FIRST DHAKA ELEVATED EXPRESSWAY (FDEE) COMPANY LIMITED.
FDEE Complex, New Airport Road, Kawla, Dhaka-1229, Bangladesh

Ref. No. FDEE/BBA/ 810 /2017 May 21, 2017

Bangladesh Bridge Authority
Bridge Division
Ministry of Road Transport and Bridges
Setu Bhaban
New Airport Road, Banani
Dhaka – 1212

Attention: **Mr. Quazi Muhammmad Ferdous**
Project Director
Dhaka Elevated Expressway PPP Project

Subject: **Submission of Road Traffic Management Plan Rev. C**

BBA Ref.: 1. Memo No: 50.00.0000.301.084.2014(V-5)-1258 dated 12/12/2016
Subject: IE Review Comment on Road Traffic Management Plan
2. Memo No: 50.00.0000.301.084.2014(V-5)-03 dated 01/01/2017
Subject: Safety Consultant Review Comment on Road Traffic Management Plan

Dear Sirs,

Pursuant to ARCA Article 11.2 Concessionaire's Conditions Precedent states the Concessionaire shall fulfil (k) prepare a Traffic Management Plan and ARCA Article 14.1 Road Traffic Management Plan.

Please find the enclosure of re-submission herewith Road Traffic Management Plan during Construction revised as per comments of IE and BBA's Safety Consultant for your kind review and approval.

Your kind consideration and response would be highly appreciated.

Very Truly Yours,

Montchai Musicabud
Managing Director
For First Dhaka Elevated Expressway (FDEE) Company Limited
BOI Registration No.: F-452011121525-H Dated 2011-12-20

Encl: 1. Road Traffic Management Plan (FDEE/DEE/TMP-001, Rev.C) 1 Volume with CD

CC: 1. Chief Engineer, BBA, Setu Bhaban, Banani, Dhaka
2. PS to Secretary, Bridge Division, Setu Bhaban, Banani, Dhaka
3. Mr. Imad I Ahmed, Team Leader, IE of DEE Project, Dhaka
4. Mr. Sanjay Kumar, Team Leader, Safety Audit Consultant of DEE Project, Dhaka

The Government of the People's Republic of Bangladesh

Represented By

The Bridges Division, Ministry of Road Transport and Bridges

Acting Through

Bangladesh Bridge Authority

FOR THE PROCUREMENT OF CONCESSION RIGHTS TO

DESIGN, FINANCING, CONSTRUCTION, OPERATION AND MAINTENANCE OF

DHAKA ELEVATED EXPRESSWAY PPP PROJECT

ON BUILD OPERATE AND TRANSFER (BOT) BASIS

"Road Traffic Management Plan"

ARCA Article 11.2(k) and Article 14.1

Document No. FDEE/DEE/TMP-001, Rev.C

MAY 2017

PREPARED BY

First Dhaka Elevated Expressway (FDEE) Company Limited (ITD Group)

Document Title: **Road Traffic Management Plan**
(ARCA Article 11.2(k) and Article 14.1)

Document No: **FDEE/DEE/TMP-001**

Document Amendment Record

Revision	Date	Amendment Record
C	**21 May 2017**	**Submission for approval (Revised)**
B	20 November 2016	Submission for approval (Ref. No.: FDEE/BBA/705/2016)
A	September 2015	Submission for approval (Ref. No.: FDEE/BBA/445/2015)

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Prepared by: _____
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Managing Director
Date : 21/05/2017

Table of Content

Road Traffic Management Plan

(ARCA Article 11.2(k) and Article 14.1)
FDEE Doc. No.: FDEE/DEE/TMP-001 Rev.C

*Note: *For Railway Traffic Management Plan (as per ARCA Article 11.2(l) and Article 14.2), please refer to FDEE Doc. No.: FDEE/DEE/TMP-002.*

1 Introduction:

First Dhaka Elevated Expressway Company Limited, Concessionaire (hereinafter referred to as **"FDEE"**). The FDEE Road Traffic Management Plan for the Dhaka Elevated Expressway PPP Project (hereinafter call "**this Project**") will be established in consultation and coordination with Dhaka Transport Coordination Board (hereinafter referred to as the **"DTCB"**) during the execution of Road Traffic Management Plan under Contract Document **(ARCA Clause 14.1)** in order to meet the current and future needs of Bangladesh Bridge Authority referred to as **"BBA"** (hereinafter referred to as the **Grantor's Representative**) of Bridges Division, Ministry of Road Transport and Bridges of the Government of the People's Republic of Bangladesh (hereinafter referred to as the **"Grantor"**).

This Road Traffic Management Plan will be applied throughout this Project including EPC contractor and sub-contractors and other related parties who will be involved in this Project.

The basic objective of the following guidelines is to lay down procedures to be adopted by the EPC Contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.

The FDEE Road Traffic Management Plan demonstrates the Principle of our intended to be used for this Project and presented in this document.

FDEE and EPC Contractor confirmed that Traffic Management Plan for each area (Sub-Plans) will be issued well in advance of the commencement of the construction activities to enable all concerned parties such as DMP, BBA, BBA's Safety Consultant, BR, BRTA, DTCB, Army and IE etc to review/consent under ARCA of the Project.

2 Summary Scope of Works:

The Dhaka Elevated Expressway PPP Project on Build, Operation and Transfer (BOT) basis comprising the construction of elevated structures of the expressway with 4 Lanes Dual Carriageway located in Dhaka city on the precast I-Girders viaduct over concrete piers or portal frames and elevated approximately 8 to 23 meters above existing ground including ramps, on bored pile foundation and central control building, toll buildings and toll plazas, toll collection & operation system, lightings and traffic surveillance system etc.

2.1 Route Alignment of the Project:

Hazrat Shahjalal International Airport – Kuril – Banani – Mohakhali – Tejgoan – Moghbazar – Kamlapur – Saidabad – Jatrabari - Dhaka Chittagong Highway (KutubKhali).

2.2 The Main Components of the Dhaka Elevated Expressway PPP Project are as follows:

- Mainline: Approx. 19.73 km. of Elevated 4 Lane Dual Carriageways;
- Ramp 31 Nos, Length 27 km;
- Total Length (with Ramps) = 46.73 Km;
- Toll Plaza : 8 Locations;
- Central Control Building : 1 Unit;
- Toll Collection System and Traffic Surveillance & Operation System.

