nine months to complete. Activities include: a) the preparation of the draft RAP, b) RAP review and approval process; c) Creation of a Resettlement Implementation Committee (RIC) to implement the RAP in the field; d) Signing of the Memorandum of Understanding among DPWH, MIAA, NHA and LGU Pasay City purposely to plan and develop the relocation site; e) Delivery or actual payment of Compensation and other benefits to PAFs; f) Preparation and implementation of Income Restoration Programs (IRP); and g) monitoring and evaluation.

ACTIVITIES	2011				2012				2013				2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1 Resettlement Action Plan (RAP) Preparation		■														
2 RAP Review & Approval			■													
3 Creation of RIC and RAP Implementation				■	■	■	■	■								
4 Signiing of MOU, Planning and Relocation Site Establishment				■	■	■	■	■								
5 Delivery of Compensation and Other Benefits to PAFs				■	■											
6 Shifting of PAFs to Relocation Site								■								
7 Preparation and Implementation of Income Restoratin Projects					■	■	■	■								
8 Monitoring & Evaluation			■	■	■	■	■	■	■	■	■	■	■	■	■	■
9 Detailed Design					■	■	■	■								
10 Construction Phase									■	■	■	■	■	■	■	■

FIGURE 11.4-1 RESETTLEMENT SCHEDULE

12 PROJECT EFFECT

(1) Comparison of Average Travel Time and Travel Speed of At-grade Road and Expressway

FIGURE 12.1-1 with blue chart above shows the comparison of average travel time between ordinary road and NAIAX. in using the expressway, it requires only 7.5 minutes to travel the whole route, as compared to 22.4 minutes using the at-grade route 1 (Roxas boulevard to SLEX), and 18.6 minutes using the at-grade route 2 (Slex to Roxas boulevard), with a savings of 14.9 minutes and 11.1 minutes, respectively.

The chart with the red color below shows the comparison of average travel speed between ordinary road and expressway. in using the expressway, the travel speed can be maximized at 45 km/hr as compared to 17.6 km/hr for route 1 (Roxas boulevard to SLEX), and 21.4 km/hr for route 2 (SLEX to Roxas boulevard).

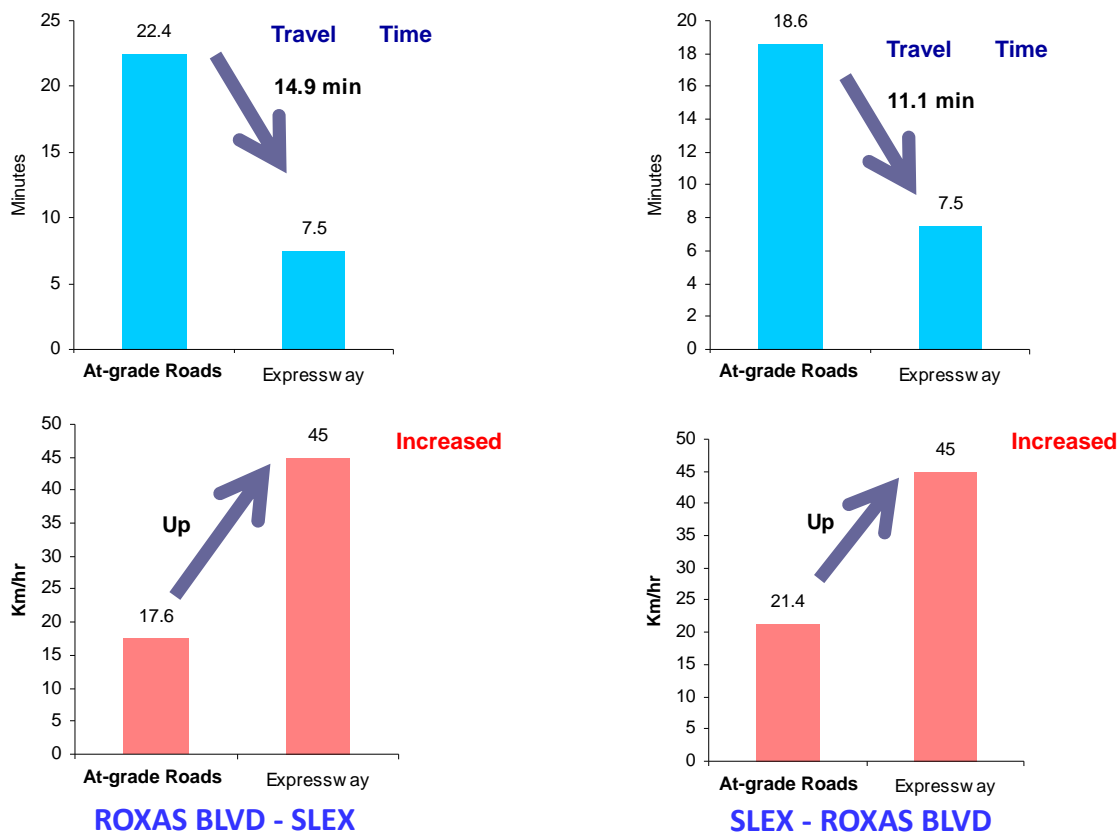


FIGURE 12.1-1 COMPARISON OF TRAVEL TIME AND AVERAGE TRAVEL SPEED BETWEEN ORDINARY ROAD AND EXPRESSWAY

(2) Vehicle Travel Hour

The savings in vehicle travel hour which is estimated by traffic assignment is presented in **FIGURE 12.1-2**. If NAIAX is constructed, around 7,245 vehicle-hours will be saved in 2015. This number increases to about 24,319 in 2020 and about 28,708 in 2030. Saving in vehicle-hour will help in improvement of environment.

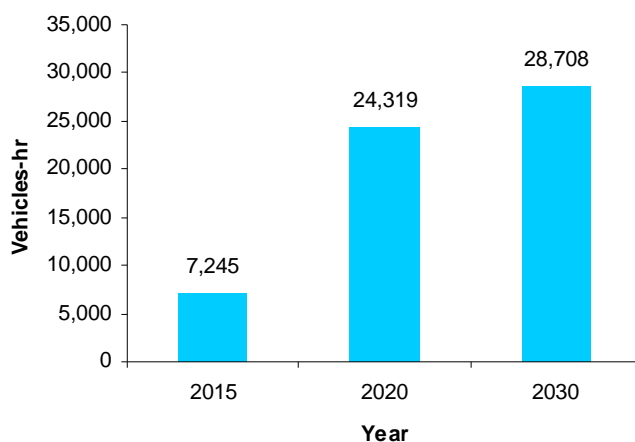


FIGURE 12.1-2 SAVINGS IN VEHICLE TRAVEL HOUR/DAY (WITH – WITHOUT PROJECT)

(3) Unquantifiable Effects

In addition to improvement of transport efficiency and direct economic impacts, the following positive impacts are expected to be generated from the NAIAX.

1) Contributes to Formation of Expressway Network

One of the serious constrains of the existing expressways in the country is the lack of network formation which would provide seamless linkages among the expressways. NAIAX can contribute in the formation of expressway network by linking Skyway to Cavite Coastal Road Expressway.

2) Contributes to Economic Development

Interview results to manufacturing industries located inside the economic zones in Cavite mentioned that one of the problems affecting their business operation is the heavy traffic congestion particularly roads connecting to ports and airports. Construction of NAIAX will remove one of the problems mentioned by industry players.

3) Contributes to Promotion of Tourism Industry

Upon exiting from airport's terminal, tourists of the country are exposed to the chaotic transportation situation of the country. Travel time survey indicated that during peak hours, it took more than 21-minutes to reach SLEX from Terminal 1 and 2 and it took almost 40-minutes for motorists moving in opposite direction. Travel speed is between 8 to 15 km/hr.

This level of congestion leaves many tourists of the country frustrated and creates a negative impression that will discourage them to promote the country to their friends and associates or to return back in the future. Construction of NAIAX although will not totally erase this problem is expected to lessen this negative impression.

4) Contributes to Social Development

Large scale construction work will need large number of labour forces. Jobs created from this project will help reduce the number of unemployed workers. And during operation and maintenance stage, long term or stable jobs will be generated which would help uplift people's lives.

5) Contributes to Affect Disaster Response

During national emergency causes by disasters, transportation hubs like ports and airports are very critical facility to realize swift movement of people and goods. The proposed NAIAX will be constructed taking into account ability to withstand disaster. When disaster struck in distant places, the NAIAX will form part of Skyway/SLEX and Coastal Road Expressway that will feed the airport to affect emergency response.

6) Contributes to Growth of Construction Industry

Project of this scale will contribute to the growth of construction industry in the country. Constant availability of jobs will improve their financial conditions which would allow them to invest more for technology innovation, employment of regular engineers, and capacity development of employees.

7) Improvement of Environment along Existing Roads

A large volume of traffic will be diverted to the new expressway from the existing roads, thus traffic load on existing roads will be reduced, resulting in improvement of environment along existing roads.

13 SUPPLEMENTAL WORK

13.1. Grade Separation Alternative Study

(1) Location of Intersection

The grade separation plans in critical intersections along NAIAX were studied. The location of the targeting intersections is indicated in **FIGURE 13.1-1**.

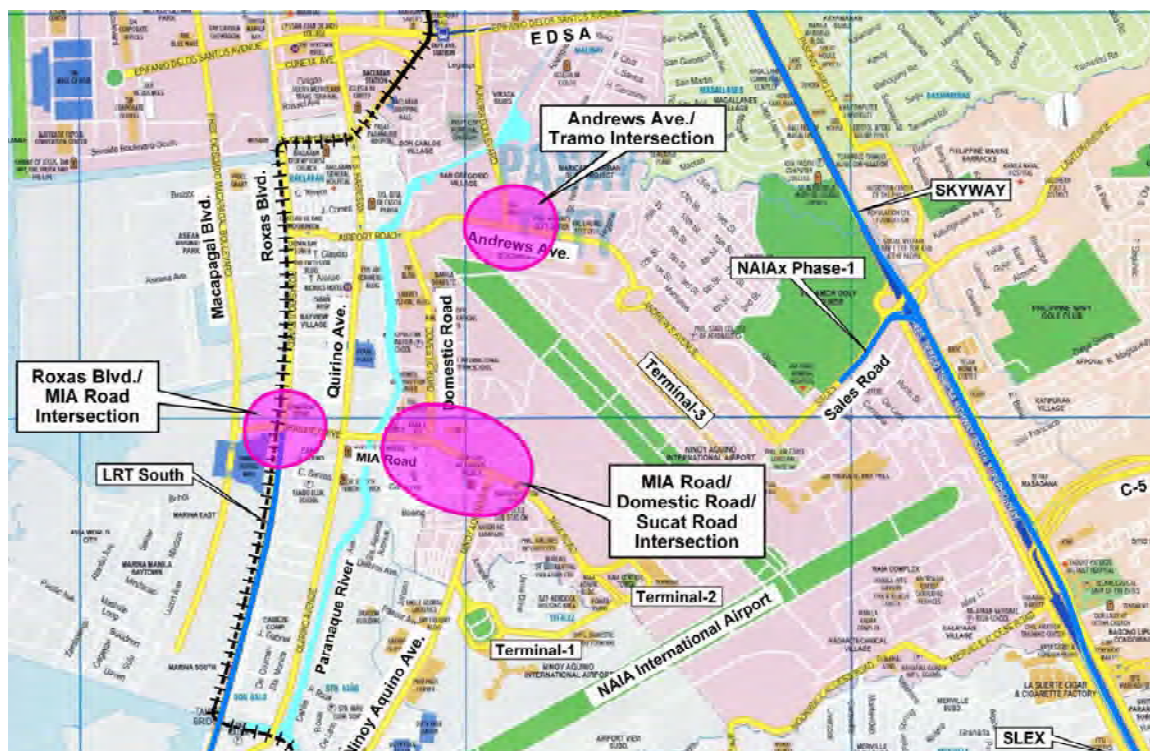


FIGURE 13.1-1 LOCATION OF CRUCIAL INTERSECTION ALONG NAIAX PHASE-2

(2) Recommended Schematic Design of Grade Separation

The three (3) grade separations on the crucial intersection were planned and designed. The schematic designs on each grade separation are illustrated as **FIGURE 13.1-2**.

(Confidential)

FIGURE 13.1-2 SCHEMATIC DESIGN OF GRADE SEPARATION

13.2. Further NAIAX Alignment Alternative Study

Concerned to the NAIAX alignment, further alternative study has been done. The three (3) alternatives are prepared, Parañaque River alignment, Airport Road alignment and MIAA Compound alignment. **TABLE 13.2-1** explained the comparative analysis among alternatives. In the result, compared with the original alignment, all three alternatives are not recommended.

TABLE 13.2-1 COMPARATIVE ANALYSIS FOR NAIAX FURTHER ANALYSIS

(Confidential)

13.3. C-5 Extension Alignment Alternatives

(1) Alignment Study of C-5 extension

Three (3) alignment alternatives of C-5 extension have been prepared. The comparative analysis is indicated as **TABLE 13.3-1**. The Alternative 3 was recommended for both Expressway and National Road Standard. The alternative 3 was recommended among Expressway Standard, and the alternative 3C among National Road Standard.

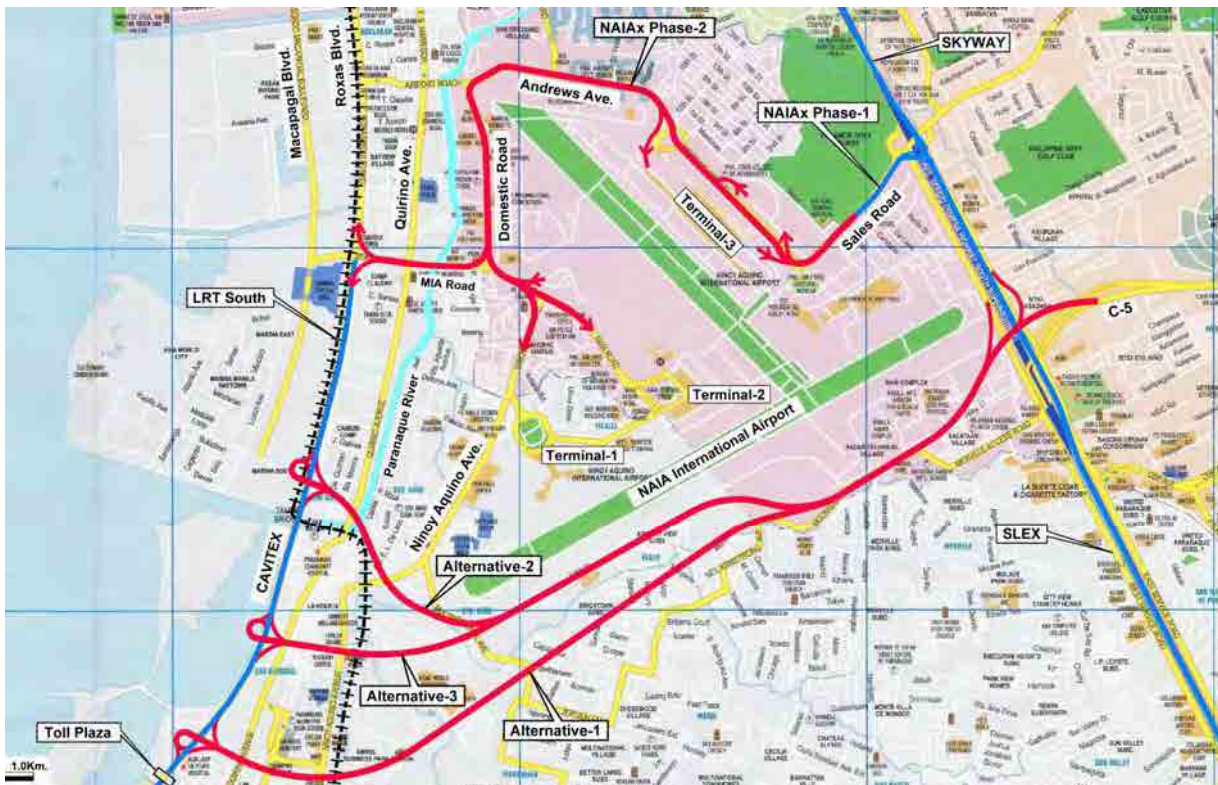


FIGURE 13.3-1 C-5 EXTENSION ALIGNMENT ALTERNATIVES

TABLE 13.3-1 COMPARATIVE ANALYSIS RESULT OF C-5 EXTENSION ALIGNMENT ALTERNATIVES

<p>(Confidential)</p>

(2) Franchise Issue of C-5 Extension

There are some issues on the franchise of C-5 Extension as follows.

- UEM-MARA has a franchise for R-1 to R-3.
- Citra Metro Manila Tollways Corp. has a franchise of Skyway with which C-5 Extension is connected.
- If C-5 Extension is implemented by PPP, will an open bidding be done, or negotiated with UEM-MARA?
- If C-5 Extension is implemented by DPWH as National Road Standard, UEM-MARA will complain.
- It may take a long time to conclude a franchise issue.

13.4. Alternative Analysis between NAIAX, Grade Separation and C-5 Extension

The comparative analysis among the alternatives, Original NAIAX plan, Grade Separation, C-5 Extension with expressway standard and C-5 Extension with National road standard have been carried out. **TABLE 13.4-1** explains the route of the alternatives.

TABLE 13.4-1 COMPARATIVE ANALYSIS BETWEEN NAIAX, GRADE SEPARATION AND C-5 EXTENSION ALTERNATIVE

<p>(Confidential)</p>

13.5. Recommendation

Based on the comparative analysis, the following are concluded and recommended.

(1) NAIAX Phase-2

- Being recommended to implement this project.
- It is a long term solution for traffic capacity expansion.
- Accessibility to NAIA Terminals will be greatly improved.
- Image of the country will be highly improved by foreign/domestic investors due to easy access to NAIA: International/Domestic Gateway.
- NAIAX will reduce traffic congestion of at-grade roads.
- The Project is ready for tendering.

(2) Grade Separation Alternative

- It improves traffic condition at the intersection, but not for adjacent sections, thus it is not a long term solution.
- If grade separation structures are built, construction of an expressway in the future will be practically impossible.

(3) C-5 Extension

- Timing of the implementation is uncertain due to franchise issue.
- Franchise issues should be firstly concluded.
- All kinds of efforts should be made to reduce negative social impacts. (over 500 houses or 3,000 people will be affected)

CHAPTER 1

INTRODUCTION

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INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

The Philippines has been experiencing relatively slower economic development partly due to limited flow of direct investments into manufacturing sector compared to other rapidly growing ASEAN countries after the recovery from Asian Economic Crisis. In order to foster both domestic and foreign investments, improving overall investment climate including road network has been an urgent matter. In particular, the economic activities are extremely concentrated in Metro Manila where 37% of GDP and 13% of total population are accumulated in merely 0.2% of the country's land. This extreme concentration causes serious congestion and delays of distribution of goods and movement of people, resulting to huge damage to economy and lowering the country's international competitiveness as an investment destination. Likewise, living condition in Metro Manila has been eroded due to air pollution and traffic noise caused by chronic congestion. In summary, solving traffic congestion in Metro Manila by networking surrounding cities and upgrading/expanding highways around Mega Manila – the area covering Metro Manila, Central Luzon and CALABARZON – contributes to improvement of both investment climate and living climate.

In early 2000s, the plan to construct NAIA Expressway (NAIAX) was envisioned in line with construction of NAIA Terminal III. Phase I construction of NAIA Expressway and its related roads project started in 2003 and completed in 2010 with the National Government funding. NAIAX Phase II is the continuation of Phase I and is planned to be implemented under the Public-Private Partnership (PPP) Scheme.

1.2 OBJECTIVES OF THE PROJECT

Objectives of the project are as follows;

- To provide easier and improved access to three (3) NAIA Terminals which are the international gateway to the Philippines.
- To reduce traffic congestion of roads related to NAIA Terminals.
- To improve international/domestic investment environment for faster economic development.

1.3 NECESSITY OF THE PROJECT

(1) Sectoral Linkages

The NAIA Expressway is intended to alleviate the existing and future traffic problems going to and from the country's premier airport, the Manila International Airport/Ninoy Aquino International Airport Complex, a major gateway and economic hub. It will provide the needed high-speed access route to NAIA Terminal 3, and have the direct links to Passenger Terminals 1 and 2 and the International Cargo Terminal. Furthermore, the NAIA Expressway will provide a seamless link between the Southern Luzon Expressway ("SLEX")/Skyway and the Manila-Cavite Toll Expressway/Roxas Blvd.

(2) Project Linkages with the National and Regional Development Thrusts, Goals, Gender and Development

The NAIA Expressway will support national development objectives of sustaining the viability of Metro Manila as a primary engine of growth in the Philippines for industry, commerce, and services, as well as for social and cultural development, by making the mobility of people and goods in the area faster and less costly particularly due to savings in vehicular operation and travel time costs. The project will also boost tourism by making the NAIA Complex more accessible to foreign and local travelers. The project will stimulate development particularly in Metro Manila and its surrounding provinces, especially in Cavite which has been experiencing rapid urban development. It will also support the development in the nearby reclamation area facing Manila Bay and the former military bases of Villamor and Bonifacio which are emerging as new commercial hubs. The NAIA Expressway will support gender and development, especially as it facilitates the movement of women engaged in the pursuit of trade, tertiary services, and education while the project will also significantly decongest the area around NAIA and, thus, reduce noise and pollution in support of the Government's climate change agenda.