2.3 Three tranches of the Project (As per Mainline Length):

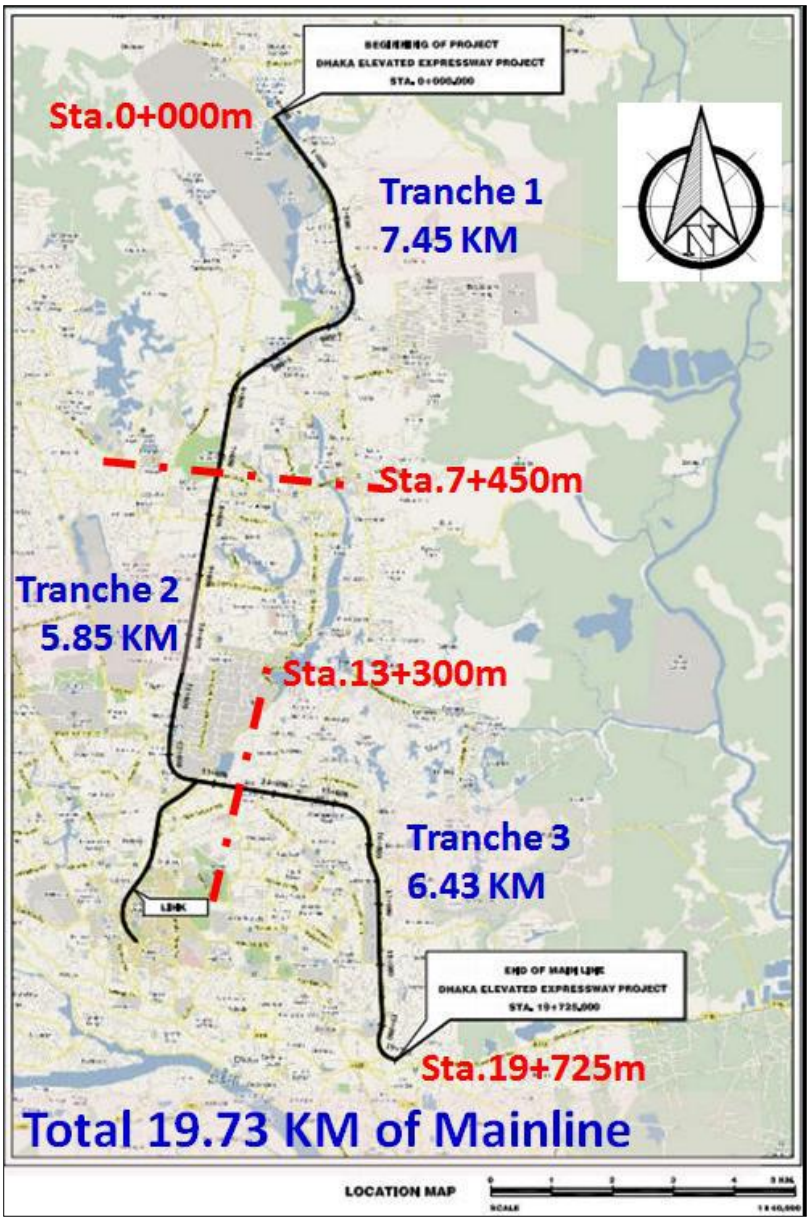
- 1st Tranche - 7.45 Km., Sta.0+000m to Sta.7+450m;
- 2nd Tranche - 5.85 Km., Sta.7+450m to Sta.13+300m;
- 3rd Tranche - Remaining Length, Sta.13+300m to Sta.19+725m (6.43 Km.).

2.4 Construction Schedule (ARCA Schedule 10):

- Construction Period: 42 Months (from Construction Commencement Date)
- Concession Period: 25 Years (Including Construction Period).

**Figure Summary and Tentative Schedule, please refer to Exhibit-C in this Document.*

2.5 Route Alignment Map of the Project:



The conceptual model of Dhaka Elevated Expressway PPP Project

3 Terms and Definitions:

Without limiting to the terms and definitions expressed in the Contract Document, the following terms and definitions shall, unless otherwise defined, be used in FDEE's Road Traffic Management Plan documentation.

"BR" means Bangladesh Railway, one of the Relevant Authorities for Approval under this Contract Document (ARCA Schedule 7) and ARCA Clause 14.2 which shall coordinate the execution of Railway Traffic Management Plan during Construction Works of the Project.

"BRTA" means Bangladesh Road Transport Authority, one of the Relevant Authorities for Approval under this Contract Document (ARCA Schedule 7) of the Project.

"Contract Document" means the **AMENDED AND RESTATED CONCESSION AGREEMENT (ARCA)** dated 15 December 2013 at Dhaka, Bangladesh.

"DTCA" means Dhaka Transport Coordination Authority, one of the Relevant Authorities for coordination under this Contract Document.

"DTCB" means Dhaka Transport Coordination Board, one of the Relevant Authorities for Approval under this Contract Document (ARCA Schedule 7) and ARCA Clause 14.1 which shall coordinate the execution of Road Traffic Management Plan during Construction Works of the Project.

"EPC" means Engineering Procurement and Construction of the Project.

"EPC Contract" means the contract that may be entered into between FDEE and the EPC Contractor for the design, construction and completion of the Project in accordance with the Contract Document (ARCA).

"EPC Contractor" means the person selected and appointed by Concessionaire as contractor and approved by the Grantor to design, build and complete the Project pursuant to the terms of the EPC Contract.

"FDEE" means First Dhaka Elevated Expressway Company Limited, the Concessionaire of this Project.

"Grantor" means Government of People's Republic of Bangladesh, represented by Bridges Division, Ministry of Communications (is now Ministry of Road Transport and Bridges).

"Grantor's Representative" means Bangladesh Bridge Authority (BBA).

"IE" means Independent Engineer.

"Procedure" means the specified way to carry out an activity or a process.

"Project" means the Dhaka Elevated Expressway PPP Project.

"Road Traffic Management Plan" means the plan prepared by the Concessionaire for managing the traffic in Dhaka city during Construction Works, in consultation with DTCB, BBA and approved by the Grantor.

"Responsible Manager" means person(s) nominated by the Concessionaire and/or EPC Contractor as being responsible for certain activities and authorized to represent in accordance with the assigned responsibility.

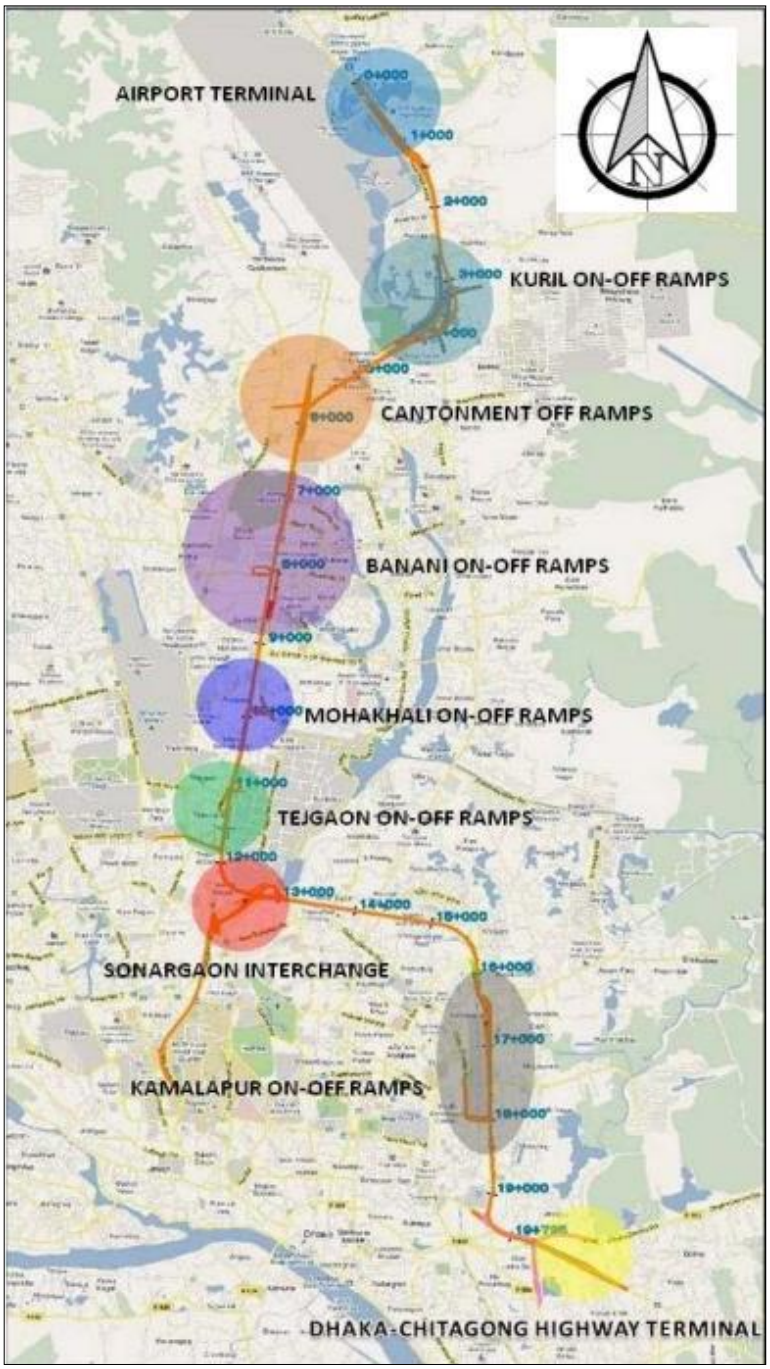
"Sub-Contractor" means a party to whom a sub-contract has been awarded by the Concessionaire and/or EPC Contractor pursuant to the EPC's and/or Sub- Contract Documents.

"Works" unless the context otherwise requires, means all the Concessionaire and/or EPC Contractor's obligations respective to works and/or products to be performed and/or provided by the Concessionaire and/or EPC Contractor under the Contract Documents. For the purpose of this document the Works shall also mean the "Scope of Works" as defined above.

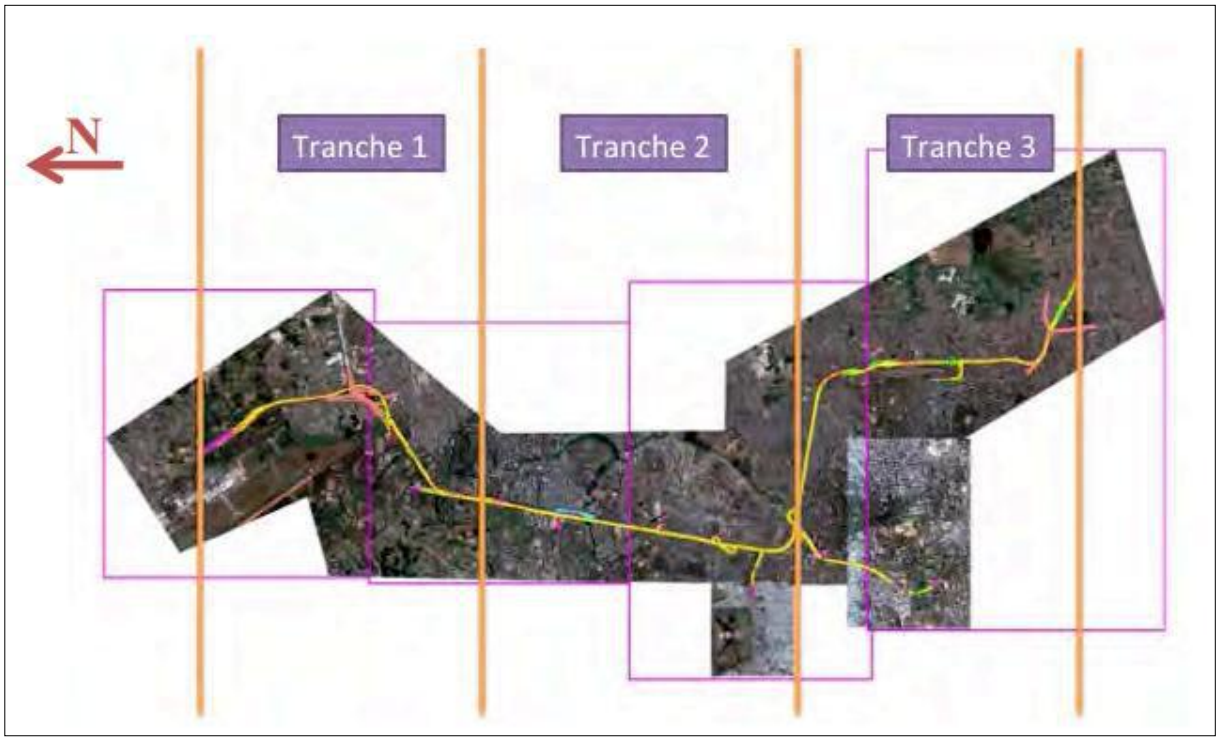
4 Road Traffic Management Plan during Construction Works:

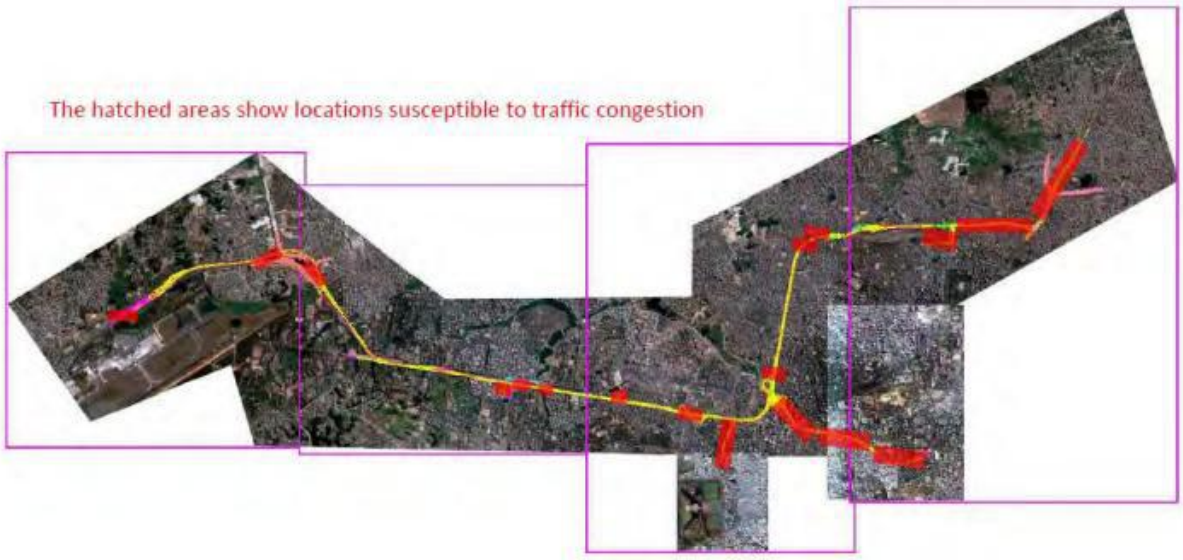
4.1 Project Brief

The proposed route of Dhaka Elevated Expressway PPP Project (DEE project) starts at Shahjalal International Airport and runs alongside New Airport Road, along the railway corridor through Mohakhali, Tejgaon and Moghbazar to Kamalapur Rail Station and go down south further to cross over and run along the Mayor Mohammad Hanif (Jatrabari) Flyover and finally connecting to Dhaka-Chittagong Highway near Kutubkhali. There are 8 Toll Plazas, 31 Ramps and a Central Control Center Building. The project is designed to be two-way, 4-lanes where the length of main line is approximately 19.73 Km and the total length of ramps is approximately 26.58 km (including Sonargaon link road). Thus, the total length is approximately 46.31 km.



No	Description	Distance (Km)		Sum (Km)	Ramp No.			Direction
		Mainline	Ramp		EN	EX	Sum	
1	**Tranche 1: Sta.0+000m - Sta.7+450m**	**7.45**	**6.02**	**13.47**	**4**	**5**	**9**	
	1.1 Mainline	7.45						
	1.2 Ramp							
	1.2.1 Airport EN		0.92		1			Southbound
	1.2.2 Airport EX		0.52			1		Northbound
	1.2.3 Kuril EN-1		0.70		1			Southbound
	1.2.4 Kuril EN-2		0.83		1			Southbound
	1.2.5 Kuril EX		0.60			1		Northbound
	1.2.6 Cantonmemt EX		0.58			1		Northbound
	1.2.7 Banani EN-1		0.70		1			Northbound
	1.2.8 Banani EX-1		0.30			1		Southbound
	1.2.9 Banani EX-2		0.88			1		Southbound
2	**Tranche 2: Sta.7+450m - Sta.13+300m**	**5.85**	**15.40**	**21.25**	**8**	**8**	**16**	
	2.1 Mainline	5.85						
	2.2 Ramp							
	2.2.1 Banani EN-2		0.74		1			Southbound
	2.2.2 Mohakali EN		0.65		1			Southbound
	2.2.3 Mohakali EX-1		0.68			1		Northbound
	2.2.4 Mohakali EX-2		0.39			1		Southbound
	2.2.5 Tejgaon EN-1		1.02		1			Southbound
	2.2.6 Tejgaon EN-2		0.16		1			Northbound
	2.2.7 Tejgaon EN-3		0.59		1			Northbound
	2.2.8 Tejgaon EX-1		1.33			1		Southbound
	2.2.9 Tejgaon EX-2		0.31			1		Northbound
	2.2.10 Sonargon EN-1 (BUET Link)		3.79		1			Northbound
	2.2.11 Sonargon EN-2 (CCB)		0.58		1			Northbound
	2.2.12 Sonargon EN-3		0.55		1			Southbound
	2.2.13 Sonargon EX-1 (BUET Link)		3.27			1		Southbound
	2.2.14 Sonargon EX-2		0.46			1		Southbound
	2.2.15 Sonargon EX-3		0.63			1		Northbound
	2.2.16 Sonargon EX-4		0.26			1		Northbound
3	**Tranche 3: Sta.13+300m - Sta.19+725m**	**6.43**	**5.16**	**11.59**	**3**	**3**	**6**	
	3.1 Mainline	6.43						
	3.2 Ramp							
	3.2.1 Kamalapur EN-1		0.33		1			Southbound
	3.2.2 Kamalapur EX-1		0.51			1		Northbound
	3.2.3 Kamalapur EN-2		0.75		1			Northbound
	3.2.4 Kamalapur EX-2		0.96			1		Southbound
	3.2.5 Kutubkali - EN		1.66		1			Northbound
	3.2.6 Kutubkali - EX		0.95			1		Southbound
	Total Overall Length (Approximate)	**19.73**	**26.58**	**46.31**	**15**	**16**	**31**	





Alignment of the Expressway showing areas susceptible to traffic congestion during construction phase

Due to the complicated existing traffic conditions in Dhaka city along the DEE Project's route alignment, it is therefore, necessary to provide a proper traffic management plan during the construction works.

In order to mitigate the possible inconvenience to the public, FDEE and EPC Contractor will be coordination and committed to construction work and confirmed that the Sub-Plan of Traffic Management Plan for each area shall be issued well in advance of the commencement of the construction activities to enable all relevant concerned authorities under ARCA of this Project.

FDEE and EPC Contractor are intending to be used **Bangladesh National Traffic Management Manual** to control Traffic Management Plan of this Project but demonstrates the Principle of this TMP proposal, FDEE has employ using guideline from the Manual on Uniform Traffic Control Devices (MUTCD):2009.

Safety Sign, Warning Sign etc. for communication to public and staff during Construction in specific working areas, all text will be in Bengali and English.

4.2 The Plan for Road Traffic Management and Safety during Construction

4.2.1 General Overview

During construction, Safety of the workmen would be necessary to prevent any accident as far as possible. Therefore, during this period Temporary Traffic Control (TTC) measures is relevant to ensure the safety of all the workmen including the Third Parties involved in the construction works.

The primary function of Temporary Traffic Control (TTC) is to provide for the reasonably safe and efficient movement of road users through or around TTC zones while reasonably protecting the workmen and equipment from any traffic incidents. As such, the efficiency of road user traffic flow is an integral element of every TTC zone, from planning through completion. Therefore, when the normal function of the roadway is suspended, TTC planning provides for continuity of the movement of traffics, transit operations; and access to property and utilities. Yet, no one set of TTC devices can satisfy all conditions for a given project or incident. At the same time, defining details that would be adequate to cover all applications is not practical. Instead, typical applications that depict common applications of TTC devices are more relevant.

The TTC selected for each location depends on type of highway, road user conditions, and duration of operation, physical constraints, and the nearness of the work space or incident management activity to road users.

The Traffic Management Plan (both Road and Railway) should be comprehensive and responsive. The plan identifies strategic traffic control measures to keep traffic moving. The plan for traffic management and safety during construction period should take account of the following criteria and procedures:

- The basic safety principles governing the design of permanent roadways and roadsides should also govern the design of TTC zones. The goal should be to route the road users through such zones using roadway geometries, roadside features, and TTC devices as comparable as possible, to those for normal highway situations.

- A TTC plan, in detail appropriate to the complexity of the work project or incident, should be prepared and understood by all responsible parties before possession of the site. Any changes in the TTC plan should be consult and consent by an official knowledgeable (for example, trained and/or certified) in proper TTC practices.