1.4 PROJECT RATIONAL

(1) Philippine Development Plan (2011 – 2016)

Philippine Development Plan (PDP), 2011-2016 was announced in 2011. Development policies of infrastructure are as follows;

DEVELOPMENT POLICIES OF INFRASTRUCTURE

“Accelerating Infrastructure Development”

- (1) To optimize resources and investment
 - Improve project preparation, development and implementation
 - Synchronize planning and budgeting
 - Coordinate and integrate infrastructure initiative
- (2) To attract investments in infrastructure
 - Improve the institutional and regulatory environment of the infrastructure sector
 - Encourage PPPs
- (3) To foster transparency and accountability in infrastructure development
 - Encourage stakeholder participation
- (4) To adopt to climate change and mitigate the impacts of natural disasters
 - Institutionalize Climate Change Act (CCA) and Disaster Risk Reduction Management (DRRM)
- (5) To provide productive employment opportunities
 - Adopt a labor-intensive scheme where applicable.

With regards to the transport sector, issues and challenges are established as follows;

TRANSPORTSECTORISSUESANDCHALLENGES

- (a) Assessment and Issues
 - Lack of integrated and coordinated transport network
 - Overlapping and conflicting functions of transport and other concerned agencies
 - Transport safety and security concerns
- (b) Strategic Plan and Focus
 - Adopt a comprehensive long-term National Transport Policy (NTP)
 - Develop strategic transport infrastructure assets
 - Prioritize asset preservation
 - Provide access to major and strategic tourism destinations and production areas
 - Promote environmentally sustainable and people-oriented transport
- (c) Develop an Integrated Multi-modal Logistics and Transport System
 - Identify and develop strategic logistics corridors based on a National Logistics Master Plan
 - Improve Roll-on/roll-off ship (RORO) terminal system
 - Explore ASEAN connectivity through sea linkages
- (d) Separate the Regulatory and Operation Functions of Transport and Other Concerned Agencies. To address the overlapping and conflicting functions of transport and other concerned agencies.
- (e) Comply with Safety and Security Standards. To ensure transport safety and standards.
- (f) Provide Linkages to Bring Communities into the Mainstream of Progress and Development. To promote conflict-affected and highly impoverished areas.

(2) RoadDevelopmentGoals

Public Investment Program (PIP) (2011 - 2016) was formulated by DPWH in 2011. Goals were set as follows;

DEVELOPMENTGOALSUNDERPIP

1. Provide safe environment through quality infrastructure facilities;
2. Increase mobility and total connectivity of people through quality infrastructure resulting to improved quality of life;
3. Strengthen national unity, family bonds and tourism by making the movement of people faster, cheaper and safer;
4. Facilitate the decongestion of Metro Manila via a transport logistics system that would ensure efficient linkages between its business centers and nearby provinces;

5. Implement more Public-Private Partnership (PPP) projects for much needed infrastructure and level playing field for investment;
6. Study the mechanism for longer maintenance period for roads and bridges; and
7. Generate more transport infrastructure with minimal budget cover or contingent liabilities.

Strategic focuses were set as follows;

STRATEGIC FOCUS

- Implement activities in the following order of priorities:
 - a. Maintenance or asset preservation – to preserve existing roads in good condition
 - b. Rehabilitation – to restore damaged roads to their original designed condition
 - c. Improvement – to upgrade road features so that they efficiently meet traffic demands; and
 - d. New Construction
- Prioritize upgrading of the national road network, as to quality and safety standards
- Prioritize national roads to address traffic congestion and safety in urban centers and designated strategic tourism destinations
- Completion of on-going bridges along national roads
- Develop more Public-Private Partnership (PPP) projects for much needed infrastructure and level playing field for investments
- Study the mechanism for a longer maintenance period (5 – 10 years) in road and bridges construction contract provision
- Prioritize flood control projects in major and principal river basins to address climate change based on master plan and adopting new technologies in flood control and slope management
- Prioritize adequate flood control and upgraded drainage design standards and facilities in flood-disaster prone areas to mitigate loss of river and damage to properties
- Promote innovative technology such as geo-textiles and coco-netting in slope protection and soil erosion control
- Promote retarding basin and rain water harvesting for non-domestic use
- Prioritize water supply in designated strategic tourist destinations/centers

(3) Master Plan on High Standard Highway Network

The study of master plan on High Standard Highway (HSH) Network Development was conducted in Year 2010. **Figure 1.4-1** shows the proposed HSH network in Metro Manila and 200 km sphere. Based on this master plan, Public Investment Program (2011-2016) for expressway projects was formulated.

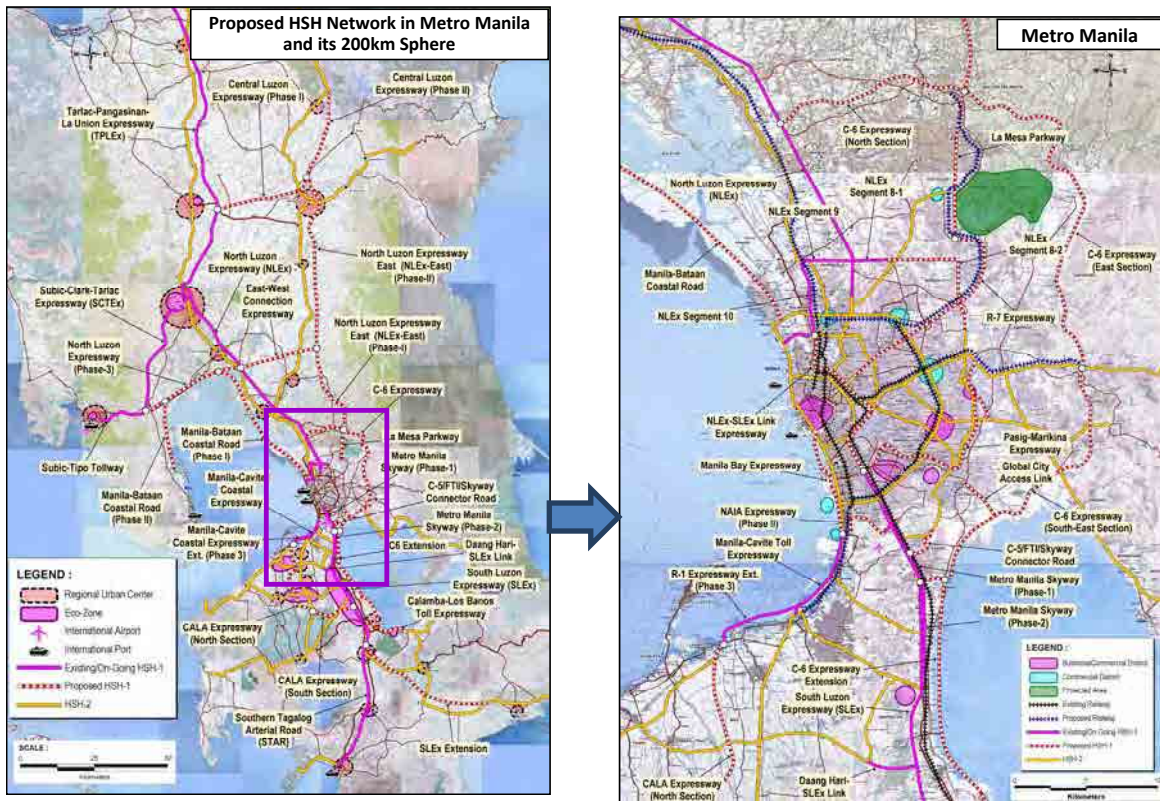


FIGURE 1.4-1 PROPOSED HSH NETWORK

Source: *The Study of Master plan on High Standard Highway Network Development, 2010, JICA*

NAIAX is one of the 1st priority projects in this Master plan shown in **Table 1.4-1**.

TABLE 1.4-1 PROPOSED HSH PROJECTS PRIORITY

	Name of HSH	Length (km)	Cost (billion pesos)
1st Priority Group	NLEX-SLEX Link Expressway	13.4	31.14
	CALA Expressway	41.8	19.67
	C-5/FTI/SKYWAY Connector Rd.	3.0	4.76
	NAIA Expressway (Phase 2)	4.9	12.18
	C-6 Expressway/Global City Link	66.5	54.29
	Central Luzon Expressway(CLEX)	63.9	29.23
	SLEX Extension (to Lucena)	47.8	16.45
	Calamba-Los Banos Expressway	15.5	5.23
	Sub-total	256.8	172.95
2nd Priority Group	R-7 Expressway	16.1	25.81
	NLEX East / La Mesa Parkway	103.0	38.94
	Manila – Bataan Coastal Road	70.3	72.94
	NLEX (Phase 3)	36.2	28.42
	East-West Con. Expressway	26.6	16.48
	C-6 Extension	43.6	18.61
	Manila Bay Expressway	8.0	46.54
	Pasig Marikina Expressway	15.7	49.58
	Sub-total	319.5	297.32
TOTAL		576.3	470.27

Source: *The Study of Master plan on High Standard Highway Network Development, 2010, JICA*

1.5 CURRENT ROAD INFRASTRUCTURE SECTOR AND ITS DEVELOPMENT PLAN RELATED TO THE PROJECT

DPWH Public Investment Program (PIP) for 2011 -2016 contains the following target and priority programs.

TABLE 1.5-1 TARGET OUTCOMES OVER THE MEDIUM TERM

	Year			Requirement
	2011	2014	2016	
a. National Arterial Roads(15,987km)	94% Paved	100% Paved in good condition		<ul style="list-style-type: none"> • Paving of 1,443km • Rehab./ widening/ upgrading/ construction of 2,828km
b. National Secondary Roads(15,372km)	72% Paved	81% Paved	100% Paved in good condition	<ul style="list-style-type: none"> • Paving of 3,329km • Rehabilitation of 1,798km
c. National Bridge (330,089m) (7,792 bridges)	95%	98%	100% Permanent	<ul style="list-style-type: none"> • Replacement of 8,544 lm of temporary bridges • Improvement of 6,047 lm of existing bridges • Construction of 2,154 lm new bridges • Repair/rehabilitation of 104,293 lm of bridges

Source: Public Investment Program (2011-2016) As of April 2012, DPWH

Under the PIP for 2011-2016, DPWH is envisaging a total investment of 698,084 million pesos. Of this total investment requirement in the PIP, 585,938 million pesos or 84% is earmarked for the highway sector, 83, 948 million pesos (12%) for flood control works and 28,198 million pesos (4%) for other locally-funded projects over the six (6) year program.

The total investment requirement for 2013 up to 2016 is based on the annual 10% increase from the approved budget of 99,490 million pesos for Y2012.

TABLE 1.5-2(2011-2016) PUBLIC INVESTMENT PROGRAM SUMMARY

List of Project	Prior Year	Proposed Allocation (in Million Pesos)						Total (2011-2016)
		2011	2012	2013	2014	2015	2016	
1.Roads	75,703	75,047	81,246	91,697	101,347	113,722	122,878	585,938
-Foreign assisted project	41,490	19,566	14,257	30,313	28,889	35,186	39,162	167,645
-PPP	-	-	1,474	11,164	7,450	4805	-	24,894
-Locally funded project	34,213	55,481	65,243	50,219	65,008	73730	83,715	393,398
2.Flood Control Project	19,692	11,166	10,816	12,523	13,854	14,960	20,628	83,948
-Foreign assisted project	13,283	2,978	2,300	2,670	3,728	6656	12,406	30,738
-Locally funded project	6,419	8,188	8,517	9,853	10,127	8304	8,221	53,211
3. Other Locally Funded DPWH Project	36,288	4,474	7,428	5,219	5,181	3,738	2,157	28,198
GRAND TOTAL	131,683	90,687	99,490	109,439	120,383	132,421	145,663	698,084

Source: Public Investment Program (2011-2016) As of April 2012, DPWH

1.6 PAST AND FUTURE PLAN OF OTHER DONOR'S PROJECT RELATED TO PPP POLICIES

(1) Technical Assistance by ADB, AusAID, and CIDA

In terms of capacity building, “Technical Assistance for Strengthening Public-Private Partnerships in the Philippines” are being carried out as of November 2011. This is a capacity development program financed by ADB AusAID (the Australian Agency for International Development), and CIDA (The Canadian International Development Agency). The purpose of the program is to help the Philippines to clear obstacles and to pave the way for PPP. Under this program, ADB provides a US\$1.5 million grant, AusAID provides a US\$7 million grant and CIDA provides a US\$1.2 million grants. The program is to run from April 2011 to July 2013.

The expected outputs of the program are 1) Strengthening of PPP Enabling Framework, 2) Strengthening Capacity of the PPP Center, 3) Institutionalization of PPP Best Practice and 4) Establishment of Long-term Financing and Risk Guarantee Mechanisms.

(2) Other Programs and Activities

Besides ADB TA, there are several assistance programs planned by GoP and foreign agencies.

Singapore Cooperation Enterprise (SCE) has agreed with GoP to provide TA to promote PPP. The objectives of SCE TA are to:

- Achieve an in-depth understanding of the benefits and challenges for greater private sector participation in the financing of public sector projects; and the policy actions required to strengthen the enabling environment, legislative and regulatory frameworks for PPP;
- Build capabilities for key public sector officials involved in the procurement and implementation of infrastructure projects, through the implementation of a pilot PPP transaction; and
- Provide examples of Singapore's infrastructure procurement process by sharing Singapore's lessons and experience in developing successful and commercially viable PPP projects.

It was agreed that SCE will provide a grant worth approximately S\$1.423 million (P48.373 Million) to DOTC for PPP capacity development of DOTC. GoP will provide counterpart fund of S\$ 270,100. The grant will cover one-year period. Based on the Joint Press Release issued

by SCE and Temasek Foundation on March 31, 2011, SCE will work with the DOTC to develop institutional capabilities for key agencies within the Philippine Government responsible for the procurement of infrastructure projects under the PPP framework.

Furthermore, according to the Joint Press Release, SCE will send a team of Singapore PPP experts to work with DOTC to prepare and structure a pilot project for procurement under the PPP framework. The pilot project will provide a real-life and hands-on case study where Philippine Government officials can adapt relevant lessons from Singapore to bring projects to a biddable and bankable stage.

SCE will also help DOTC organize a series of capacity building workshops to build capacity for some 100 Philippine Government officials in the development and implementation of PPP transactions. During these workshops, Singapore public sector agencies, such as Public Utilities Board, Singapore Sports Council and Institute of Technical Education, will share with the workshop participants the key challenges Singapore had faced, including the policy considerations, regulatory framework and practical experiences in implementing Singapore's PPP projects. The Singapore private sector players involved in Singapore's PPP projects will also share the perspective of the private sector investors and project developers in investing in a PPP project.

There is also information about assistance coming from the World Bank. According to the World Bank's website, they are interested in helping specific projects, such as expansion of the LRT System and the sewerage system in Manila. There can be further assistance that is directed towards individual projects.

1.7 RELATION BETWEEN OTHER JICA ODA LOAN PROJECTS AND OTHER DONOR PROJECTS

Projects related of NAIAX are below.

- LRT-1 Extension Project
- NLEx-SLEx Connector Road Project

1.LRT-1 Extension Project

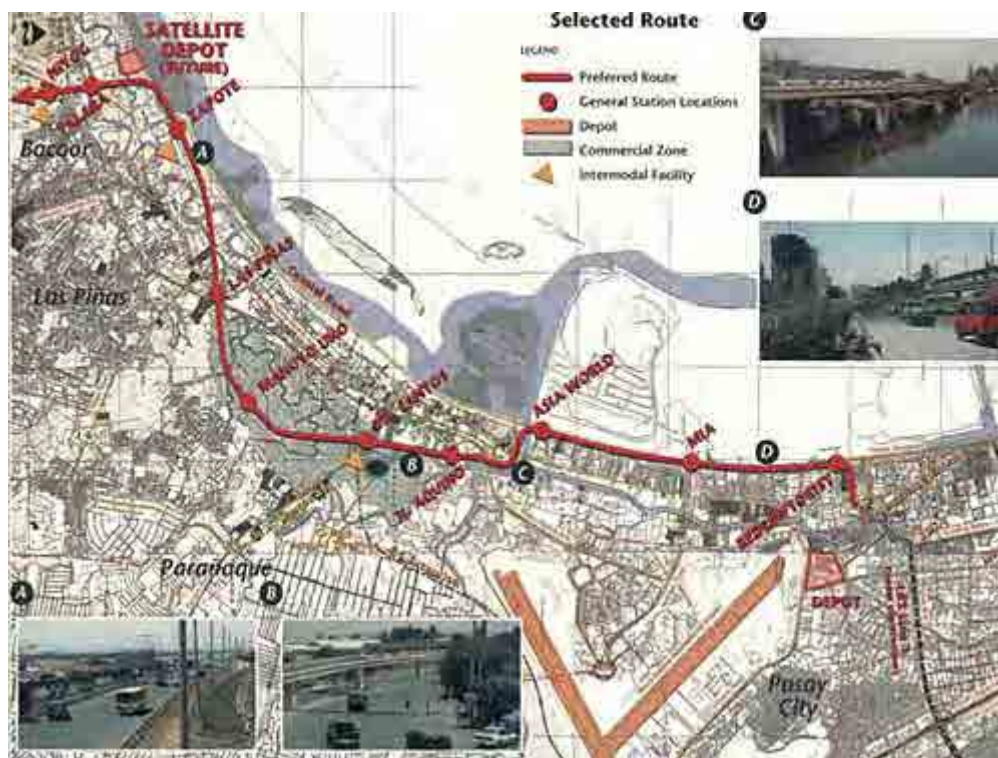
The LRT Line 1 South Extension Project starts from the existing Baclaran station through southern Metro Manila (Parañaque, Las Piñas) to Bacoor, the Province of Cavite.

- Extension of the existing 20.7 km. LRT Line 1 by approximately 11.7 km. from Baclaran to Bacoor including the initial Rolling Stock (55 train sets).
- Eight (8) passengers stations with a provision for two (2) additional stations; one (1) satellite depot and three (3) Intermodal facilities.
- Operations and Maintenance Concession of the integrated line with systems enhancement works throughout the concession period.
- Estimated Project Cost:P 61.53 Billion(GOP:₱30,593.63 Million, Private Sector:₱30,934.18 Million)
- Target Implementation Schedule

ACTIVITY	DATE
NEDA Approval	March 2012
Bidding Process	March - November 2012
Expected Date of Award/ Effectivity	December 2012
Start of Construction (Phase 1)	April 2013
Start of Construction (Phase 2)	April 2015
Commissioning Phase 1(Baclaran to Dr. Santos Ave. Station)	May 2015
Commissioning Phase 2(Dr. Santos Ave. Station to Niyog Station)	May 2017

Source: <http://www.lrta.gov.ph>

Figure 1.7-1 shows the location of LRT-1. NAIAX may affect MIAA Station and DEPOT of LRT.



Source: <http://www.lrta.gov.ph>

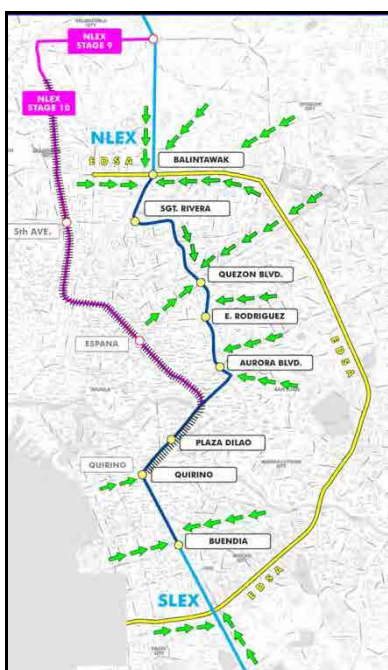
FIGURE 1.7-1 LOCATION MAP OF LRT-1 EXTENSION

2.NLEx-SLEx Connector Road Project

Currently, Metro Pacific Tollways Development Corp (MPTDC) and San Miguel Corp-backed Citra Metro Manila Tollways Corp (CMMTC), headed by San Miguel have presented their proposal on their respective NLEx-SLEx connector road projects.

The road projects will link Makati City to Caloocan and Balintawak.

Linking NLEx and SLEx has been in the pipeline since 2010, when MPTDC submitted an unsolicited proposal for it. It was supposed to be just one project until CMMTC submitted its own proposal, claiming it has the right to develop the project as an extension of its Skyway. The two proposals covered different routes for the proposed link.



TWORoads. Metro Pacific and San Miguel-Citra propose to build separate roads connecting NLEx and SLEx. MPIC's proposal is the pink line, while San Miguel-Citra's is the shorter, dark blue line. Illustration from the SMC-Citra group

Source: SMC-Citra Group

1.8 LESSON AND COUNTERMEASURE FROM THE SIMILAR PAST PROJECT

Interview surveys were conducted to government officials and the private O& M companies in order to identify the bottleneck and recommendation in the Preparatory Survey for PPP infrastructure Development Project (JICA 2011).

Table 1.8-1 shows the summary of major issues and bottlenecks of PPP project and corresponding recommendations.

TABLE 1.8-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
1. Legal Framework	<p>1.1 There are two laws/E.O. to allow the private sector to invest infrastructure projects:</p> <p>a) RA 7718 (BOT Law) and its IRR</p> <p>b) EO 423 and its Guidelines and Procedure for entering into joint venture agreement between the Government and the private entities.</p> <ul style="list-style-type: none"> ▪ No NEDA ICC nor NEDA Board's project approval is required. ▪ Head of Agency has authority to approve the JV Agreement regardless of project cost. 	<p>1.1 Options:</p> <p>Option 1 : EO 423 be abolished and integrated into RA 7718</p> <p>Option 2 : Modification of Guidelines and Procedure</p> <ul style="list-style-type: none"> - Project should be approved by NEDA ICC or NEDA Board - Ceiling of project cost should be specified. - Enough time should be given to challengers.
	<p>1.2 Modification of IRR of RA 7718 Amendments of IRR is being studied on</p> <ul style="list-style-type: none"> i) Approval of Individual Projects and Draft Contract, ii) List of Priority Projects, iii) Publication of Invitation, iv) Approving Authority for the Contract, v) Contract Variation, vi) Protest Fee, vii) Timelines, viii) Substitution/Withdrawal of a Member of a Consortium/Joint Venture, ix) Government Shoulder the Differential, x) Period of Comparative Bids Preparation, xi) Information Disclosure of Unsolicited Proposal, xii) New ROW Acquisition Under Unsolicited Proposal 	<p>1.2 Amendments should be finalized as early as possible.</p>
	<p>1.3 Creation of PPP Laws Present BOT Law is for the one type of PPP schemes, which should be improved by adding other PPP schemes so as to add more flexibility to other types of PPP schemes and to specify the Government's responsibilities.</p>	<p>1.3 Study on creation of PPP Law should start.</p>

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 1.8-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
2. Institutional Framework	2.1 Lack of Experiences/Capacity of Government Officials for Planning and Implementation of PPP Projects <ul style="list-style-type: none"> - Historically, planning and implementation of BOT projects was led by the private sector's initiative. - The Government is discouraging the unsolicited proposals. - The Agencies are required to be more pro-active and take a leadership for PPP projects. 	2.1 Agencies should take a leadership for promotion of PPP projects. <ul style="list-style-type: none"> - Develop priority projects with implementation priority and firm implementation schedule. - The roles of the private sector, government agencies and other authorities as well as LGUs in transport infrastructure development in operation and management needs to be defined.
	2.2 No PPP Project Specialized Office except DPWH.	2.2 Organize PPP Specialized Office.
	2.3 BOTCenter has been not so active.	2.3 In close coordination with Agencies, BOT center should be more active in project development of PPP projects.
	2.4 Strengthening of DPWH Planning Service and PMO-BOT <ul style="list-style-type: none"> - In line with the DPWH Rationalization Plan, DPWH is planning to upgrade existing PMO-BOT to PPP Service. 	2.4 PMO-BOT should be upgraded to PPP Service as early as possible.
	2.5 Materials for PPP Capacity Development and manuals/standards are incomplete. <ul style="list-style-type: none"> - Training materials for PPP - Standard PQ/Tender and Draft Toll Concession Agreement - O & M manual 	2.5 Necessary materials, standards and manuals should be prepared. DPWH should establish regular PPP training course.
3. PPP Project Financing	3.1 Long period (sometimes years) is required for financial closure due to unfavorable offer of banks to the investor (short repayment period with no grace period and high interest rate). Some commercial banks are not familiar with the PPP project financing.	3.1 PPP fund to finance the private entities needs to be created.
	3.2 Delay in ROW acquisition delays financial closure.	3.2 Refer to 4.4

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 1.8-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
3. PPP Project Financing	3.3 Project Development Fund (PDF) of BOTCenter is not fully utilized.	3.3 PDF needs to be revitalized by increasing fund as well as establishment of rules and guidelines for usage.
	3.4 On the part of financing the Government expenditure, it is still relying on the project loans from the international lending institutions and/or bilateral sources.	3.4 PPP fund to finance the Government expenditure needs to be studied and established.
4. Bottlenecks in PPP Project Cycle	4.1 <u>Master Plan/Basic Plan/Project Identification Stage</u> <ul style="list-style-type: none"> • Master Plan and/or basic plans were not updated. • Listing of projects and their implementation schedule was not updated. • Project promotion has been largely relied on the private sector. 	4.1 Master Plan, project list and project implementation priority should be always updated and firm implementation schedule and corresponding budgeting should be done.
	4.2 <u>Business Case/Feasibility Study Stage</u> <ul style="list-style-type: none"> • Level of feasibility studies has been incomplete/inadequate. • Soon after a feasibility study is completed, it has been difficult to go into a tendering stage due to unfixed ROW, lack of ECC, lack of LGUs' endorsement, etc. • Agencies' capacity and local consultants' capacity to undertake a feasibility study of PPP project is not sufficient. 	4.2 <ul style="list-style-type: none"> • More fund and time should be spent for this study • Complete information and documents for NEDA's project approval and succeeding tendering should be prepared.
	4.3 <u>Project Approval Stage</u> <ul style="list-style-type: none"> • Lengthy time is required until the project is approved by NEDA ICC or NEDA Board. 	4.3 <ul style="list-style-type: none"> • Complete information and documents should be prepared during the feasibility study stage. • NEDA should undertake seminars on "ICC Project Evaluation Procedure and Guidelines".

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 1.8-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
4. Bottlenecks in PPP Project Cycle	<p>4.4 <u>ROW Acquisition/Resettlement Stage</u></p> <ul style="list-style-type: none"> • Preparation of IROW plan and parcellary plan takes long time due to inaccurate land registration, difficulty to locate land owners, inaccurate record of lot boundary, etc. • A lot of documentations are needed and lot owners have difficulty to prepare required documents. • Land valuation is made based on BIR land valuation for the first offer, and based on Provincial/ City Appraisal Committee or Land Bank valuation for the second offer, these are close to, but still lower than market value. • In case that land owners fail to prepare complete documents, expropriation is the only solution. • ROW acquisition Teams are not provided sufficient logistics (like service vehicles, computers, etc.). • More staff who are familiar with ROW acquisition are needed. • Some Toll Concession Agreements include the private sector's funding for ROW acquisition. 	<p>4.4</p> <ul style="list-style-type: none"> • Preparation of IROW plan and parcellary plan and succeeding ROW acquisition should start soon after the project is approved by NEDA Board or NEDA ICC. • Once major critical documents are prepared, cash advance by the private sector should be made to PAPs through the Government, which shall be refunded to the private sector. This arrangement should be specified in TCA. • Land value should be based on the prevailing market price. • Enough logistics support such as service vehicles, computers, etc. should be provided for ROW acquisition team, cost of which should be included in the project cost. • IROW Procedural Manual should be updated and more staff should be trained.
	<p>4.5 <u>Tender Stage</u></p> <p>1) <i>Government Projects</i></p> <ul style="list-style-type: none"> • Selection of Consultants and Contractors takes lengthy time. - Consultant selection - over 8 months - Contractor selection - over 10 months <p>2) <i>Selection of Project Proponent of PPP Project</i></p> <ul style="list-style-type: none"> • Selection of project proponent takes lengthy time - over 12 months <p>3) <i>Unsolicited Proposal</i></p> <ul style="list-style-type: none"> • Takes much longer time to finalize due to many disputes and counteroffers and negotiation of contract terms such as toll rates, risk allocation, etc. 	<p>4.5</p> <p>1) <i>Government Projects</i></p> <ul style="list-style-type: none"> • Selection of Consultants should target 6 months or less. • Selection of Contractor should target 8 months or less. <p>2) <i>Selection of Project Proponent of PPP Project</i></p> <ul style="list-style-type: none"> • Selection of Project Proponent should target 10 months or less. • Agency should undertake project campaign and enough information should be disclosed before the project is advertized. • All tender conditions and draft Toll Concession Agreement should be agreed between DPWH and TRB before advertisement.

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 1.8-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
4. Bottlenecks in PPP Project Cycle	4.6 <u>Contracting Stage</u> <ul style="list-style-type: none"> • Review of Toll Concession Agreement (TCA) by TRB usually takes lengthy time. • Approval of NEDA Board also takes lengthy time. 	4.6 <ul style="list-style-type: none"> • Close coordination between NEDA and Agencies should be made.
	4.7 <u>Toll Operation Agreement Stage</u> <ul style="list-style-type: none"> • Review by TRB of toll adjustment formula and other O & M aspects take considerable time. 	4.7 <ul style="list-style-type: none"> • From the feasibility study stage, TRB should be involved.
	4.8 <u>Fund Procurement/Preparation Stage</u> <ul style="list-style-type: none"> • Government <ul style="list-style-type: none"> - Budget constraints and delay in budget release - Difficult to cope with cost overrun. • Private <ul style="list-style-type: none"> - Delay in attaining financial closure due to difficulty in meeting lender's requirement such as complete ROW acquisition, government financial support, approval of toll rates and toll rate adjustment formula. - Difficult to find appropriate financier (short repayment period with no grace period, and high interest rates). - Unexpected changes requiring additional costs due mainly to additional facilities required by LGUs and LGU fees. 	4.8 <ul style="list-style-type: none"> • Government <ul style="list-style-type: none"> - Needs provision of adequate annual budget. - Needs to tap ODA. • Private <ul style="list-style-type: none"> - Creation of fund to finance the private sector for infrastructure project implementation should be studied.
	4.9 <u>Detailed Design Stage</u> <ul style="list-style-type: none"> • Lacks proper coordination with LGUs, thus modification of design, requirement of additional facilities, etc. is required by LGUs. • Lacks proper coordination with utility companies for relocation/protection of public utilities affected. 	4.9 <ul style="list-style-type: none"> • Proper coordination with LGUs and utility companies should be done during the feasibility study. • Value engineering should be exercised.

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 1.8-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
4. Bottlenecks in PPP Project Cycle	4.10 <u>Construction Stage</u> <ul style="list-style-type: none"> • Delayed construction due to delayed delivery of ROW and financial closure. • Needs more strict quality control and schedule control. 	4.10 <ul style="list-style-type: none"> • An Independent Certificate Engineer should be employed at the cost of the Government.
	4.11 <u>Operation and Maintenance Stage</u> <ul style="list-style-type: none"> • Approval of toll fee and adjustment of toll fee by TRB is delayed. • Increase of toll fee is usually objected by the people and politicians and adoption of new toll rate is delayed. 	4.11 <ul style="list-style-type: none"> • TRB should approve toll fee and its adjustment in accordance with provisions of TCA. • The Government should compensate the loss of revenue due to delayed increase of toll rates. • TRB and operators should jointly make information disclosure to the people why toll rates and toll adjustment are needed and determined and what are benefits of users.
	4.12 <u>End of Contract and Facility Transfer Stage</u> No experience on this stage, yet.	-

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

1.9 DPWH ORGANIZATION AND CURRENT O& M COMPANY

(a) DPWH Organization (Central Office)

Organization chart of DPWH is shown in **Figure 1.9-1**. Offices within the DPWH which are related to the development of PPP projects are highlighted and discussed below.

Planning Service (PS)

Tasked to formulate policies, plans and programs for the development of the national road network, which includes expressways; prepare PPP proposals for ODA financing; maintain a national road database; and prepare multi-year and annual budgets for the construction (including right-of-way and engineering) and maintenance of national roads.

PMO-Feasibility Studies (PMO-FS)

Assigned to conduct/supervise FS of major foreign-assisted and locally-funded road and expressway projects; and assist the PS and PMO-BOT in preparing project proposals for ODA financing.

PMO-Built-Operate-Transfer (PMO-BOT)

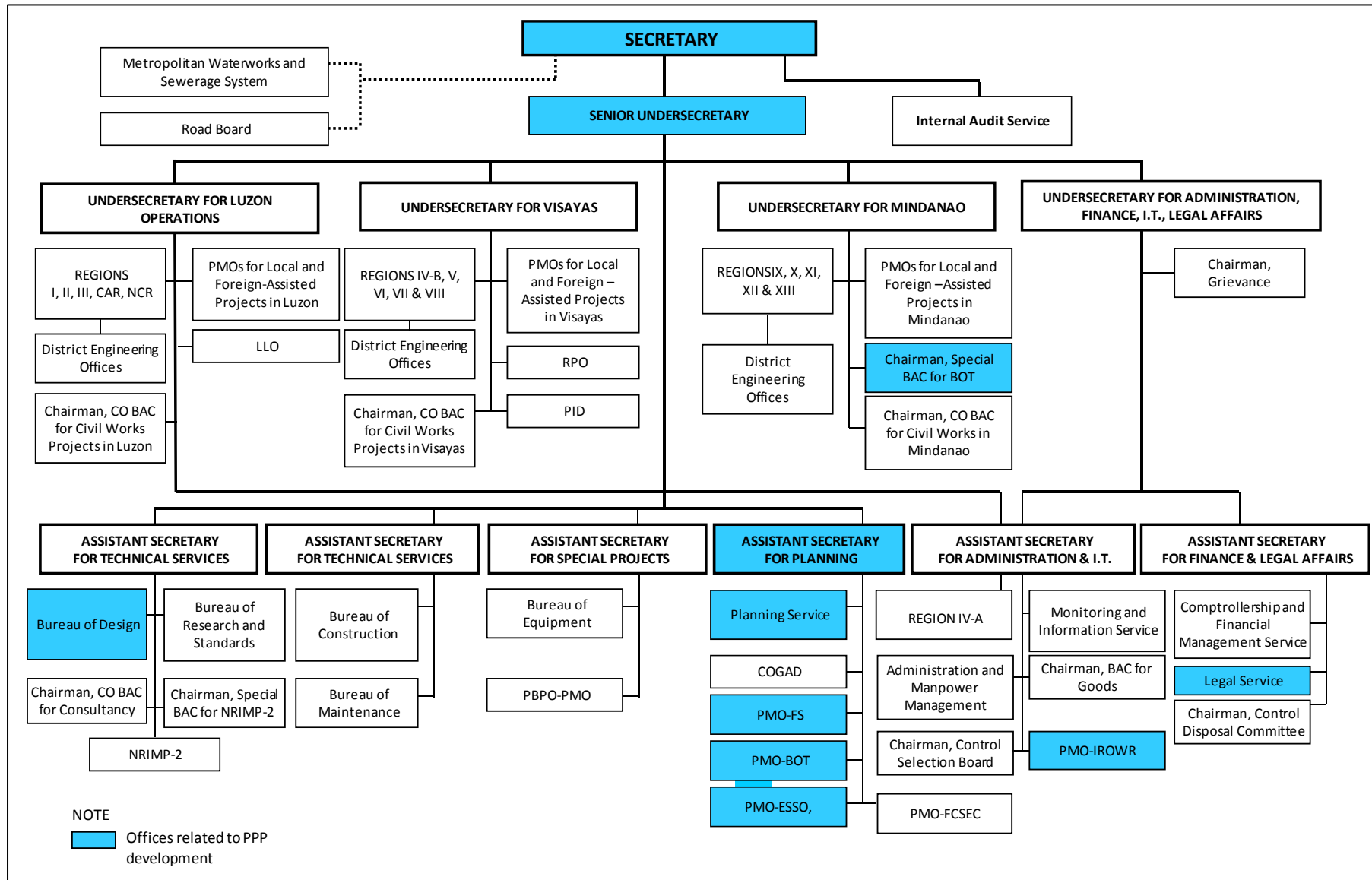
Tasked to identify and initiate projects for BOT/PPP implementation; prepare/review feasibility studies (FS) and proposals for BOT/PPP projects for approval of the NEDA-Investment Coordinating Committee (ICC); prepare bidding documents; participate in negotiations and finalization of BOT/PPP contracts; and monitor/supervise the implementation of BOT/PPP projects.

Environmental and Social Services Office (ESSO)

Involved in preliminary planning activities related to Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Rapid Social Assessment, Resettlement Action Plan (RAP); conduct public consultations on PPP projects; conduct Information, Education and Communication (IEC) on environment-related concerns; and compliance and effects monitoring of ECC conditions and Environmental Management Plan (EMP).

PMO-Infrastructure Right-of-Way and Resettlement (PMO-IROWR)

Tasked to consult with LGUs, local communities, project affected persons, and the designer/contractor for PPP projects; coordinate with the Presidential Commission for the Urban Poor (PCUP) and the National Housing Authority (NHA) on the relocation of squatter families; conduct census and tagging of affected lots and improvements; coordinate with the Bureau of Internal Revenue or BIR (for zonal valuation), Registry of Deeds (for titles), Assessor's Office, and DAR (for land conversion); coordinate and negotiate with affected property owners on the sale of their properties; coordinate with the Office of the Solicitor General (OSG) for filing of expropriation proceedings; and effect payment of affected properties.



NOTE
 Offices related to PPP development

As of July 2012

FIGURE 1.9-1 ORGANIZATION CHART OF DPWH

Source: DPWH website

(b) Overview of Current Toll Expressway Companies for Construction and O&M

Table 1.9-1 shows the summary of toll expressway investors and O&M companies and **Table 1.9-2** shows the summary of current toll collection system and traffic control system.

TABLE 1.9-1 TOLL EXPRESSWAY COMPANYY

Investors	Operating Expressway(length)	O&MCompanies	Remarks
Manila North Tollways Corp.(MNTC)	<ul style="list-style-type: none"> North Luzon Expressway (82.6km) Subic-TipoTollway (8.5km) 	Tollways Management Corp.	Metro Pacific Investment Corp.(Hong Kong Fund)
(BCDA)	<ul style="list-style-type: none"> Subic-Clark-Tarlac Expressway (93.8km) 	Tollways Management Corp.	Construction by ODA fund
Private Infrastructure Development Corp. (PIDC)	<ul style="list-style-type: none"> Tarlac-Pangasinan-La Union Expressway (88.0km under construction) 	—	PIDC was established by ten (10) local contractor companies
UEM-MARA Philippine Corp.	<ul style="list-style-type: none"> Manila-Cavite Coastal Expressway (8.8km) and Extension (11.2km) 	Direct operation	Malaysian Fund
Citra Metro Manila Tollways Corp./ San Miguel Corp.	<ul style="list-style-type: none"> Skyway : PhaseI (9.4km) South Luzon Expressway (13.4km) Skyway : PhaseII (6.8km) 	Skyway O&M Company	Indonesia Fund
San Miguel Corp.	<ul style="list-style-type: none"> South Luzon Expressway (37.2km) 	South Luzon Tollways Corp.	Philippine Fund
Ayala Corp/	<ul style="list-style-type: none"> DaangHariSLEx Link Road 		Philippine Fund
San Miguel Corp.	<ul style="list-style-type: none"> Southern Tagalog Arterial Road (STAR) (41.9km) 	Star Infrastructure Development Corp.	Philippine Fund

TABLE 1.9-2TOLL EXPRESSWAY'S TOLL COLLECTION SYSTEM AND TRAFFIC CONTROL SYSTEM

Operating Expressway(length)	Toll Collection System	Traffic Control System
<ul style="list-style-type: none"> North Luzon Expressway (82.6km) 	<ul style="list-style-type: none"> Cash, EC-tag, Easy Trip 	Yes, CCTVs, Vehicle detectors and VMSs (Variable Message e Sign) are installed.
<ul style="list-style-type: none"> Subic-Clark-Tarlac Expressway (93.8km) Subic-TipoTollway (8.5km) 	<ul style="list-style-type: none"> Cash only 	Not yet installed
<ul style="list-style-type: none"> Manila-Cavite Coastal Expressway (8.8km) and Extension (11.2km) 	<ul style="list-style-type: none"> Cash only 	Not yet installed
<ul style="list-style-type: none"> Skyway : PhaseI (9.4km) South Luzon Expressway (13.4km) Skyway : PhaseII (6.8km) 	<ul style="list-style-type: none"> Cash, E-pass 	Yes, CCTVs are installed.
<ul style="list-style-type: none"> South Luzon Expressway (37.2km) 	<ul style="list-style-type: none"> Cash, E-pass 	Yes, CCTVs and VMSs are installed.
<ul style="list-style-type: none"> Southern Tagalog Arterial Road (STAR) (41.9km) 	<ul style="list-style-type: none"> Cash only 	Not yet installed

1.10 SOCIO-ECONOMIC CONDITION OF THE STUDY AREA

(1) Land-Use

The National Capital Region has a total area of about 63,300 hectares which is 0.2% of the total land area of the Philippines (30 million hectares). Of the 17 cities and municipality that compose the NCR, Quezon City has the biggest land area at 17,171 hectares (27.1%), followed by Caloocan City, and Pasig City at 5,580 (8.8%) and 4,846 (7.7%) hectares respectively. Paranaque and Pasay City, which are traversed by Phase II of the NAIAX, has a total land area of 4,657 (7.4%) and 1,397 (2.2%) hectares, respectively. **Table 1.10-1** contains the breakdown of NCR component cities and municipality's land area.

**TABLE 1.10-1 LAND AREA OF METRO
MANILA COMPONENT CITY / MUNICIPALITY**

City/Municipality	Area (hectares)	%
1 Manila City	2,498	3.9%
2 Caloocan City	5,580	8.8%
3 Pasay City	1,397	2.2%
4 Makati City	1,831	2.9%
5 Mandaluyong City	929	1.5%
6 San Juan	595	0.9%
7 Quezon City	17,171	27.1%
8 Muntinlupa City	3,975	6.3%
9 Paranaque	4,657	7.4%
10 Pasig City	4,846	7.7%
11 Marikina City	2,152	3.4%
12 Taguig	4,521	7.1%
13 Pateros	1,040	1.6%
14 Las Pinas	3,269	5.2%
15 Malabon	3,264	5.2%
16 Navotas	894	1.4%
17 Valenzuela	4,702	7.4%
Total	63,321	100.0%

Source: MMDA

A paper prepared by the Philippine Center for Development Studies in 2000 had indicated that NCR has a predominantly urban environment. About one third (65%) of the land is devoted to residential areas, more than 10% is for institutional and slightly less than 10% is used for commercial purposes. The large tracks of land within and at the suburbs had been developed for

residential area that caters to the big population of the metropolis estimated at 11 million (2009). Similarly, it is in Metro Manila where the business/commercial districts are located in cities such as in Manila, Makati, Mandaluyong, Pasig, and Taguig. **Table 1.10-2** contains the land use of Metro Manila.

TABLE 1.10-2 LAND USE OF METRO MANILA*

Landuse	Area	%
Residential	41,158.7	65
Commercial	5,065.7	8
Industrial	1,899.6	3
Institutional	6,712.0	11
Utilities	2,532.8	4
Agricultural	2,786.1	4
Open Space	2,532.8	4
Forest Land/Parks	633.2	1
Total	63,321.0	100

Source: Land Use Planning in Metro Manila and the Urban Fringes: Implications of the Land and Real Estate Market, Philippine Institute for development Studies, June 200

(2) Demography

1) National Demographic Profile

The National Statistics Office (NSO) that had conducted the national census on 01 August 2007, reported that the total Philippine population is about 88.57 million with an average annual growth rate of 2.04 percent. This figure had exceeded the projected average annual population growth rate for the period 2005 to 2010 placed at 1.95 percent by the 2000 Census of Population and Housing. **Table 1.10-3** shows the country's population based on census conducted in year 1995, 2000 and 2007. This data show that from year 2000 to 2007, there was an increase of 12.07 million Filipinos within the span of seven (7) years, while from 1995 to 2000, the increase was at 9.88 million. **Table 1.10-4** presents the average annual population growth rate in the Philippines.