- Individuals who are knowledgeable (for example, trained and/or certified) in the principles of proper TTC should be assigned responsibility for safety in TTC zones. The most important duty of these individuals should be to check that all TTC devices of the project are reasonably consistent with the TTC plan and are effective in providing reasonably safe conditions for road users and workmen.

- As the work progresses, temporary traffic controls and/or working conditions should be modified in order to provide reasonably safe and efficient road user movement and to provide worker safety. The responsible person to the TTC should have the authority to halt work until applicable or preventive safety measures are taken.

- TTC zones should be carefully monitored under varying conditions of road users - volumes, light, and weather to check that applicable TTC devices are effective, clearly visible, clean, and in compliance with the TTC plan.

- When warranted, an engineering study should be made (in cooperation with concerned officials) of reported accidents occurring within the TTC zone. Accident records in TTC zones should be monitored to identify the need for changes in the TTC plan.

- Adequate warning signs, road markings, guide signs, directional signs should be provided to assist in guiding road users in advance of and through the TTC zone or incident site by using proper pavement marking, signing, or other devices that are effective under varying conditions.

- Flagging procedures, when used, should provide positive guidance to road users traversing the TTC zone.

- To accommodate run-off-the-road incidents, disabled vehicles, or emergency situations, unencumbered roadside recovery areas or clear zones should be provided where practical.

- Channelization of road users should be accomplished by the use of pavement markings, signing, and crashworthy, detectable guiding devices.

- Work equipment, workmen' private vehicles, materials, and debris should be stored in such a manner to reduce the probability of being impacted by run-off-the-road vehicles.

4.2.2 Temporary Traffic Control Plans (TTC Plans)

A TTC plan describes TTC measures to be used for facilitating road users through a work zone or an incident area. TTC plans play a vital role in providing continuity of reasonably safe and efficient road user flow when a work zone, incident, or other event temporarily disrupts normal road user flow. Important auxiliary provisions that cannot conveniently be specified on project plans can easily be incorporated into Special Provisions within the TTC plan. The degree of detail in the TTC plan depends entirely on the nature and complexity of the situation.

TTC plans should be prepared by persons knowledgeable (for example, trained and/or certified) about the fundamental principles of TTC and work activities to be performed. The design, selection and placement of TTC devices for a TTC plan should be based on engineering judgment. Traffic control planning should be completed for highway construction, utility work, maintenance operations, and incident management including minor maintenance and utility projects prior to occupying the TTC zone. Planning for all road users should be included in the process. Modifications of TTC plans may be necessary because of changed conditions or a determination of better methods of safely and efficiently handling road users.

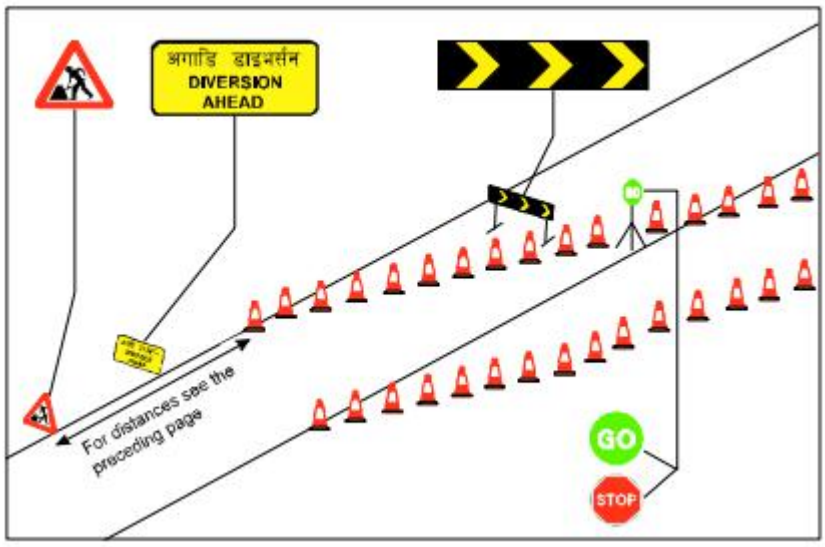
Reduced speed limits should be used only in the specific portion of the TTC zone where conditions or restrictive features are present. However, frequent changes in the speed limit should be avoided. A TTC plan should be designed so that vehicles

can reasonably safely travel through the TTC zone with a speed limit of no more than 25 km/h (15 mph).

A speed limit over than 25 km/h (15 mph) should be used only when required by restrictive features in the TTC zone. Where restrictive features justify a speed limit over than 25 km/h (15 mph), additional driver notification should be provided.

The speed limit should be stepped down in advance of the location requiring the lowest speed, and additional TTC warning devices should be used.

Road diversion



Mitigation of Traffic Disturbances

Special care will be taken in order to maintain essential traffic flows, as they may impact the construction progress and the public. They include providing local traffic diversion routes and assessing traffic impacts caused in the affected areas.

Sufficient signage will be installed to ensure that adequate information will be provided to motorists and pedestrians for traffic diversion.

When it becomes necessary to close a road or intersection or supplementary lanes, the overall (including adjacent road networks) traffic diversion schemes will be developed and implemented with quantitative justifications and coordination with all relevant authorities.