TABLE 1.10-3 COMPARATIVE PRESENTATION OF THE PHILIPPINE POPULATION FROM 1995 TO 2007

Census Year	Census Date	Philippine Population
2007	August 1, 2007	88.57 million
2000	May 1, 2000	76.50 million
1995	September 1, 1995	66.62 million

**Source: National Statistics Office*

TABLE 1.10-4 COMPARATIVE PRESENTATION OF THE COUNTRY'S AVERAGE ANNUAL POPULATION GROWTH RATE FROM 1960 TO 2007

Reference Period	Average Annual Population Growth Rate in the Philippines
2000-2007	2.04 %
1990-2000	2.34 %
1980-1990	2.35 %
1970-1980	2.75 %
1960-1970	3.01 %

**Source: National Statistics Office*

The top three (3) regions with the highest population based on the 2007 Population Census are the Calabarzon (Region IV-A) with 11.74 million, NCR (Metro Manila) with 11.5 million and Central Luzon (Region III) with 9.72 million. The combined population in the said regions comprised more than one-third (37.3 percent) of the total population in the Philippines. Aside from the ARMM, the three regions likewise have the biggest growth rate between the years 2000 – 2007. **Table 1.10-5** contains the population details.

TABLE 1.10-5 TOTAL POPULATION AND ANNUAL POPULATION GROWTH RATES BY REGION BASED ON POPULATION CENSUSES 1995, 2000, AND 2007

Region/Province	Total Population			Annual Population Growth Rate (%)		
	1-Aug-07	1-May- 00	1-Sep-1995	2000-2007	1995-2000	1995-2007
PHILIPPINES	88,574,614	76,506,928	68,616,536	2.04	2.36	2.16
National Capital Region	11,553,427	9,932,560	9,454,040	2.11	1.06	1.70
Cordillera Administrative Region	1,520,743	1,365,220	1,254,838	1.50	1.82	1.62
Region I - Ilocos	4,545,906	4,200,478	3,803,890	1.10	2.15	1.51
Region II - Cagayan Valley	3,051,487	2,813,159	2,536,035	1.13	2.25	1.56
Region III - Central Luzon	9,720,982	8,204,742	7,092,191	2.36	3.17	2.68
Region IV-A - Calabarzon	11,743,110	9,320,629	7,750,204	3.24	4.03	3.55
Region IV-B - Mimaropa	2,559,791	2,299,229	2,033,271	1.49	2.67	1.95
Region V - Bicol	5,109,798	4,674,855	4,325,307	1.23	1.68	1.41
Region VI - Western	6,843,643	6,211,038	5,776,938	1.35	1.56	1.43

Region/Province	Total Population			Annual Population Growth Rate (%)		
	1-Aug-07	1-May- 00	1-Sep-1995	2000-2007	1995-2000	1995-2007
Visayas						
Region VII - Central Visayas	6,398,628	5,706,953	5,014,588	1.59	2.81	2.07
Region VIII - Eastern Visayas	3,912,936	3,610,355	3,366,917	1.12	1.51	1.27
Region IX - Zamboanga Peninsula	3,230,094	2,831,412	2,567,651	1.83	2.12	1.94
Region X - Northern Mindanao	3,952,437	3,505,708	3,197,059	1.67	1.99	1.79
Region XI - Davao	4,156,653	3,676,163	3,288,824	1.71	2.41	1.98
Region XII - Socargen	3,829,081	3,222,169	2,846,966	2.41	2.69	2.52
Caraga Region	2,293,480	2,095,367	1,942,687	1.25	1.63	1.40
Autonomous Region in Muslim Mindanao	4,120,795	2,803,045	2,362,300	5.46	3.73	4.78

*Source: NSO, 2007

2) Demographic Profile of NCR (Metro Manila)

Metro Manila has a total population of 11,553,427 million as of August 1, 2007. Of the 32 highly urbanized cities in the country having more than 1 million populations, among them are in NCR which includes the following cities: Quezon City (2.68 million), City of Manila (1.66 million), and Caloocan City (1.36 million). Of the two cities traversed by NAIAX phase II, Parañaque City has a bigger population of 552,660 while Pasay City has 403,064. The other cities within NCR with the highest population includes Taguig City (613,343), Makati City (510,383), Las Piñas City (532,330), Pasig City (617,301), and Marikina (424,610). All of these areas are located with proximity to NAIAX. With respect to population growth rate, Taguig City had registered to have the highest at 3.82% over the period between 2000-2007, which is followed by Caloocan (3.06%), Paranaque (2.88%) and Pasig (2.80%). It is worth noting that the start of NAIAX Phase I is in Taguig City with the highest population growth rate, while the end of NAIAX Phase II is in Paranaque City also having the 3rd highest growth rate. **Table 1.10-6** contains the population data for all the component cities and municipality of NCR.

TABLE 1.10-6 TOTAL POPULATION, TOTAL NO. OF BARANGAYS, POPULATION DENSITY AND ANNUAL POPULATION GROWTH RATES IN METRO MANILA

Local Government Unit	Total No. of Bgys.	Total Population	Population Density (persons per km²)	Annual Population Growth Rate (2000-2007)
PHILIPPINES	41,975	88,574,614	-	2.04
NCR (Metro Manila)	1,695	11,553,427	18,246	2.11
City of Manila	896	1,660,714	43,079	0.68
Mandaluyong City	27	305,576	27,138	1.29
City of Marikina	16	424,610	12,500	1.14
City of Pasig	31	617,301	19,913	2.80
Quezon City	142	2,679,450	16,630	2.92
City of San Juan	21	125,338	20,907	0.87
Caloocan City	188	1,378,856	25,855	3.06
City of Malabon	21	363,681	23,076	0.98
City of Navotas	-	245,344	22,780	0.87
City of Valenzuela	32	568,928	12,762	2.21
City of Las Piñas	20	532,330	12,815	1.65
City of Makati	33	510,383	18,654	1.91
City of Muntinlupa	9	452,943	9,699	2.48
City of Parañaque	16	552,660	11,589	2.88
Pasay City	201	403,064	21,214	1.77
Taguig City	18	613,343	12,810	3.82
Pateros	10	61,940	29,495	1.05

Source: NSO, 2007

(3) Economic Trend

The economic performance of NCR as well as neighboring provinces is depicted in **Figure 1.10-1**. These three regions, NCR, Region III and Region IV-A, are considered the economic engine of the country contributing 56.8% of the country's economic output. NCR consistently surpassed the national average.

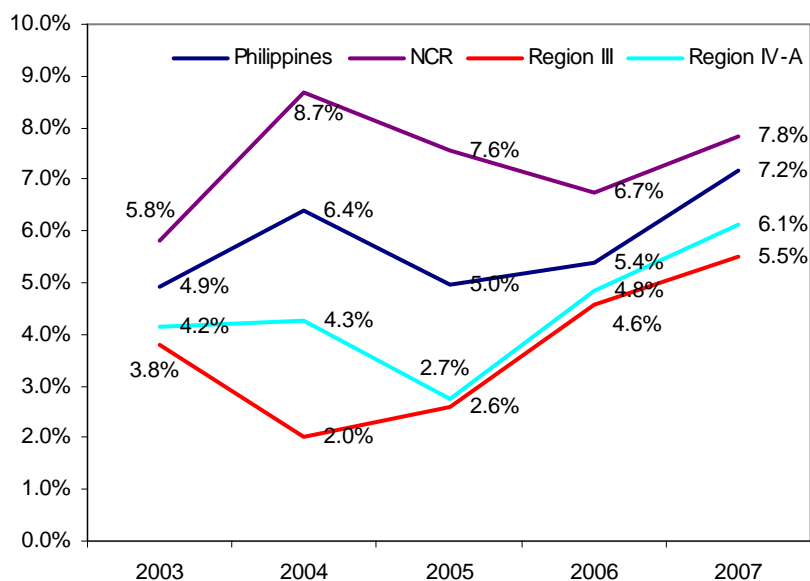


FIGURE 1.10-1 GDP AND GRDP GROWTH RATE

The industrial structure of the economy of NCR is as follows: Primary Sector (0%), Secondary Sector (34%), and Tertiary Sector (66%) as shown in **Table 1.10-7**.

TABLE 1.10-7 INDUSTRIAL STRUCTURE OF THE ECONOMY, 2007

	Primary	Secondary	Tertiary	Total
Philippines	251,272	445,486	671,883	1,368,641
NCR	1	151,135	295,656	446,793
Region III	27,963	40,500	45,539	114,001
Region IV-A	30,253	67,971	67,853	166,077
IN PERCENTAGE				
Philippines	18%	33%	49%	100%
NCR	0%	34%	66%	100%
Region III	25%	36%	40%	100%
Region IV-A	18%	41%	41%	100%

Source: NSO, 2007

In terms of economic growth rate, the country in general posted high economic growth from 2002 to 2007. High growth is particularly observed from 2006 to 2007 where 7.18% growth rate was recorded. At regional level, NCR registered 7.84% from 2006 to 2007; Region III had 6.11% and Region IV-A with 5.49% in the same period as depicted in **Table 1.10-8**.

TABLE 1.10-8 ECONOMIC GROWTH RATE (2002-2007)

	2002-03	2003-04	2004-05	2005-06	2006-07
Philippines	4.93 %	6.38 %	4.95 %	5.40 %	7.18 %
NCR	5.82 %	8.67 %	7.56 %	6.74 %	7.84 %
Region III	3.79 %	2.00 %	2.74 %	4.83 %	6.11 %
Region IV-A	4.15 %	4.27 %	2.59 %	4.57 %	5.49 %

Source: NSBC, 2008

1) Per Capita GDP and GRDP

The per capita GRDP in current price and constant price are shown in **Table 1.10-9** and **Table 1.10-10** respectively. As expected, NCR being the capital of the country has the highest per capita GRDP which almost 3 fold higher than the national average. Per capita GRDP of Region IV-A is a bit lower than the national average at 0.90. The country's per capita GRDP grew by 3.8% per annum from 2003 to 2007. Highest growth is realized in NCR and followed by Region IV-A and then by Region III as presented in **Table 1.10-10**.

TABLE 1.10-9 PER CAPITA GRDP IN CURRENT PRICE

Unit: Peso

	2003	2004	2005	2006	2007	
Philippines	52,718	58,149	63,556	69,365	74,947	1.00
NCR	148,743	165,814	184,758	205,117	223,332	2.98
Region III	39,407	42,256	45,789	49,469	52,351	0.70
Region IV-A	50,997	55,213	59,320	63,640	67,466	0.90

Source: NSBC, 2008

TABLE 1.10-10 PER CAPITA GRDP IN CONSTANT PRICE*Unit: Peso*

	Per Capita GRDP					Growth Rate
	2003	2004	2005	2006	2007	2003-2007
Philippines	13,252	13,789	14,186	14,681	15,429	3.87 %
NCR	31,730	33,867	35,742	37,856	40,252	6.13 %
Region III	11,092	11,054	11,142	11,448	11,904	1.78 %
Region IV-A	13,853	14,068	14,159	14,439	14,891	1.82 %

*Source: NSBC, 2008***2) Employment**

The number of establishment in NCR reaches 196,426 in 2007. The said number of establishments generated 2,025,751 employments in the region.

**TABLE 1.10-11NUMBER OF ESTABLISHMENTS AND EMPLOYMENTS
BYREGION/PROVINCE: LUZON**

Region/Province	No. of Establishments			No. of Employments		
	2005	2006	2007	2005	2006	2007
Philippines	782,980	783,065	783,869	5,479,297	4,984,883	5,187,793
NCR	195,412	195,632	196,426	1,976,359	1,869,507	2,025,751
Region III	84,368	84,344	84,361	480,020	419,320	421,962
Region IV-A	114,182	114,114	114,208	924,867	857,361	856,193
Luzon Total	362,654	362,819	363,539	2,790,975	2,564,084	2,723,991

Source: NSO, Statistical Sampling and Operations Division, 2000 List of Establishments

CHAPTER 2

OUTLINE OF 2010 FEASIBILITY STUDY

CHAPTER 2 OUTLINE OF 2010 FEASIBILITY STUDY

2.1 EXPRESSWAY CONFIGURATION

The expressway configuration proposed by the 2010 FS is shown in **Figure 2.1-1**. Schematic ramp layout is shown in **Figure 2.1-2**.

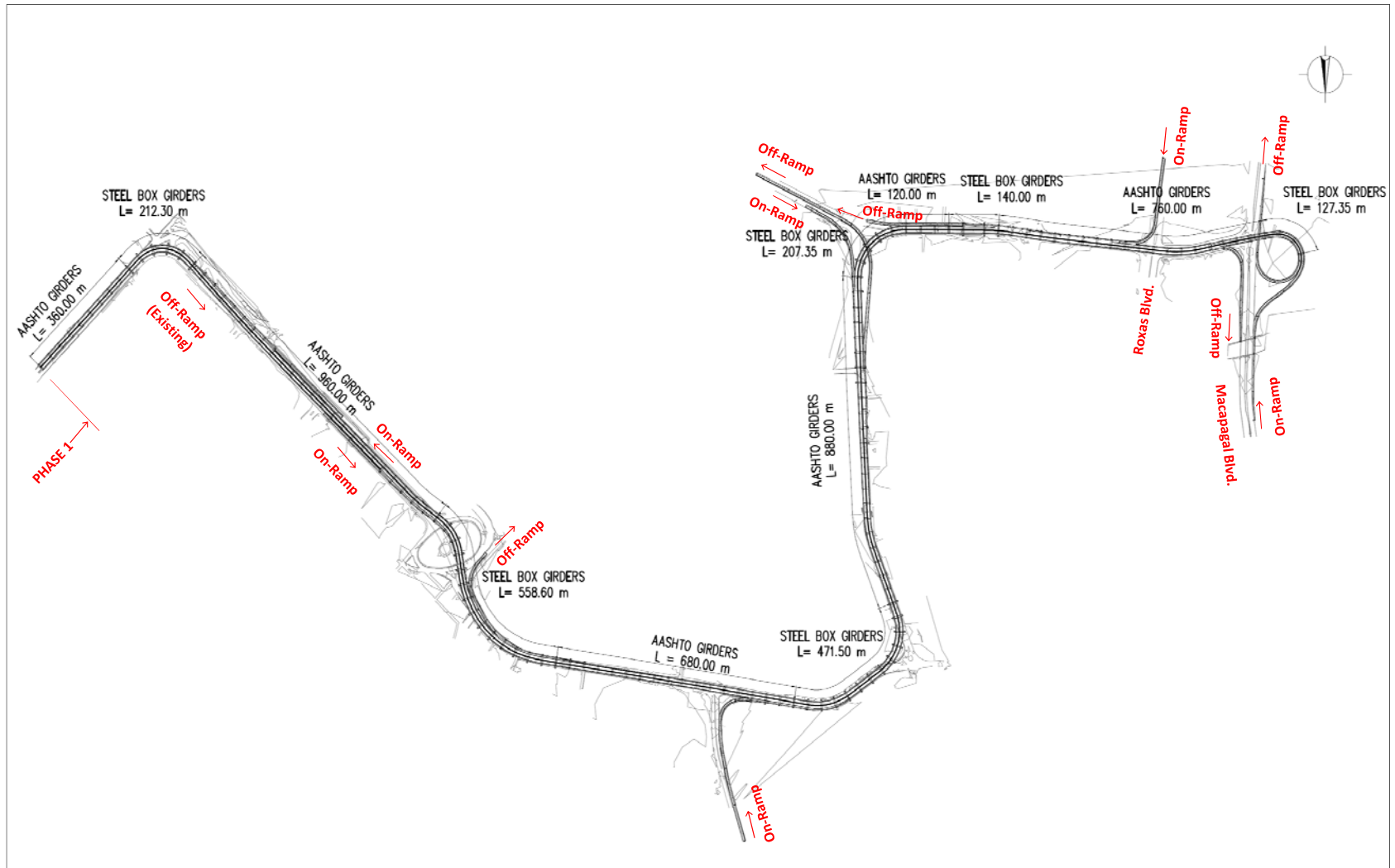


FIGURE 2.1-1 EXPRESSWAY CONFIGURATION PROPOSED BY THE 2010 FS

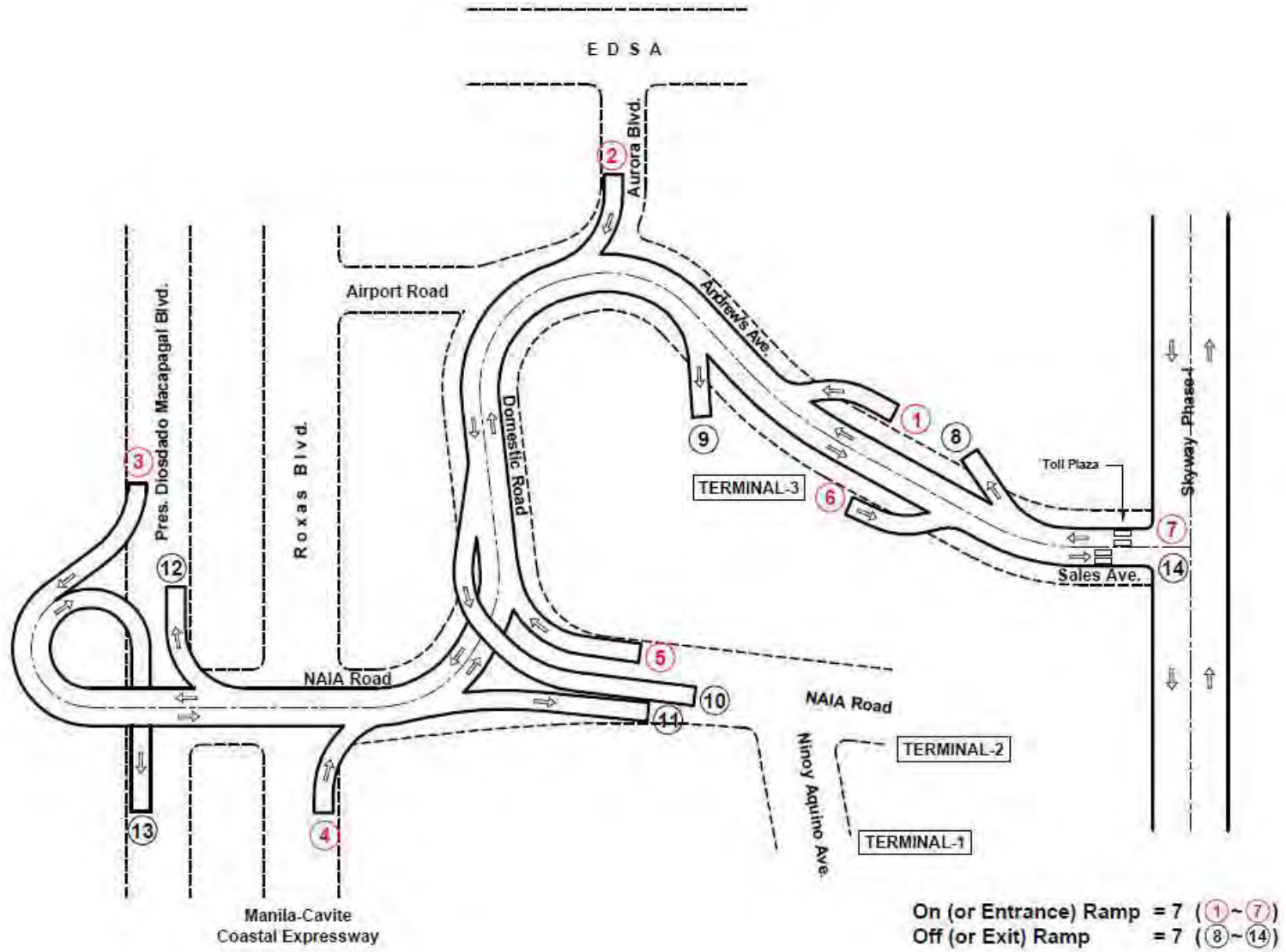


FIGURE 2.1-2 SCHEMATIC RAMP LAYOUT

2.2 TECHNICAL ISSUES

Our review results show that the 2010 FS contains various technical issues as summarized in **Table 2.2-1** and shown in **Figure 2.2-1**.