4.2.3 Temporary Traffic Control Zones

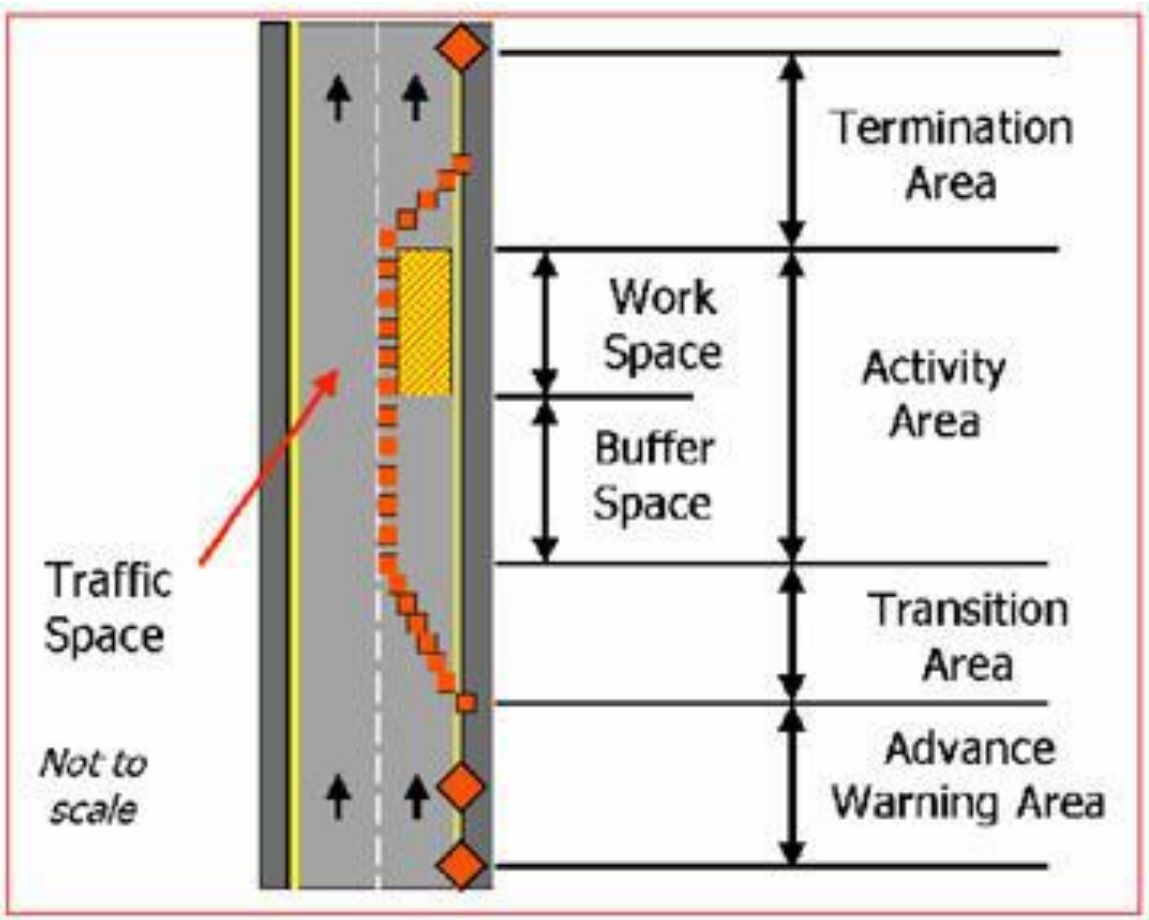
A TTC zone is an area of a highway where road user conditions are changed because of a work zone or an incident through the use of TTC devices. A work zone is an area of a highway with construction, maintenance, or utility work activities. A work zone is typically marked by warning signs, guide signs, guiding devices, barriers, pavement markings, and/or work vehicles.

While an incident area is an area of a highway where temporary traffic controls are imposed by authorized officials in response to a traffic incident, natural disaster, or special event.

4.2.3.1 Components of Temporary Traffic Control Zones

Most TTC zones are divided into **four areas** ie.,

- the advance warning area,
- the transition area,
- the activity area, and
- the termination area.



4.2.3.1.1 Advance Warning Area

The advance warning area is the section of highway where road users are informed about the upcoming work zone or incident area. Typical distances for placement of advance warning signs on freeways and highways should be longer because drivers are conditioned to uninterrupted flow. Therefore, the advance warning sign placement should extend on these facilities as far as 45-200 m or more based on justifications with all relevant authorities requirement.

Advance warning may be eliminated when the activity area is sufficiently removed from the road users' path so that it does not interfere with the normal flow.

4.2.3.1.2 Transition Area

The transition area is that section of highway where road users are redirected out of their normal path. Transition areas usually involve strategic use of tapers. When redirection of the road users' normal path is required, they shall be channelized from the normal path to a new path. Tapers may be used in both the transition and termination areas. Whenever tapers are to be used in close proximity to an interchange ramp, crossroads, curves, or other influencing factors, the length of the tapers may be adjusted. Tapers are created by using a series of guiding devices and/or pavement markings to move traffic out of or into the normal path. Longer tapers are not necessarily better than shorter tapers because extended tapers tend to encourage sluggish operation and to encourage drivers to delay lane changes unnecessarily. The test concerning adequate lengths of tapers involves observation of driver performance after TTC plans are put into effect.

4.2.3.1.3 Activity Area

The activity area is the section of the highway where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space. While the work space is that portion of the highway closed to road users and set aside for workmen, equipment, and material. Work spaces are usually delineated for road users by guiding devices or, to exclude vehicles and pedestrians, by temporary barriers.

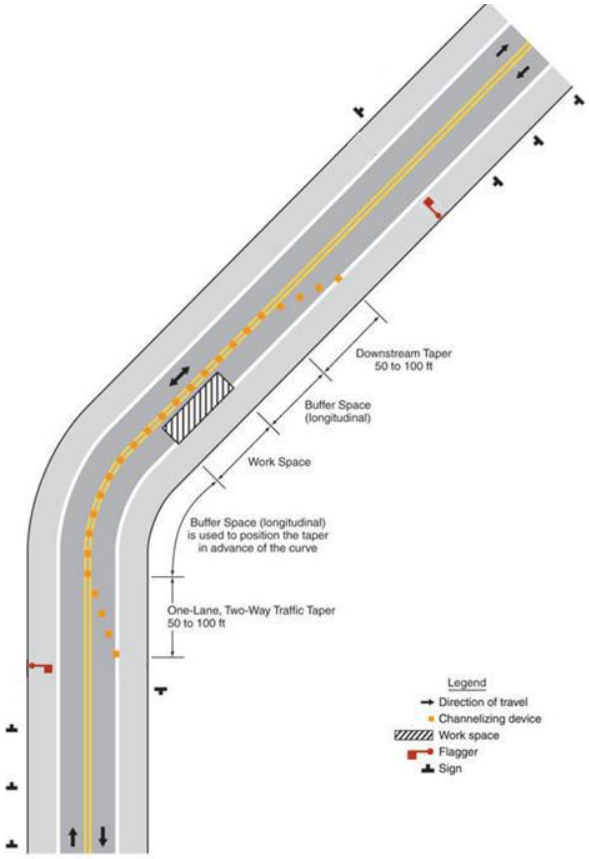
The work space may be stationary or may move as work progresses. The buffer space is a lateral and/or longitudinal area that separates road user flow from the work space or an unsafe area, and might provide some recovery space for an errant vehicle. The width of a lateral buffer space should be determined by engineering judgment. Neither work activity nor storage of equipment, vehicles, or material should occur within a buffer space. Buffer spaces may be positioned either longitudinally or laterally with respect to the direction of road user flow. The activity area may contain one or more lateral or longitudinal buffer spaces. A longitudinal buffer space may be placed in advance of a work space. The longitudinal buffer space may also be used to separate opposing road user flows that use portions of the same traffic lane.

4.2.3.1.4 Termination Area

The termination area shall be used to return road users to their normal path. The termination area shall extend from the downstream end of the work area to the last TTC device such as END CONSTRUCTION WORK signs, if posted.