TABLE 2.2-1 SUMMARY OF TECHNICAL ISSUES

1.	<i>NAIA Navigational Clearance</i>
2.	<i>West End Alternatives</i>
3.	<i>Alternatives at Park 'n Fly Building Area</i>
4.	<i>Alternatives at Interface between Phase-1 and Phase-2</i>
5.	<i>Alignment at MMDA Landmark</i>
6.	<i>Ramp Lay-out</i>
7.	<i>Design Standards</i>
8.	<i>Vertical Clearance for At-grade Roads and Expressway</i>
9.	<i>Number of Traffic Lanes to be provided</i>
10.	<i>Toll Collection System (Open System or Closed System)</i>
11.	<i>Pedestrian Overpass Bridges</i>
12.	<i>Economical Span Length for the Standard Section</i>

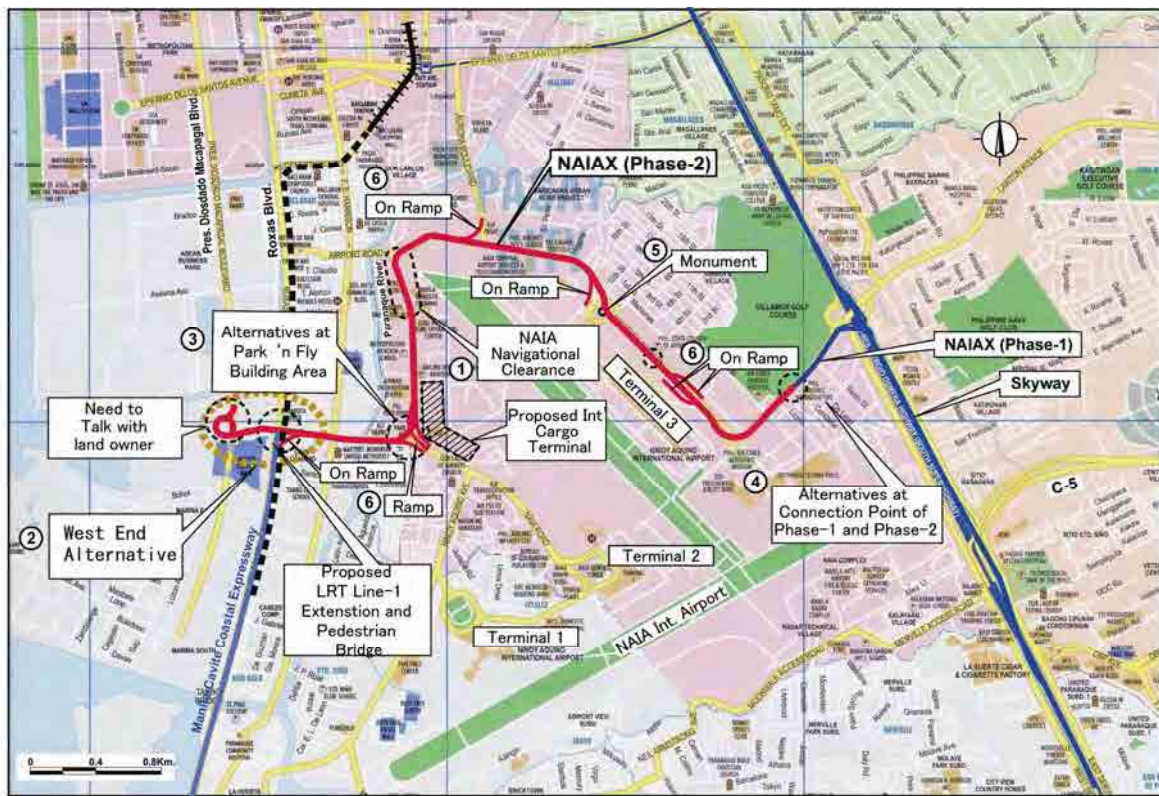


FIGURE 2.2-1 LOCATION AREA OF TECHNICAL ISSUES

CHAPTER 3

RECOMMENDED SOLUTIONS FOR TECHNICAL ISSUES

CHAPTER 3 RECOMMENDED SOLUTIONS FOR TECHNICAL ISSUES

There are many technical issues in 2010 Feasibility Study which were mentioned in Chapter 2. The recommended solution for each technical issue is described below.

3.1 NAIA NAVIGATIONAL CLEARANCE

To ensure that the proposed vertical alignment of NAIAX satisfies the requirement of NAIA navigational clearance, the vertical and horizontal alignment of NAIAX was reviewed.

3.1.1 NAIA Navigational Clearance Requirements

- NAIA Navigational Clearance
Figure 3.1.1-1(1) and (2) shows Navigation Clearance (Civil Aviation Authority of the Philippines: CAAP)
 - Runway Strip Width : 300m(150m+150m)
 - Coordinate of end of runway and elevation
WGS 84 System
N 14° 31' 21.7"
E121° 00' 18.2"
Elevation 3.00m above Mean Sea Level
- Height Limit along Andrews Ave. and Domestic Road and Available net height is shown in **Figure 3.1.1-2**.
- The Concessionaire is required to obtain a “Height Clearance Permit (HCP)” from
 - Aerodrome Development and Management Service
 - Air Navigation Service
 - Air Traffic Service
- Controls for vertical alignment planning for the Expressway is shown in **Figure 3.1.1-3**.
 - Special type of structure for the expressway is required for about 600 m along Andrews Avenue and Domestic Road.
 - Space under the expressway cannot be used for the at-grade road, along Domestic Road for about 480 m, thus additional ROW for the at-grade road is required.
- Land development condition is shown in **Figure 3.1.1-4**.

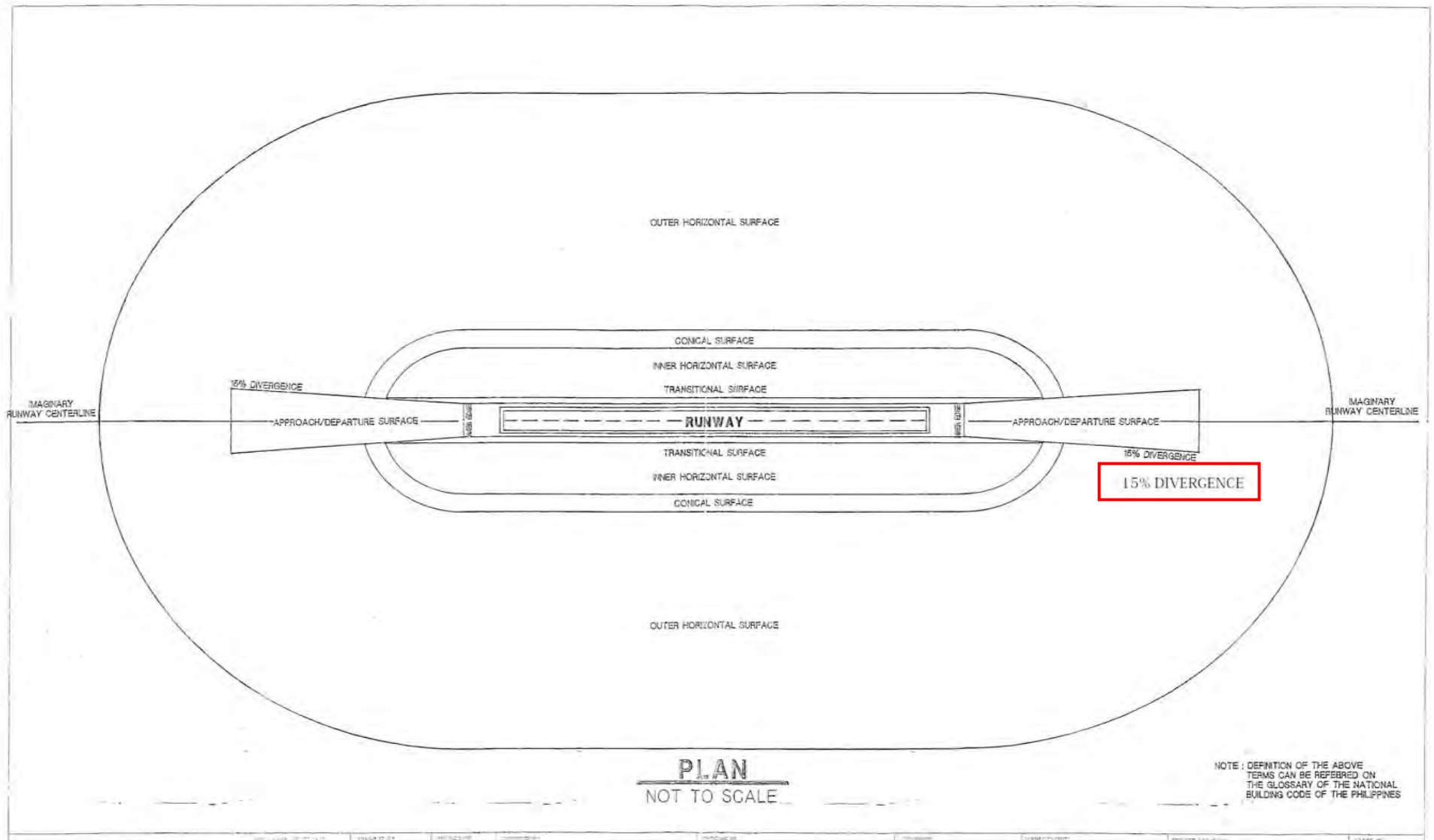


FIGURE 3.1.1-1 (1) NAIA NAVIGATIONAL CLEARANCE

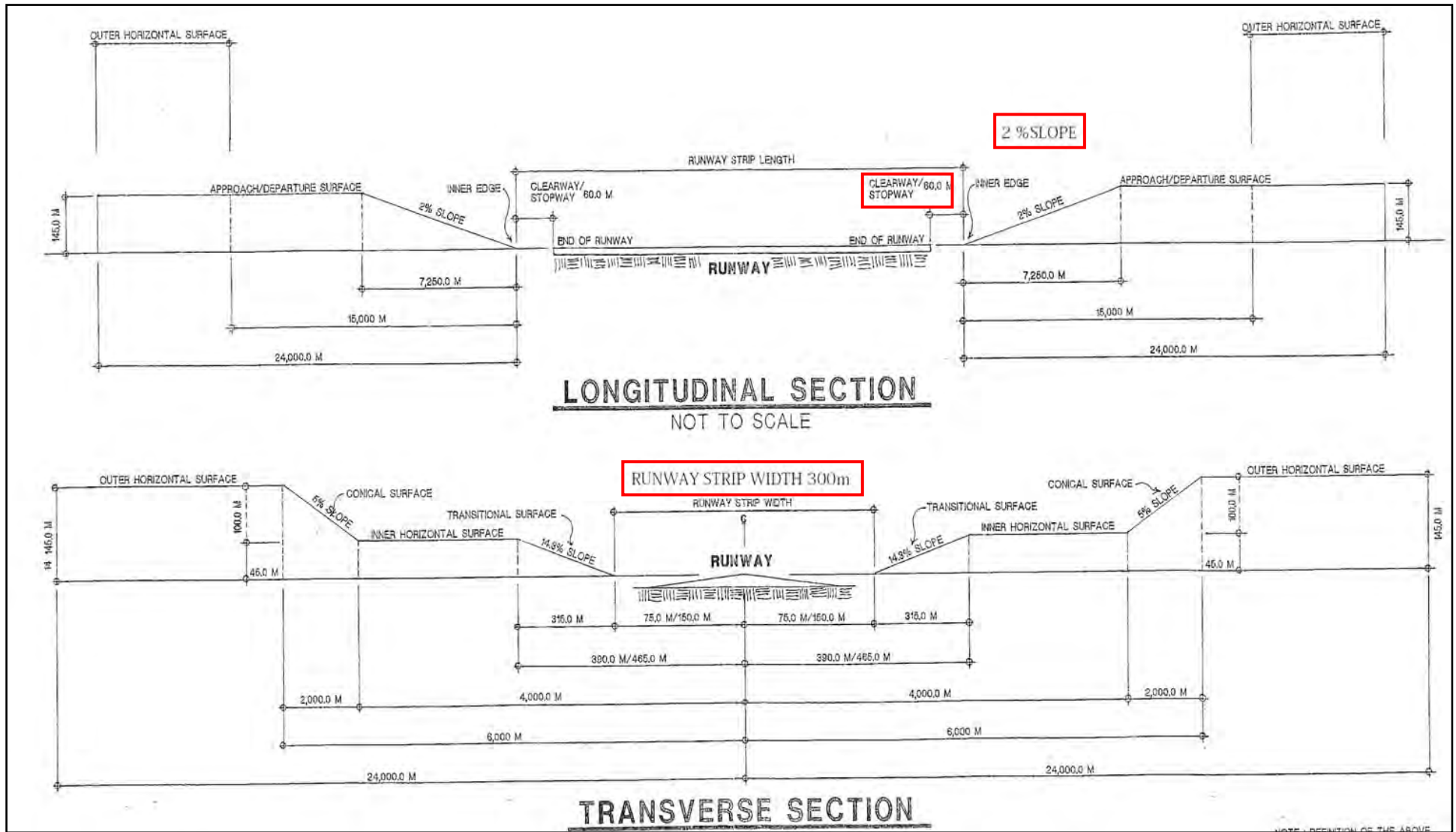


FIGURE 3.1.1-1 (2) LONGITUDINAL AND TRANSVERSE SECTION



Available net height

No	Navigation clearance from Mean Sea level	Road Elevation	Available net height
1	14.463	2.92	11.54
2	15.256	2.90	12.36
3	16.274	2.34	13.93
4	15.627	2.33	13.30
5	12.613	2.24	10.37
6	10.595	2.69	7.91
7	10.513	2.75	7.76
8	20.65	2.99	17.66

FIGURE 3.1.1-2 HEIGHT LIMIT ALONG ANDREWS AVE. AND DOMESTIC ROAD AND AVAILABLE NET HEIGHT

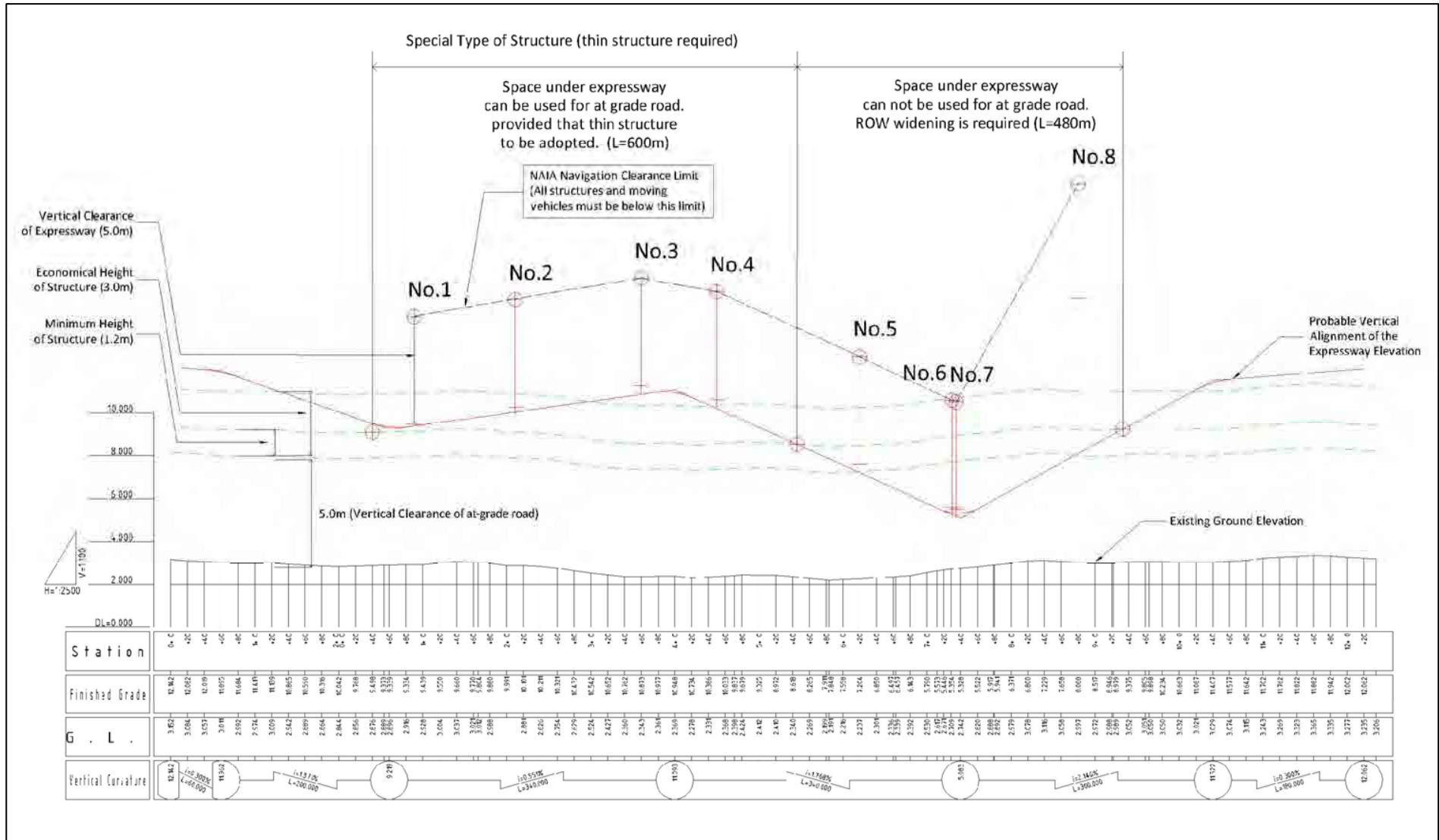


FIGURE 3.1.1-3 CONTROLS FOR VERTICAL ALIGNMENT PLANNING AND EXPRESSWAY

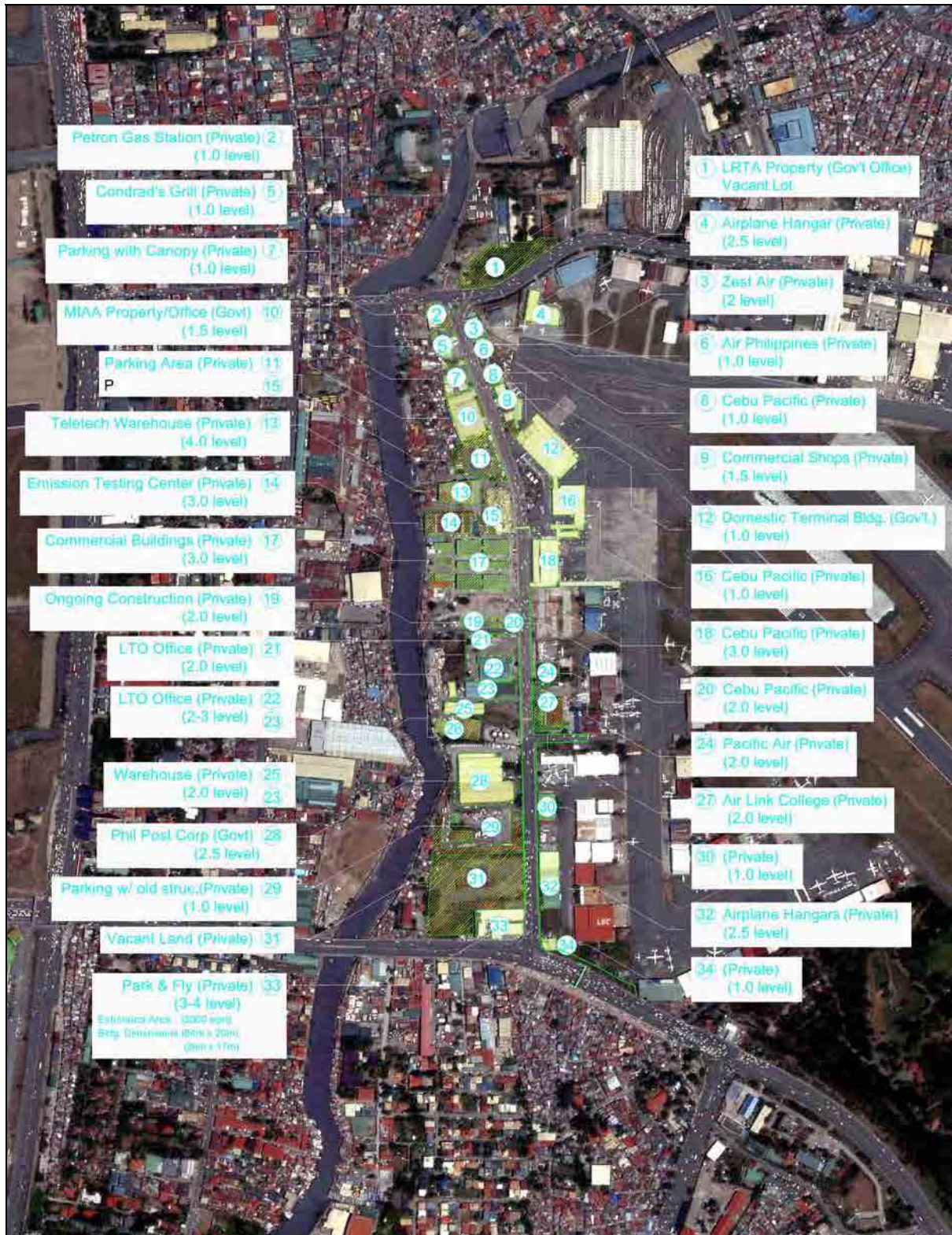


FIGURE 3.1.1-4 LAND DEVELOPMENT CONDITION

3.1.2 Alternative River alignment and Domestic Road Alignment

In order to ensure the above vertical clearance, two route alignments were studied.

Alternative-1 Expressway alignment along Parañaque River.

Alternative-2 Expressway alignment along Domestic Road.

Table 3.1.2-1 shows the comparison table of Alternatives and Alternative-2 was recommended..

TABLE 3.1.2-1 COMPARISON OF TWO (2) ALTERNATIVES

(Confidential)

3.1.3 Alternatives Along Domestic Road

Since the alignment along Domestic Road is recommended, three alternatives were studied in due consideration of height limit requirement of NAIA as follows;

Alternative-1: Expressway passes at west side of Domestic Road
(see **Figure 3.1.3-1 (A) and (B)**)

Alternative-2: Expressway passes at east side of Domestic Road (Airport side)
(see **Figure 3.1.3-2 (A) and (B)**)

Alternative-3: Expressway passes at the center of Domestic Road
(see **Figure 3.1.3-3 (A) and (B)**)

TABLE 3.1.3-1 COMPARISON OF THREE (3) ALTERNATIVES

	Alternative-1	Alternative-2	Alternative-3
Expressway Alignment	<ul style="list-style-type: none"> West side of Domestic Road 	<ul style="list-style-type: none"> East side (airport side) of Domestic Road 	<ul style="list-style-type: none"> Center of domestic Road
ROW Acquisition	<ul style="list-style-type: none"> West side: 11.5 m. East side: 1.1 m. 	<ul style="list-style-type: none"> West side: 11.5 m. East side: 3.5 m. 	<ul style="list-style-type: none"> West side: 10.5 m. East side: 1.0 m.
Impact to Large Buildings	<ul style="list-style-type: none"> No large buildings are affected. 	<ul style="list-style-type: none"> No large buildings are affected. 	<ul style="list-style-type: none"> No large buildings are affected.
Accessibility to Abutting Area	<ul style="list-style-type: none"> West side area: by 1-lane road East side area by 2x2=4 lane road. 	<ul style="list-style-type: none"> West side area: by 2x2=4 lane road East side area by 1-lane road 	<ul style="list-style-type: none"> West side area: by 2-lane road East side area by 2 lane road.
Accessibility to NAIA Terminal-4	<ul style="list-style-type: none"> By 2x2=4 lane road 	<ul style="list-style-type: none"> By 1-lane road. U-turn area needs to be provided between Section (A) and Section (B) 	<ul style="list-style-type: none"> By 2-lane road. U-turn area needs to be provided between Section A and (B) and Section (B) and (C).
Recommendation	<ul style="list-style-type: none"> Access to West area is not good. Not recommended. 	<ul style="list-style-type: none"> Access to East area and NAIA Terminal-4 is not good. Not recommended. 	<ul style="list-style-type: none"> Best option to provide access to both West and East areas and NAIA Terminal-4. Recommended.

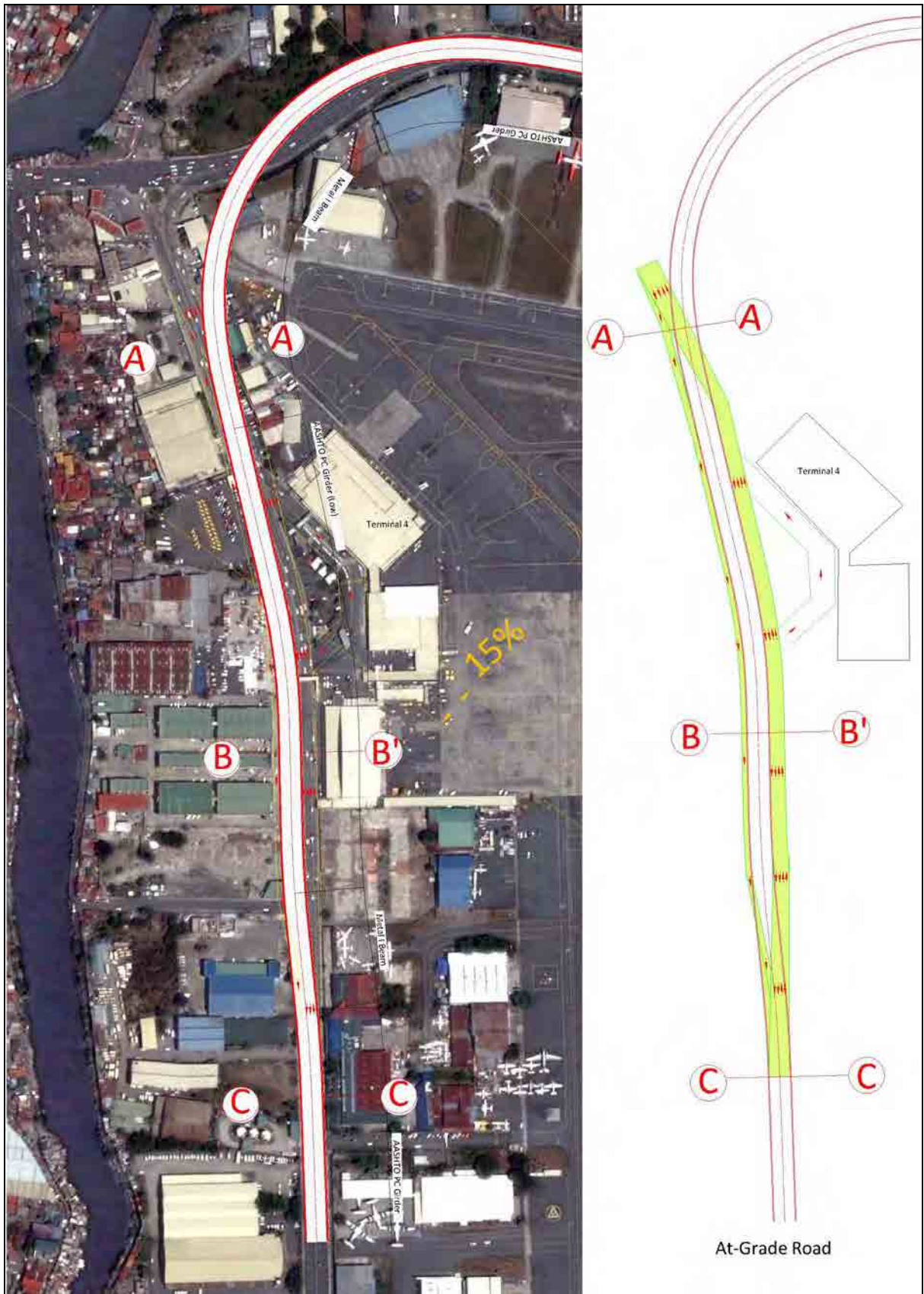


FIGURE 3.13-1 (A) ALTERNATIVE-1 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)

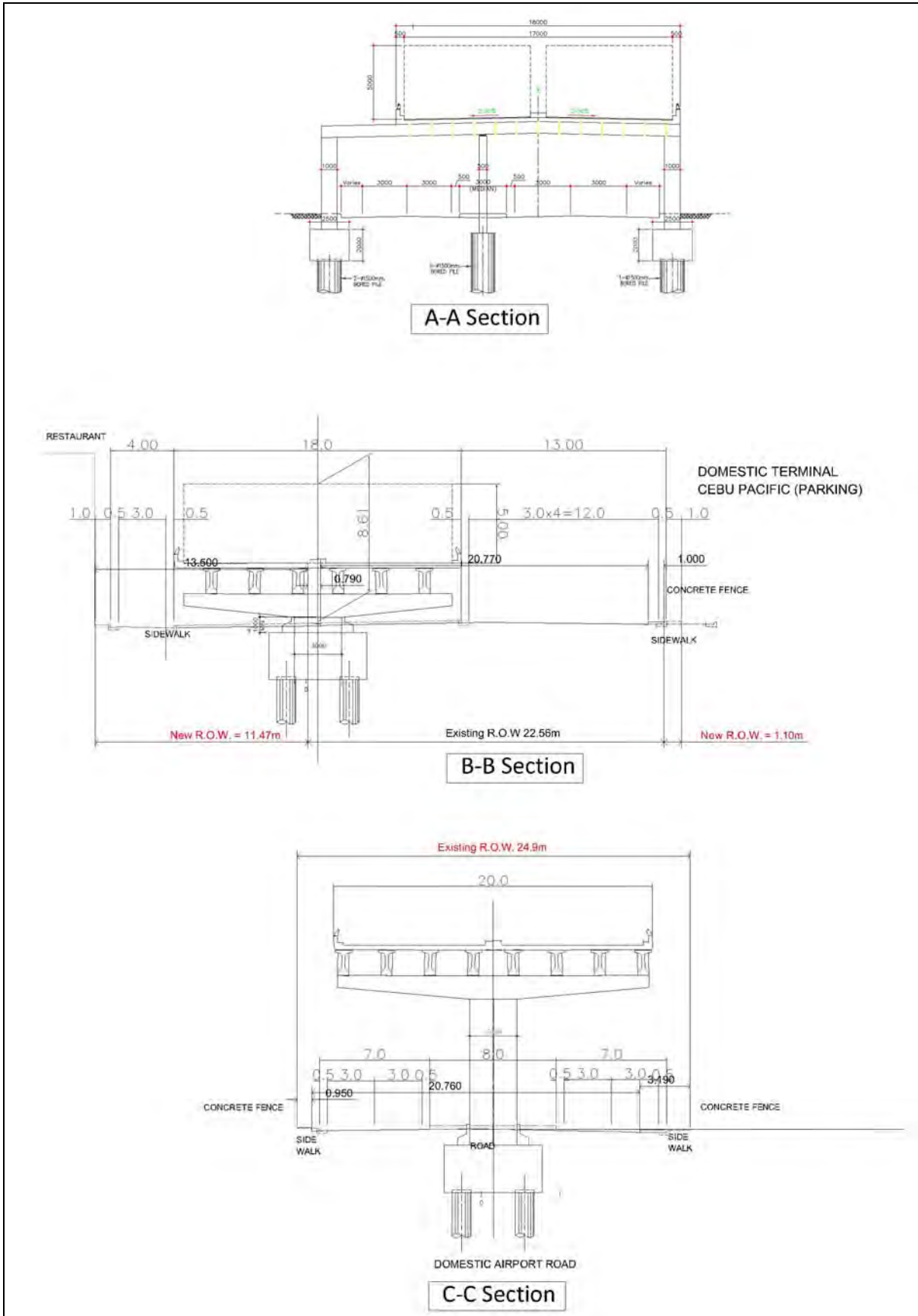


FIGURE 3.1.3-1 (B) ALTERNATIVE-1 AT NAIA NAVIGATIONAL CLEARANCE (CROSS SECTION)

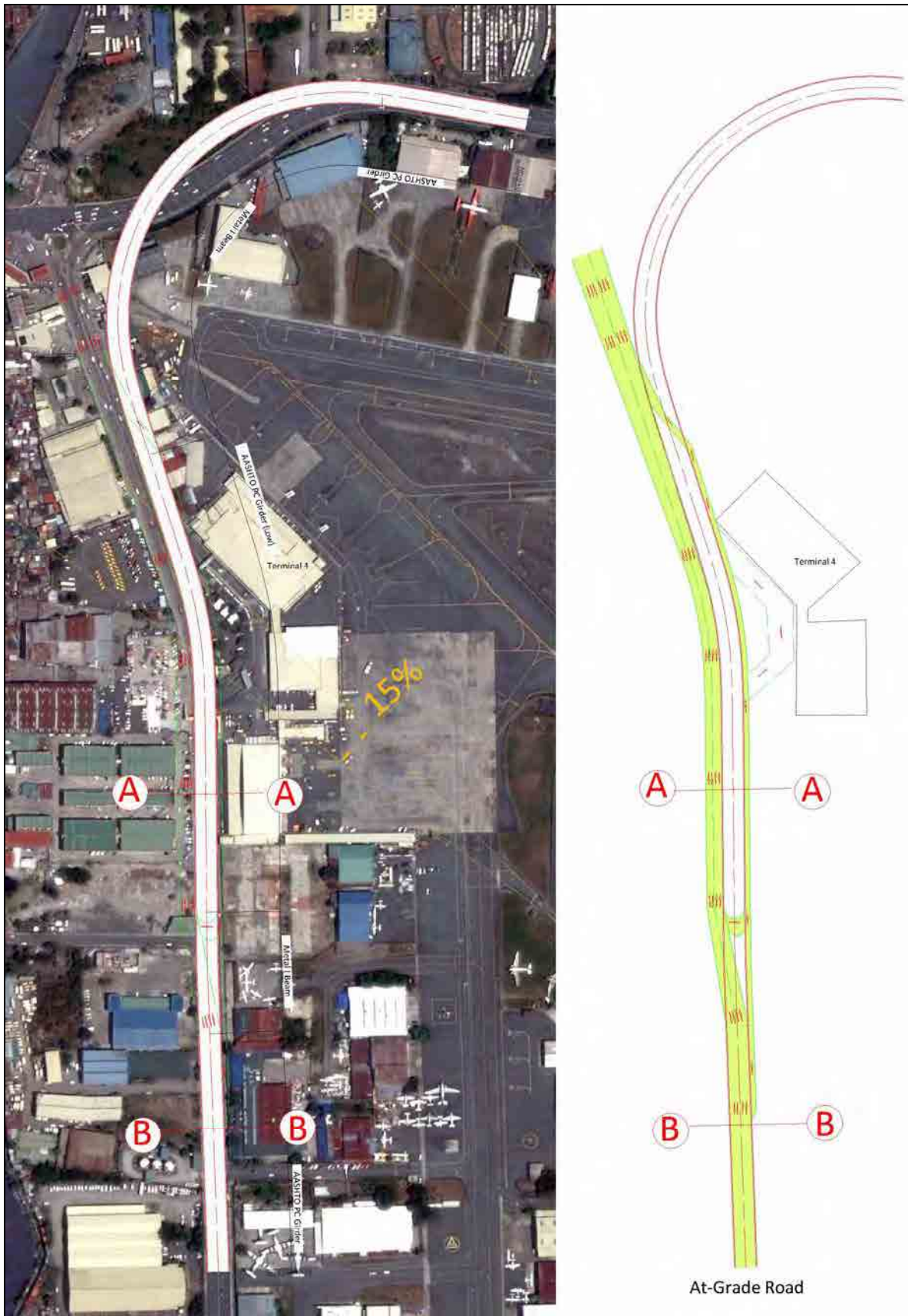


FIGURE 3.1.3-2 (A) ALTERNATIVE-2 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)

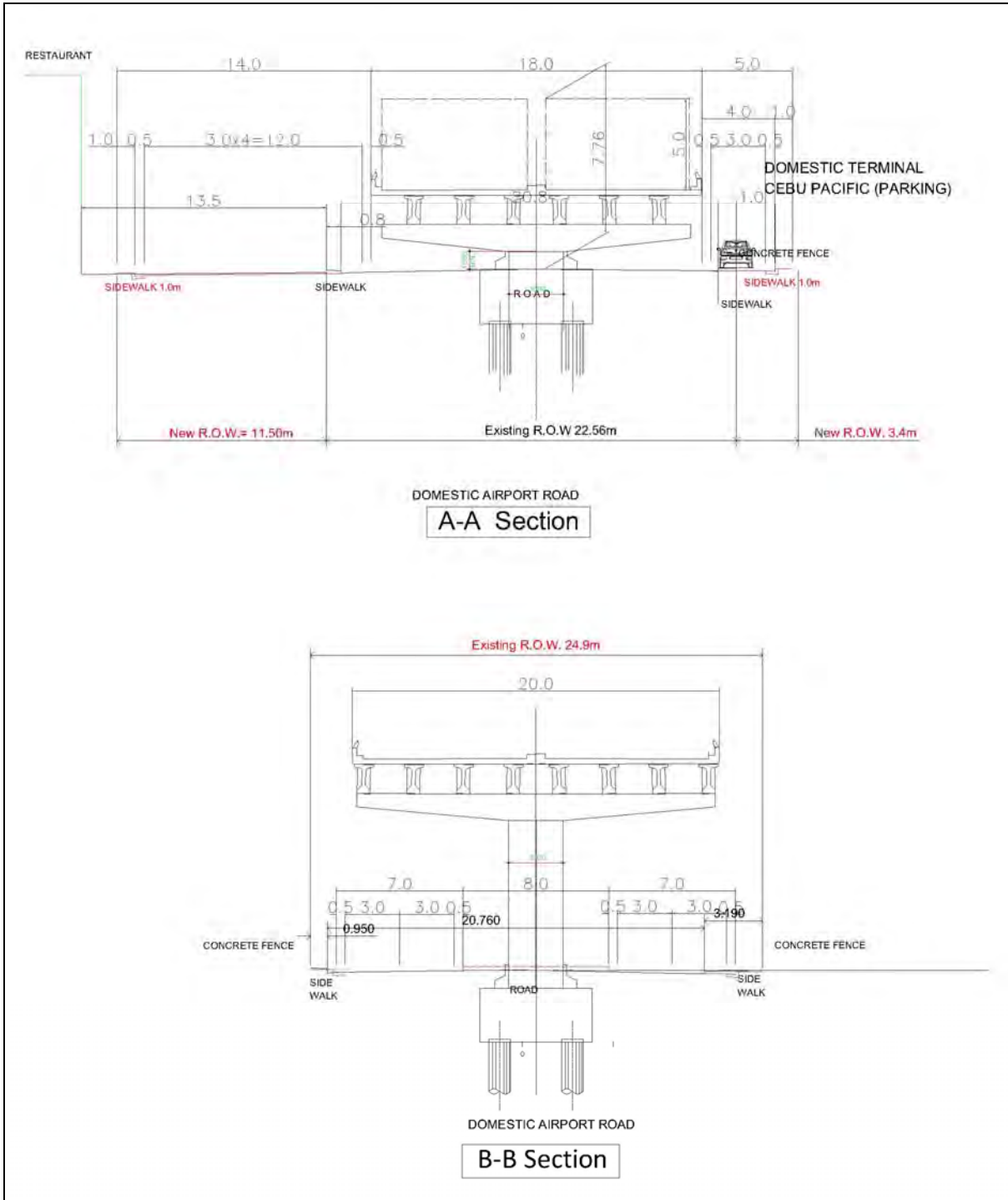


FIGURE 3.1.3-2 (B) ALTERNATIVE-2 AT NAIA NAVIGATIONAL CLEARANCE (CROSS SECTION)

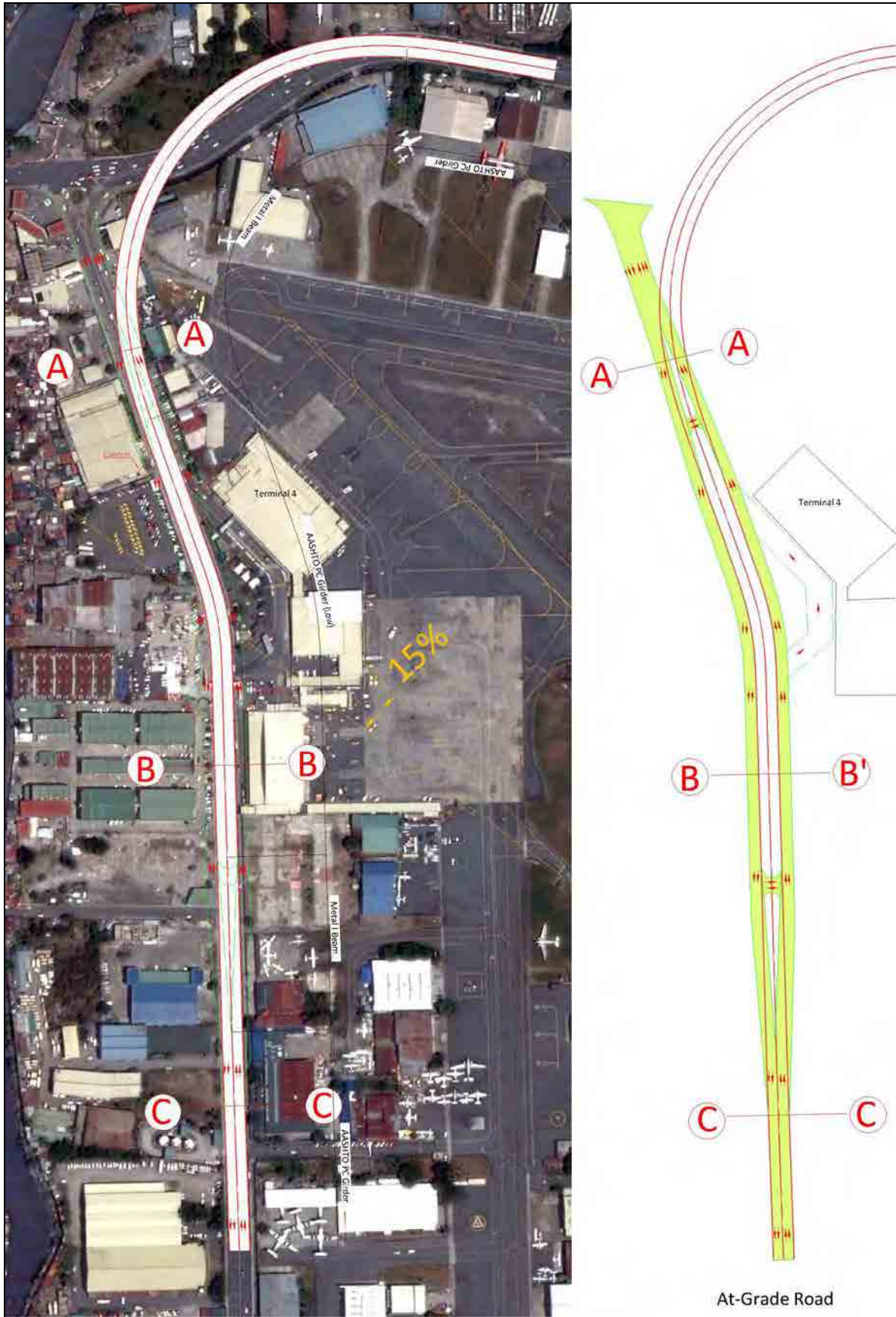


FIGURE 3.1.3-3 (A) ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)

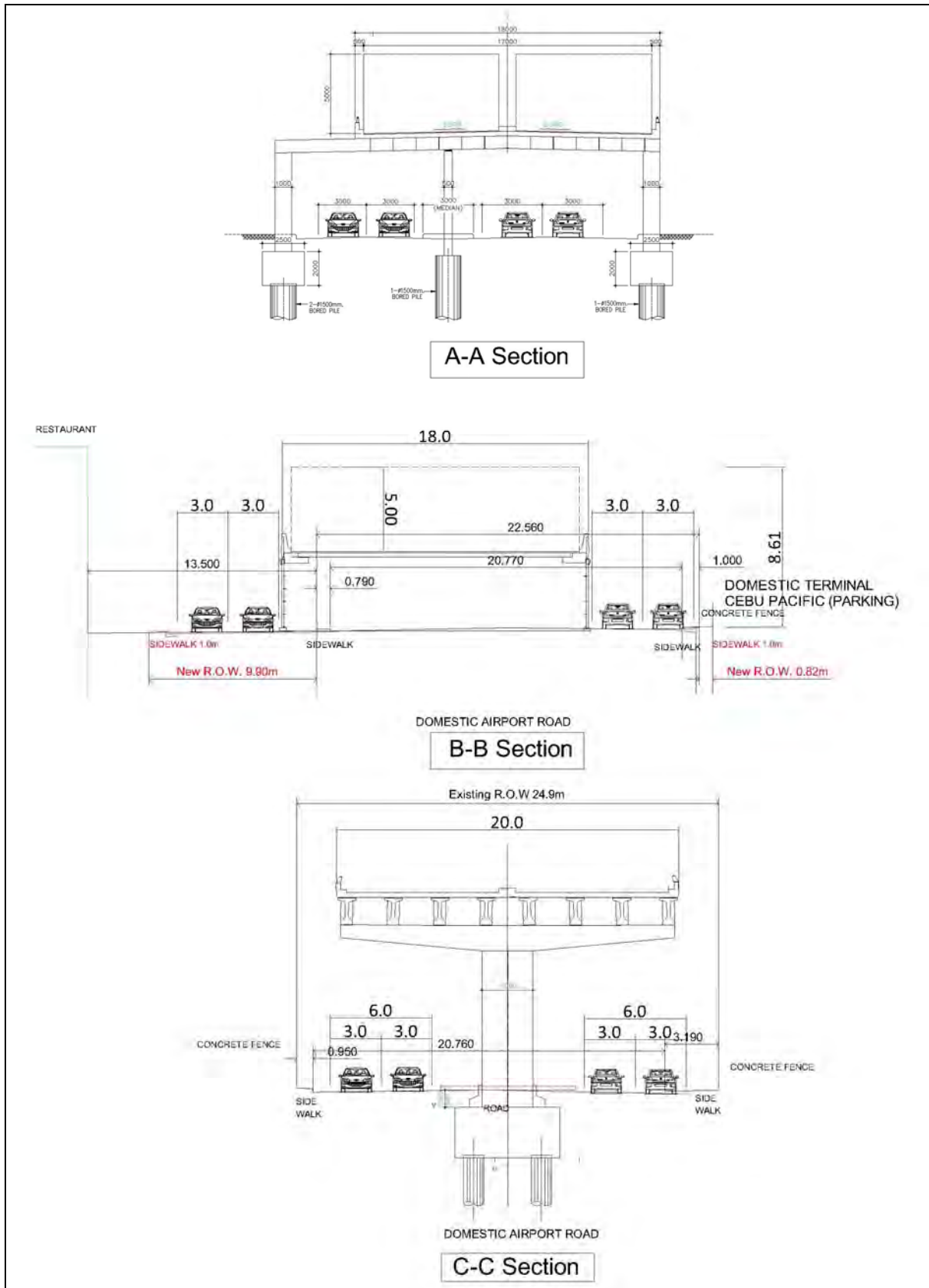


FIGURE 3.1.3-3 (B) ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE (CROSS SECTION)

After these comparison studies, the JICA Team explained the design and alignment of NAIAX to Pasay City Mayor and city engineers. They requested that the number of lanes of Domestic Road to be 6 lanes after construction. JICA Team re-studied the alignment to provide 6 lanes for the at-grade road without affecting large buildings in the area. **Figure 3.1.3-4(A)** and **(B)** shows the final alignment and the cross section.