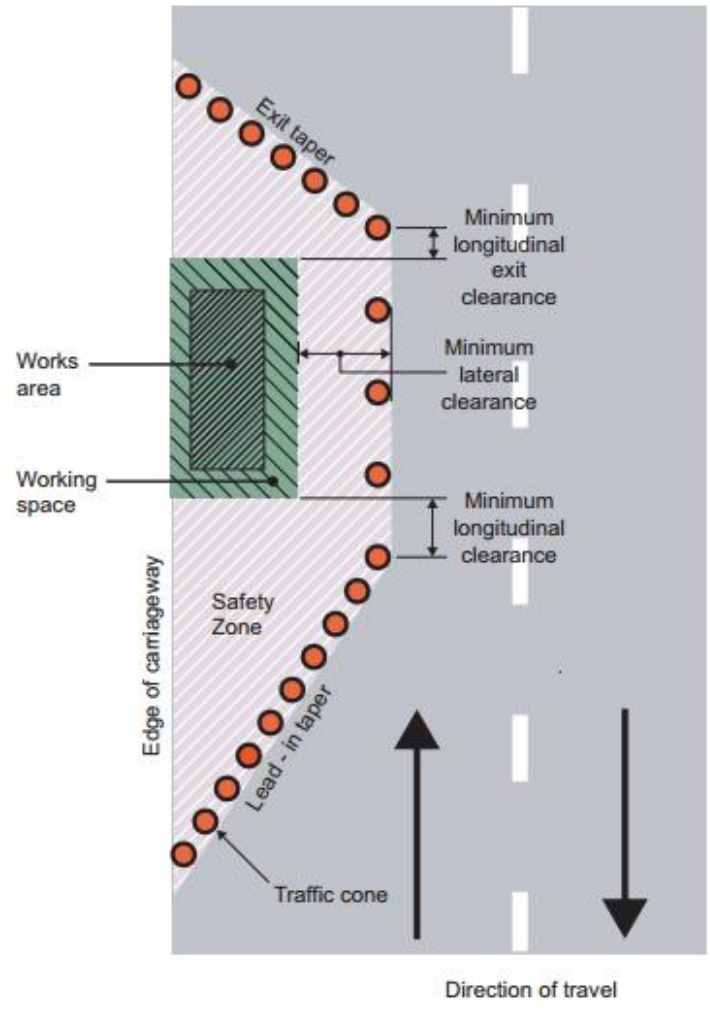
An END CONSTRUCTION WORK sign, a Speed Limit sign, or other signs may be used to inform road users that they can resume normal operations. A longitudinal

buffer space may be used between the work space and the beginning of the downstream taper.



4.2.4 Detour and Diversion

A detour is a temporary rerouting of road users onto an existing highway in order to avoid a TTC zone. Detours should be clearly signed over their entire length so that road users can easily use existing highways to return to the original highway. While a diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area. An example of a one-lane, two-way traffic taper is shown in Figure.



4.2.4.1 Movement of Traffic through Work Zone and Incident Area

4.2.4.1.1 One-Lane, Two-Way Traffic Control

When traffic in both directions must use a single lane for a limited distance, movements from each end shall be coordinated. Provisions should be made for alternate one-way movement through the constricted section via methods such as flagger control, a flag transfer, or stop or yield control. Control points at each end should be chosen to permit easy passing of opposing lanes of vehicles. At a spot construction, such as an isolated pavement patch on highways with lower speeds and adequate sight distance, the movement of traffic through one-lane, two-way constrictions tends to be self-regulating.

4.2.4.1.2 Flagger Method of One-Lane, Two-Way Traffic Control

When a one-lane, two-way TTC zone is short enough to allow a flagger to see from one end of the zone to the other, traffic may be controlled by either a single flagger or by a flagger at each end of the section. When a single flagger is used, the flagger should be stationed on the shoulder opposite the constriction or work space, or in a position where good visibility and traffic control can be maintained at all times. When good visibility and traffic control cannot be maintained by one flagger station, traffic

should be controlled by a flagger at each end of the section. One of the flaggers should be designated as the coordinator. Flaggers should be able to communicate with each other orally, electronically, or with manual signals. These manual signals should not be mistaken for flagging signals.

4.2.4.1.3 Flag Transfer Method of One-Lane, Two-Way Traffic Control

The driver of the last vehicle proceeding into the one-lane section is given a red flag (or other token) and instructed to deliver it to the flagger at the other end. The opposite flagger, upon receipt of the flag, then knows that it is reasonably safe to allow traffic to move in the other direction. A variation of this method is to replace the use of a flag with an official pilot car that always follows the last road user vehicle proceeding through the section. The flag transfer method should be employed only where the one-way traffic is confined to a relatively short length of a road, usually not more than 1.6 km (1 mile) in length.

4.2.4.1.4 Stop or Yield Control Method of One-Lane, Two-Way Traffic Control

STOP or YIELD signs may be used to control traffic on low-volume roads at a one-lane, two-way TTC zone when drivers are able to see the other end of the one-lane, two-way operation and have sufficient visibility of approaching vehicles.

If the STOP or YIELD sign is installed for only one direction, then the STOP or YIELD sign should face road users who are driving on the side of the roadway that is closed for the work activity area.

4.2.5 Flagger Control

4.2.5.1 Responsibility of Flaggers

A flagger shall be a person who provides TTC. Because flaggers are responsible for public safety and make the greatest number of contacts with the public of all highway workmen, they should be trained in safe traffic control practices and public contact techniques. Flaggers should be able to satisfactorily demonstrate the following abilities:

- Ability to receive and communicate specific instructions clearly, firmly, and courteously;
- Ability to move and maneuver quickly in order to avoid danger from errant vehicles;
- Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a TTC zone in frequently changing situations;
- Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations; and
- Ability to recognize dangerous traffic situations and warn workmen in sufficient time to avoid injury.

In addition to that the under-mentioned criteria should be adhered as well:

- For daytime and nighttime activity, flaggers shall wear High-Visibility Safety Apparel. The apparel background (outer) material shall be fluorescent **orange-red.**

- The retro reflective material color shall be either orange, red, yellow, white or a fluorescent version of these colors, and shall be visible at a minimum distance of 300 m (1,000 ft). The retro reflective safety apparel shall be designed to clearly identify the wearer as a person;

- Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags, are used to control road users through TTC zones;

- The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags should be limited to emergency situations.

4.2.5.2 Flagger Procedures

The use of paddles and flags by flaggers is illustrated. The following methods of signaling with paddles shall be used:

- To stop road users, the flagger shall face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic;

- To direct stopped road users to proceed, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed;

- To alert or slow traffic, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body;

- To further alert or slow traffic, the flagger holding the SLOW paddle face toward road users may motion up and down with the free hand, palm down.

The following methods of signaling with a flag shall be used:

- To stop road users, the flagger shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above the shoulder level toward approaching traffic;

- To direct stopped road users to proceed, the flagger shall stand parallel to the road user movement and with flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed;

- To alert or slow traffic, the flagger shall face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down

without raising the arm above a horizontal position. The flagger shall keep the free hand down.