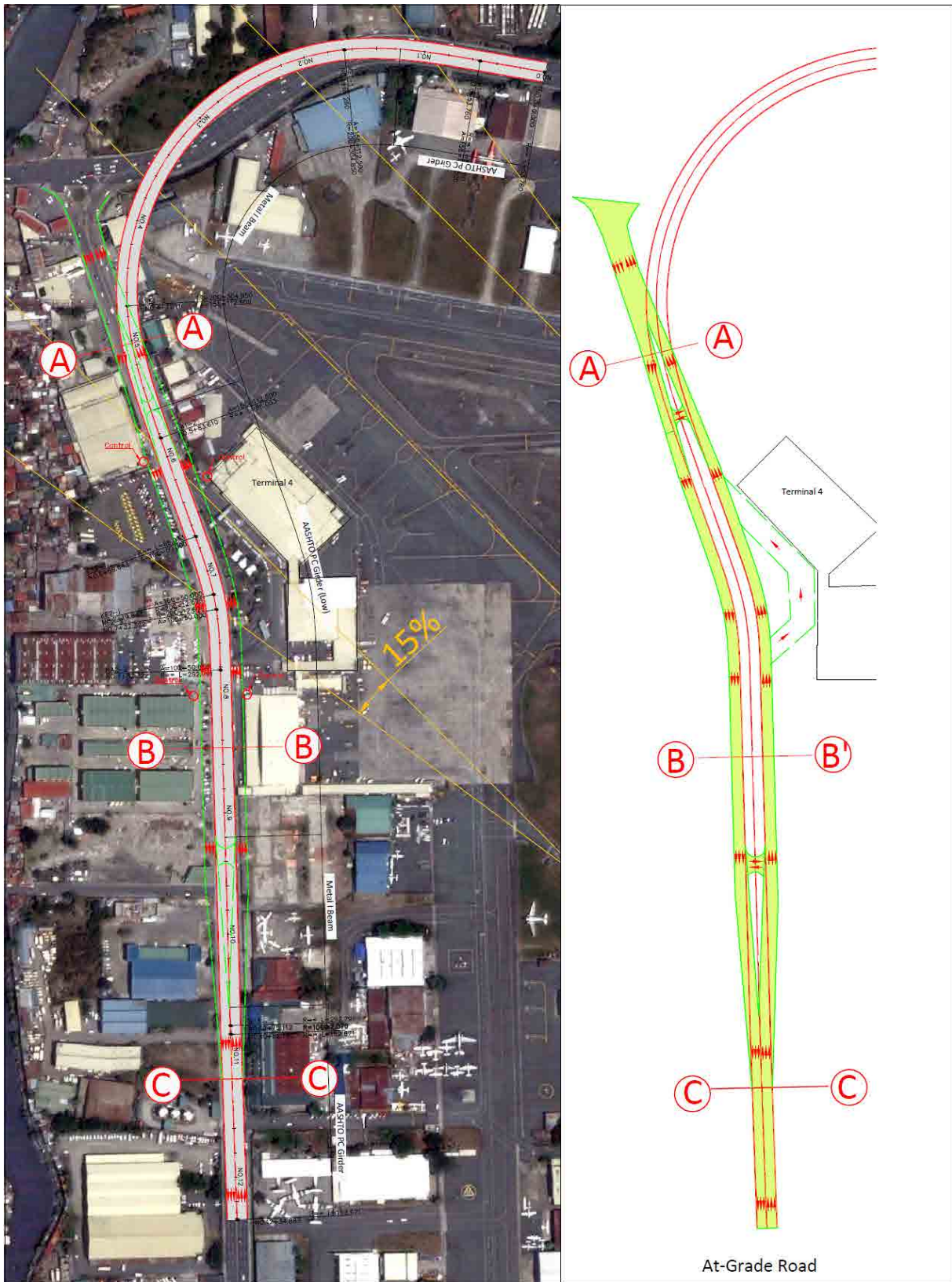


FIGURE 3.13-4 (A) ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE (PLAN)

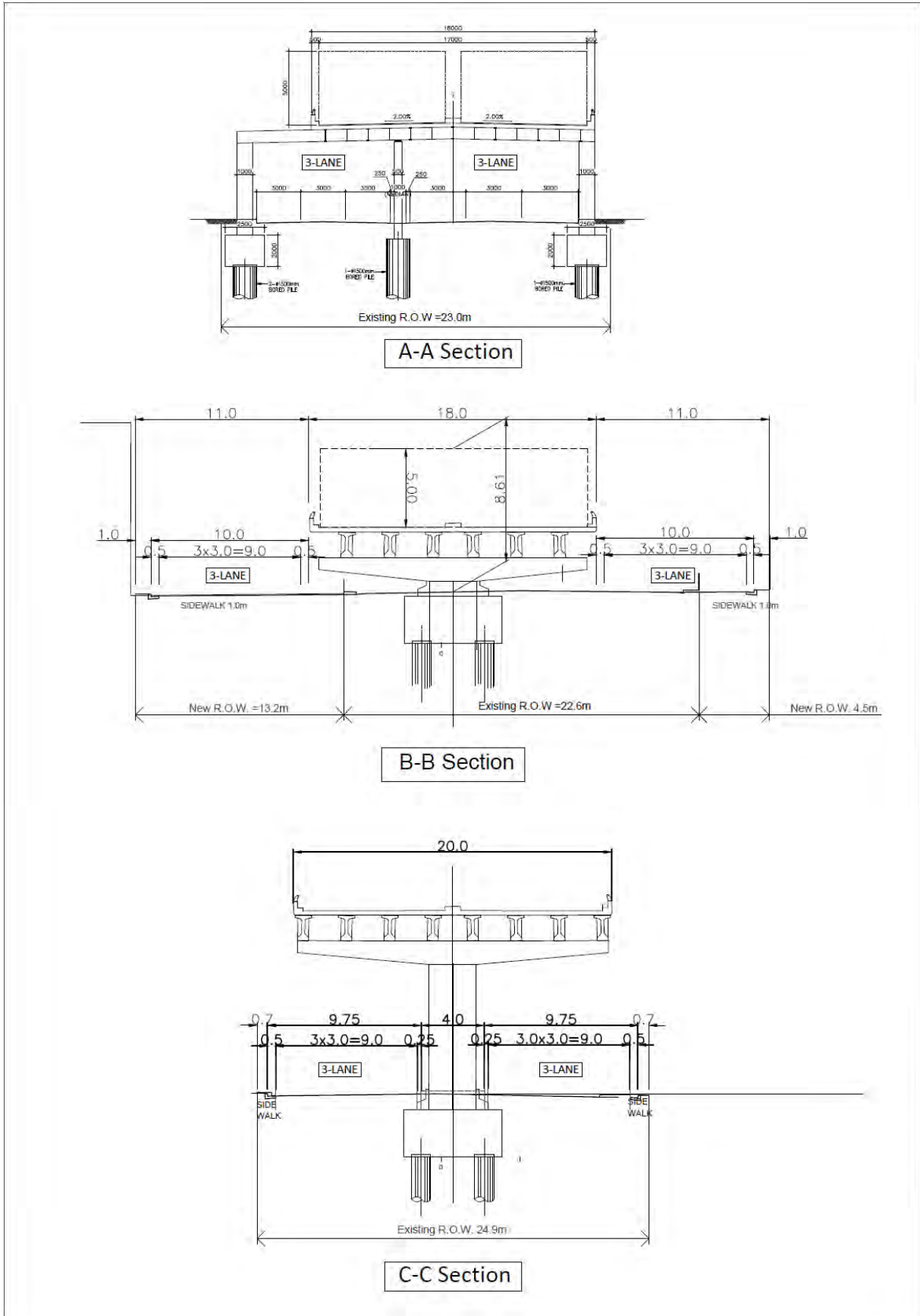


FIGURE 3.1.3-4 (B) ALTERNATIVE-3 AT NAIA NAVIGATIONAL CLEARANCE 6-LANE AT-GRADE (CROSS SECTION)

3.2 WEST END ALTERNATIVES

3.2.1 LRT Line-1 Cavite Extension Plan

LRT Line-1 Cavite Extension and Land Ownership is shown in **Figure 3.2.1-1 (1) and (2)**.

LRT Line-1 Cavite Extension

- LRT Line-1 Cavite Extension will be constructed along Roxas Blvd and Manila-Cavite Coastal Expressway. LRT will not affect existing ROW of both roads.
- LRT MIA Station will be constructed over the NAIA (MIA) road west extension.
- MIA Station will occupy (**Figure 3.2.1-2**);
Width = 20.8 m.
Height = 15.712 m.

Land Ownership

- Subject land is owned by Manila Bay Development Corp. (MBDC).
- Coastal Mall (or Uniwide) leased land from MBDC and lease contract is going to be expired in 2015.
- Annex building of Coastal Mall is not used anymore.
- Second and Third Floor of Coastal Mall is closed and only a part of ground floor is open for business.

Manila Bay Blvd

- MBDC and PAGCOR have a plan to construct Manila Bay Blvd.

3.2.2 Alternatives

There are two alternatives.

Alternative-1: The expressway is to end at Macapagal Blvd.

Alternative-2: The expressway is to end at Roxas Blvd.

Alternative-1 has two sub-alternatives;

Alternative-1(A): Ramp A and B utilizes MBDC land which is currently vacant.

Alternative-1(B): Ramp A and B utilizes Annex Building Area of Coastal Mall.

Vertical Clearance control of Alternative-1 is shown in **Figure 3.2.2-1**.

Alternative-1(A) plan is shown in **Figure 3.2.2-2 (1), (2), and (3)**.

Alternative-1(B) plan is shown in **Figure 3.2.2-3 (1), (2), and (3)**.

Alternative-2 plan is shown in **Figure 3.2.2-4 (1) and (2)**.



FIGURE 3.2.1-1 LRT LINE-1 CAVITE EXTENSION AND LAND OWNERSHIP

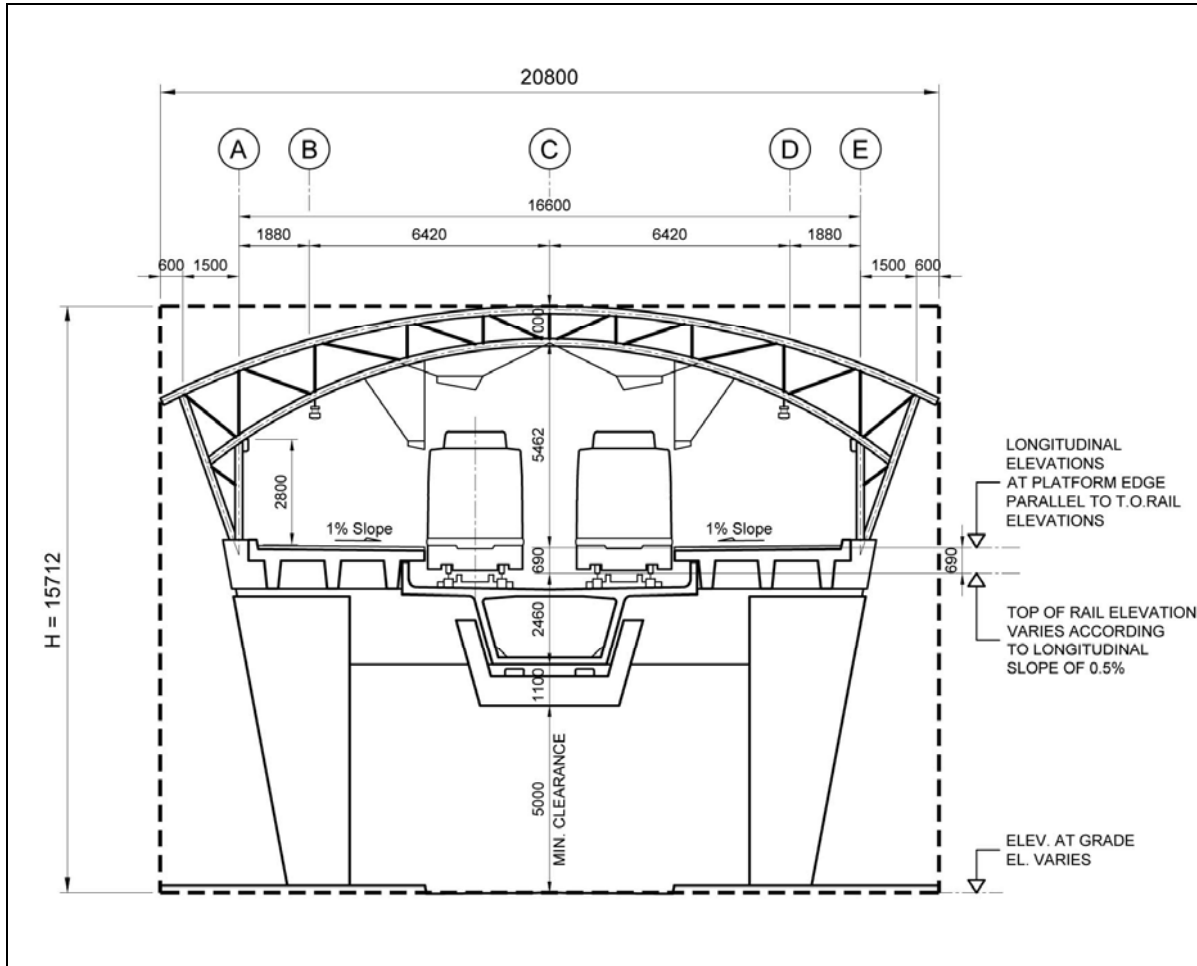


FIGURE 3.2.1-2(1) LRT LINE-1 CAVITE EXTENSION LINE MIA STATION OVER NAIA (MIA) ROAD EAST EXTENSION

NOTE : MIA Station of LRT Line-1 Cavite Extension shall be built outside of west side sidewalk of Roxas Blvd. MIA Station shall occupy 20.8m. from the west edge of Roxas Blvd. horizontally with the height of 15.712m.

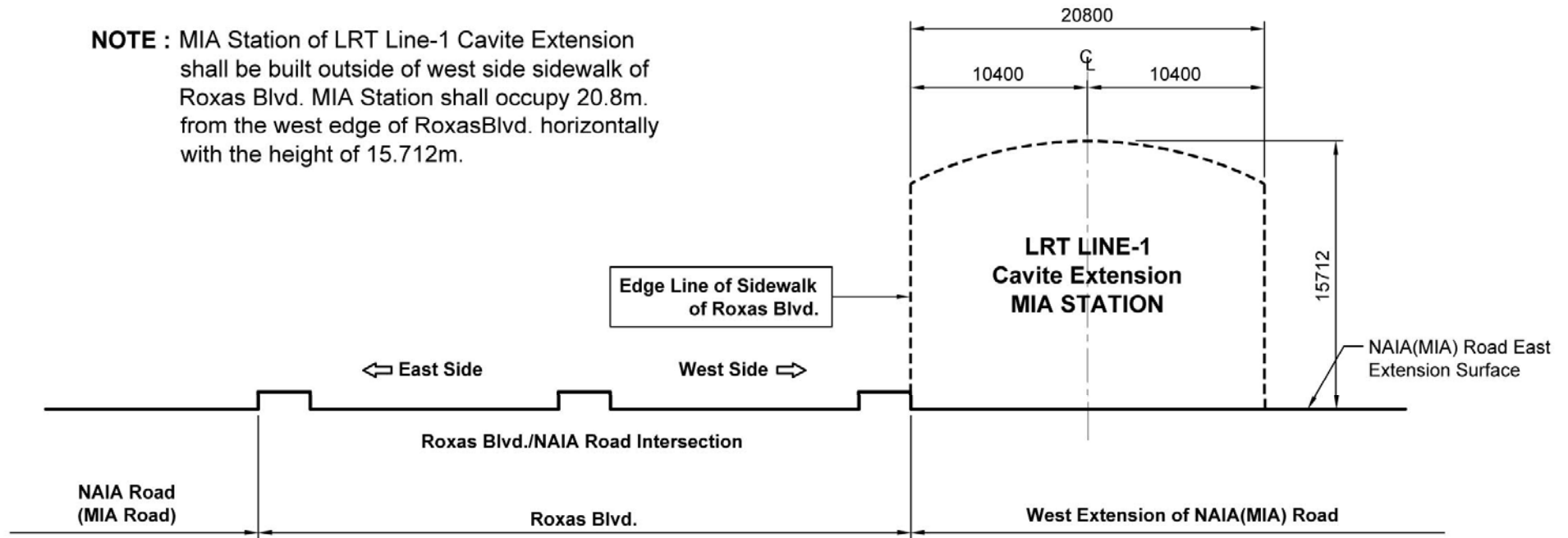


FIGURE 3.2.1-2 (2) HORIZONTAL LOCATION OF MIA STATION

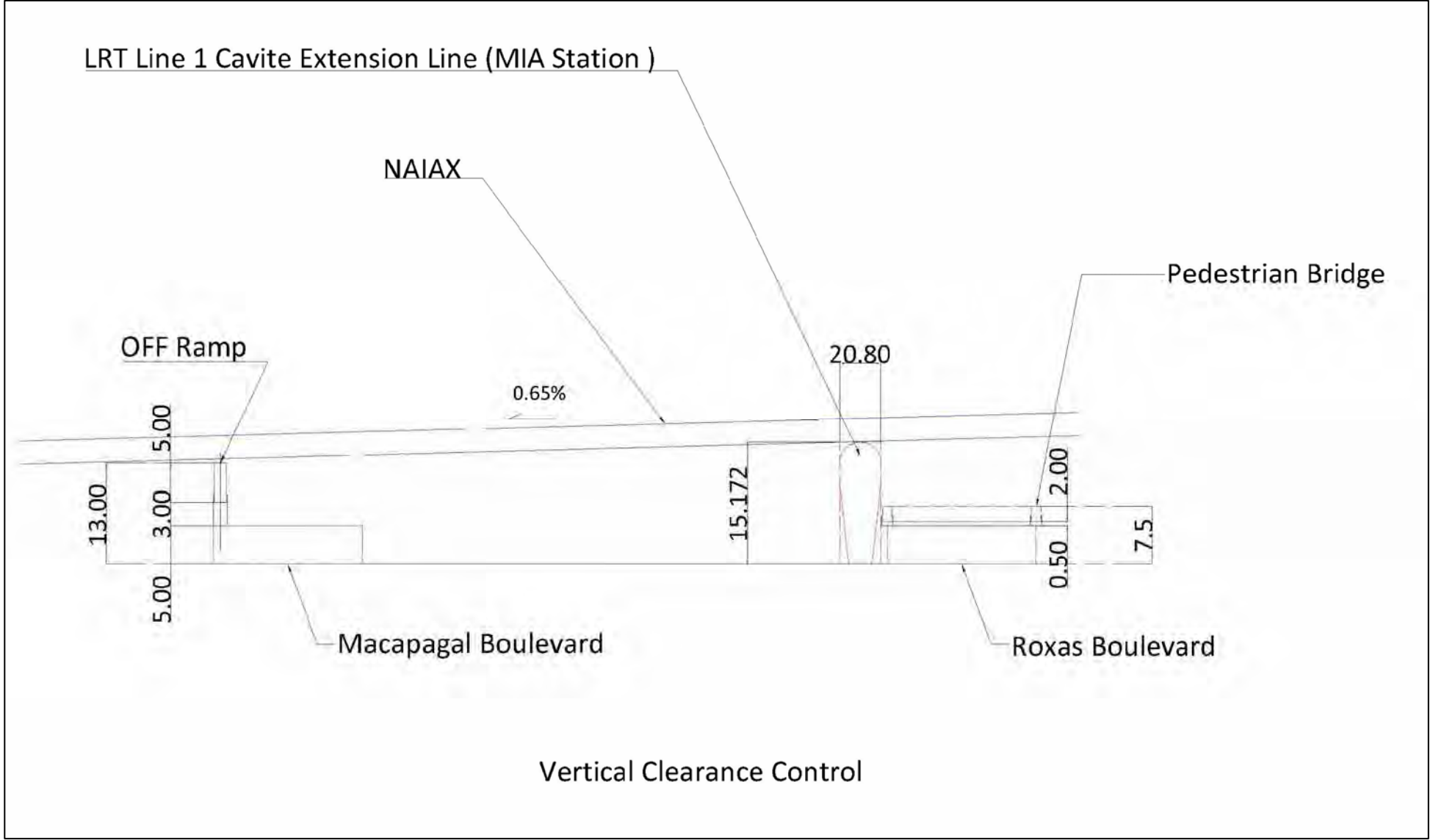


FIGURE 3.2.2-1 VERTICAL CLEARANCE OF CONTROL OF ALTERNATIVE-1



FIGURE 3.2.2-2(1) ALTERNATIVE-1 (A) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PLAN)

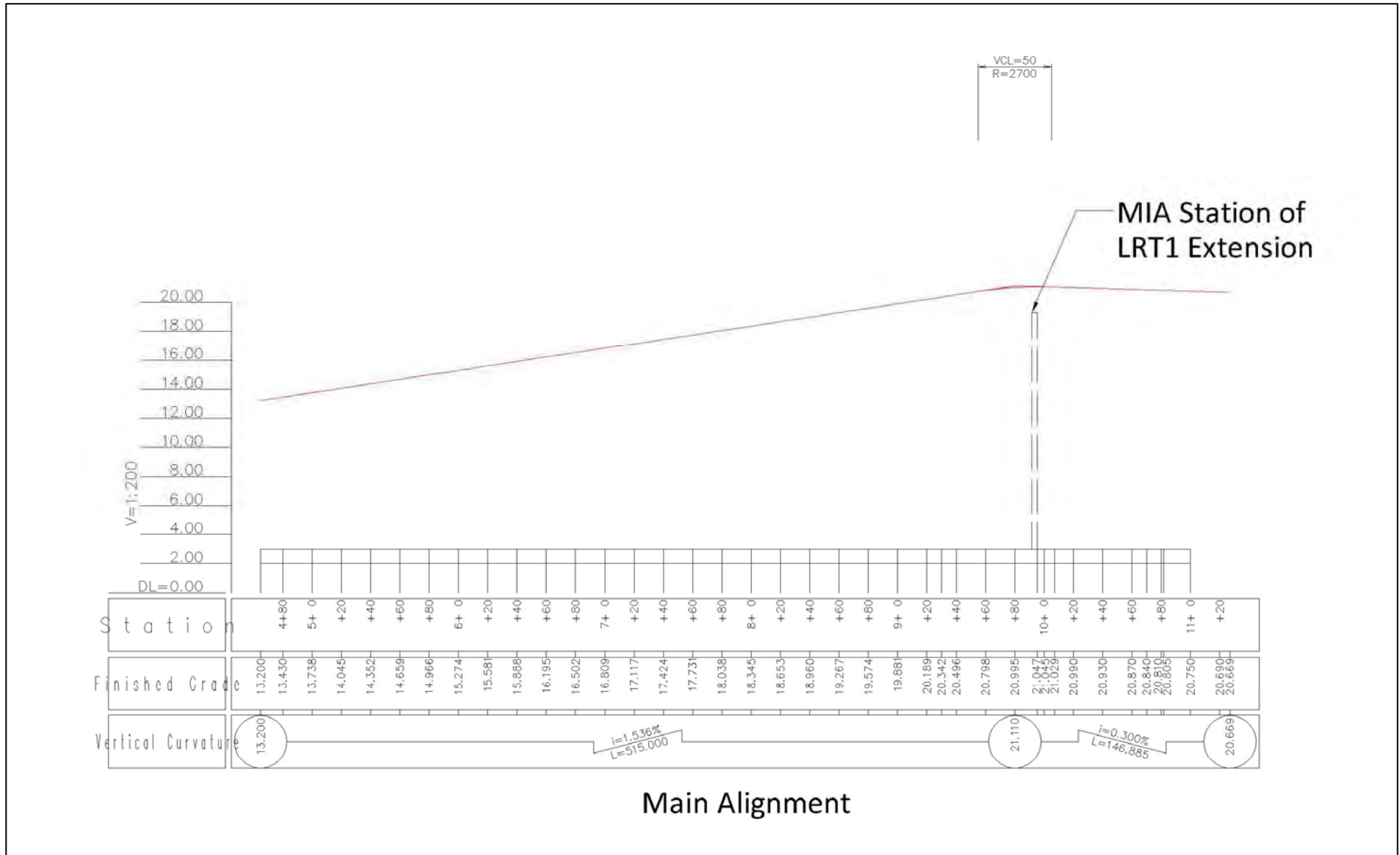


FIGURE 3.2.2-2(2) ALTERNATIVE-1 (A) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE)

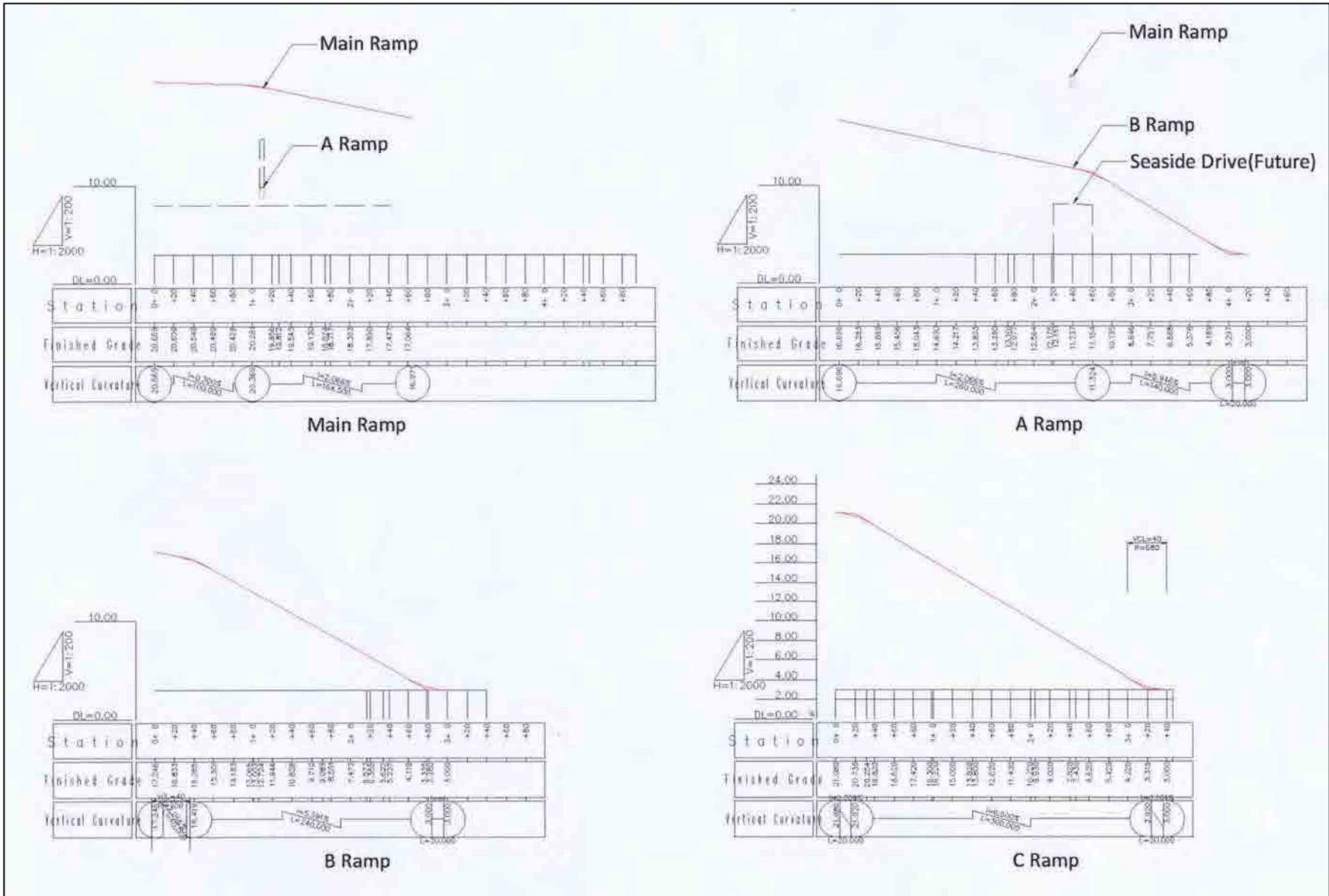


FIGURE 3.2.2-2(3) ALTERNATIVE-1 (A) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE)



FIGURE 3.2.2-3(1) ALTERNATIVE-1 (B) INTERCHANGE PLAN END AT MACAPAGAL BLVD PLAN

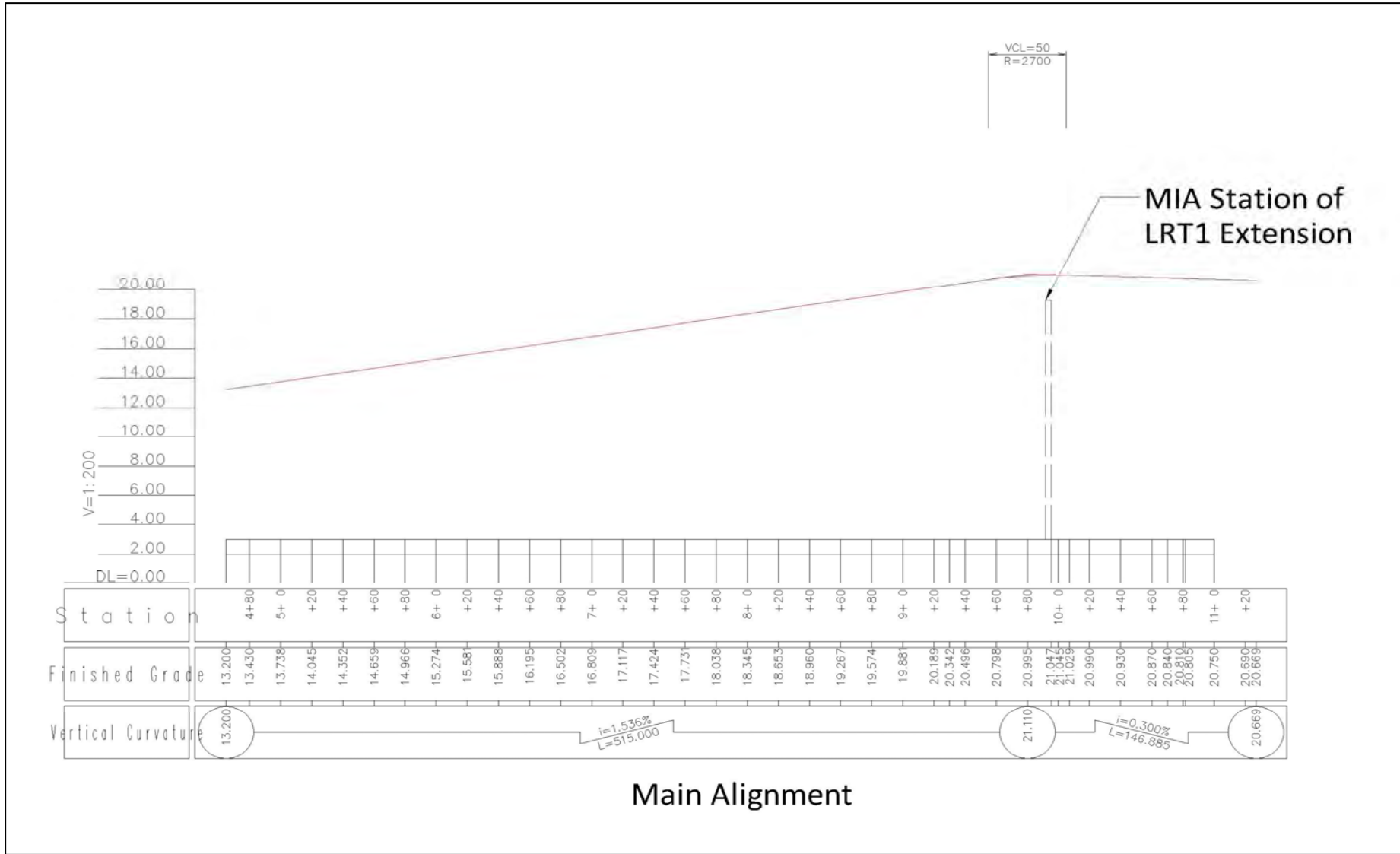


FIGURE 3.2.2-3(2) ALTERNATIVE-1 (B) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE)

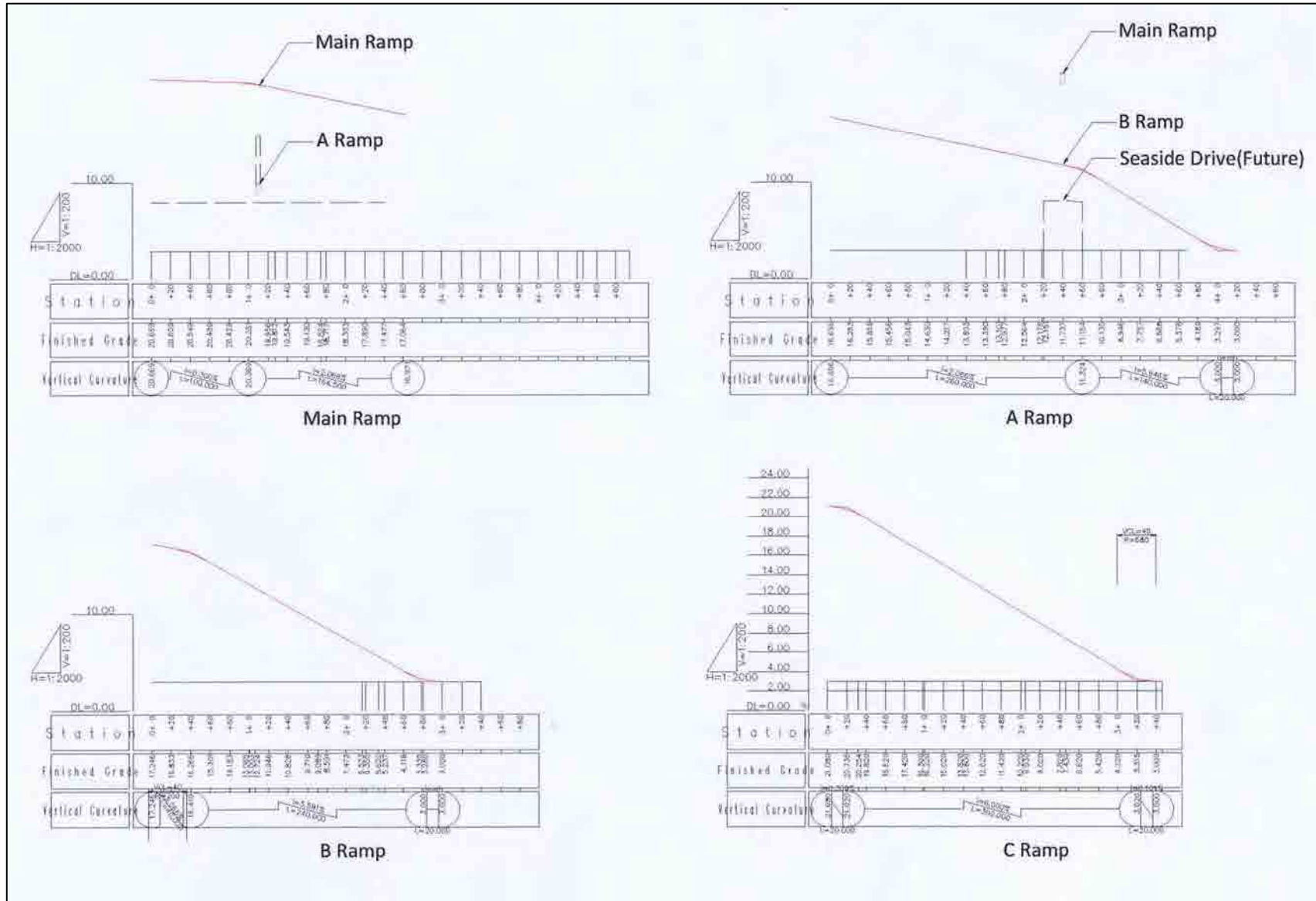


FIGURE 3.2.2-3(3) ALTERNATIVE-1(B) INTERCHANGE PLAN END AT MACAPAGAL BLVD (PROFILE)



FIGURE 3.2.2-4 (1) ALTERNATIVE-2 INTERCHANGE PLAN END AT ROXAS BLVD (PLAN)

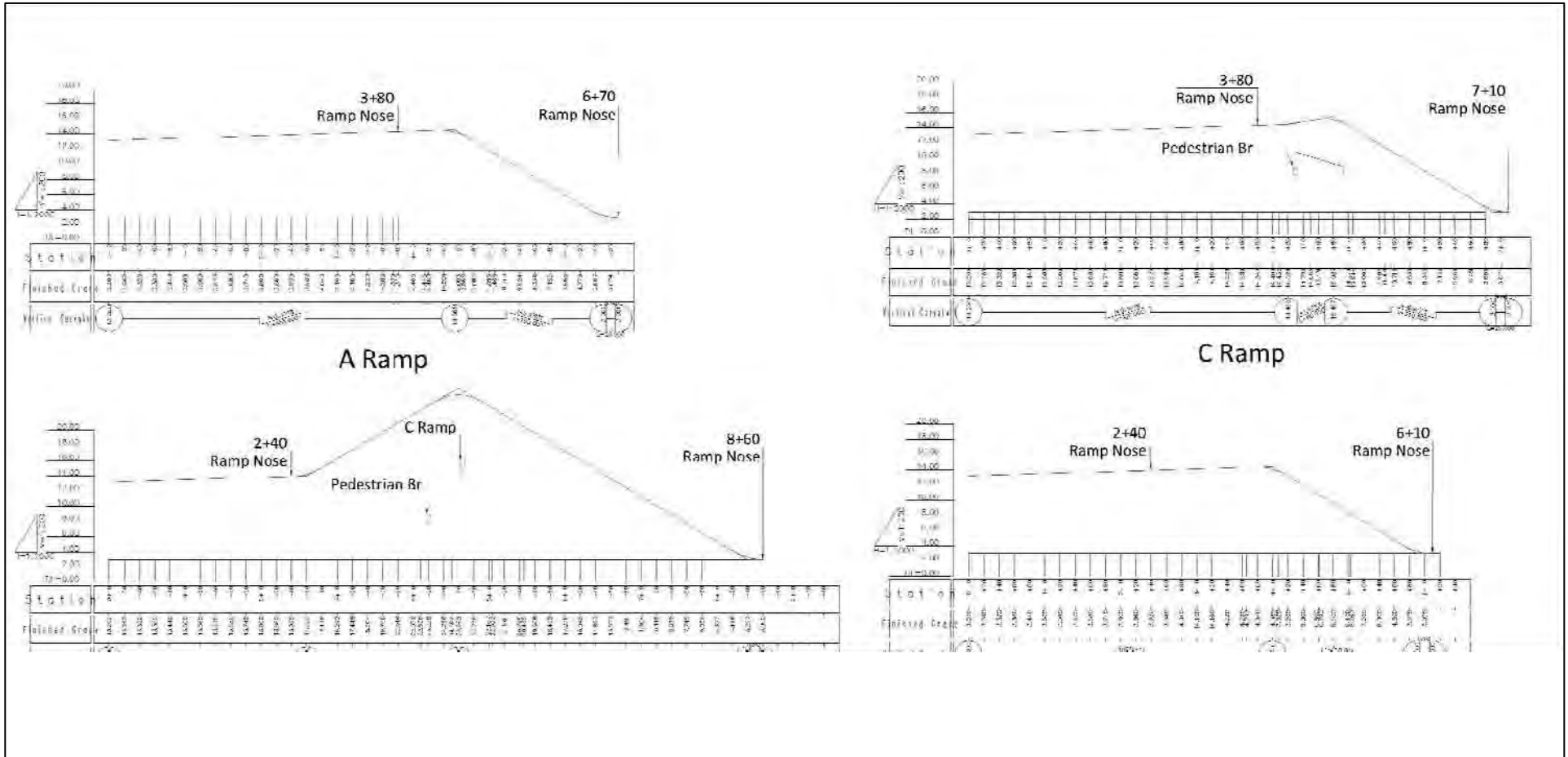


FIGURE 3.2.2-4 (2) ALTERNATIVE-2 INTERCHANGE PLAN END AT ROXAS BLVD (PROFILE)

TABLE 3.2.2-1 COMPARISON FOR OF END POINT OF NAIAX PHASE-2

(Confidential)