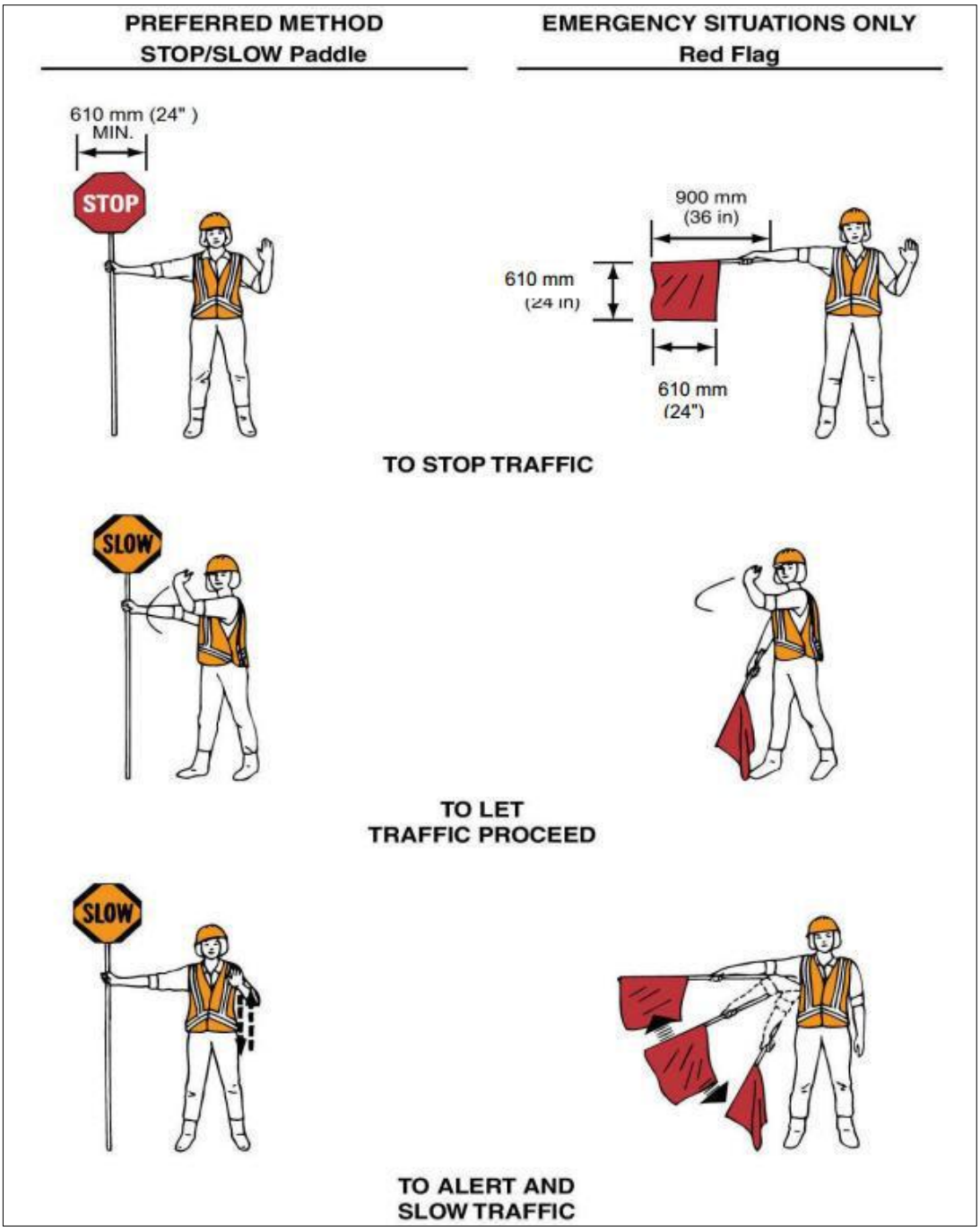


Figure: Use of Hand-Signaling Devices by Flaggers

4.2.5.3 Flagger Stations

Flagger stations shall be located such that approaching road users will have sufficient distance to stop at an intended stopping point. Flagger stations should be located such that an errant vehicle has additional space to stop without entering the work space. Except in emergency situations, flagger stations shall be preceded by an advance warning sign or signs. Except in emergency situations, flagger stations shall be illuminated at night.

The flagger should stand either on the shoulder adjacent to the road user being controlled or in the closed lane prior to stopping road users. A flagger should only stand in the lane being used by moving road users after road users have stopped. The flagger should be clearly visible to the first approaching road user at all times. The flagger also should be visible to other road users.

The flagger should be stationed sufficiently in advance of the workmen to warn them (for example, with audible warning devices such as horns or whistles) of approaching danger by out-of-control vehicles.

The flagger should stand alone, never permitting a group of workmen to congregate around the flagger station. At a spot construction, the flagger may have to take a position on the shoulder opposite the closed section in order to operate effectively. At spot lane closures where adequate sight distance is available for the reasonably safe handling of traffic, the use of one flagger may be sufficient.

4.2.6 Pedestrian and Worker Safety

4.2.6.1 Pedestrian Considerations

For facilitating local activities the Service Roads need to be provided for efficient movement of people and goods in some areas. In such areas, pedestrian consideration has to be incorporated during construction phase. The pedestrians might be affected by TTC zones, including the young, elderly, and people with disabilities such as hearing, visual, or mobility. These pedestrians need a clearly delineated and usable travel path. The following items should be considered when planning for pedestrians in TTC zones:

- Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations.
- Pedestrians should not be led into conflicts with vehicles moving through or around the work site.
- Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as much as practical the desirable characteristics of the existing pedestrian facilities.
- Provisions for continuity of accessible paths for pedestrians should be incorporated into the TTC process.

A pedestrian route should not be severed and/or moved for non-construction activities such as parking for vehicles and equipment. TTC devices used to delineate a TTC zone pedestrian walkway shall be crashworthy and, when struck by vehicles, pose a minimum threat to pedestrians, workmen, and occupants of impacting vehicles.

4.2.6.2 Worker Safety Considerations

The safety of workmen is equally as important as the safety of road users traveling through the TTC zone. TTC zones present temporary and constantly changing conditions that are unexpected by the road user. This creates an even higher degree of vulnerability for workmen on or near the roadway. The following are the key elements of worker safety and TTC management that should be considered to improve worker safety:

- Training-all workmen should be trained on how to work next to motor vehicle traffic in a way that minimizes their vulnerability. Workmen having specific TTC responsibilities should be trained in TTC techniques, device usage, and placement;

- Worker Safety Apparel-all workmen exposed to the risks of moving roadway traffic or construction equipment should wear high-visibility safety apparel. A competent person designated by the employer to be responsible for the worker safety plan within the activity area of the job site should make the selection of the appropriate garment for the workmen;

- Temporary Traffic Barriers-temporary traffic barriers should be placed along the work space depending on factors such as lateral clearance of workmen from adjacent traffic, speed of traffic, duration and type of operations, time of day, and volume of traffic;

- Speed Reduction -reducing the speed of vehicular traffic, mainly through regulatory speed zoning, funneling, lane reduction, or the use of uniformed law enforcement officers, or flaggers, should be considered;

- Activity Area-planning the internal work activity area to minimize backing-up maneuvers of construction vehicles should be considered to minimize the exposure to risk;

- Worker Safety Planning - a competent person designated by EPC contractor in association with FDEE should conduct a basic hazard assessment for the work site and job classifications required in the activity area during construction works.

4.3 Work Zones Devices

4.3.1 General

Federal Highway Administration (FHWA) policy calls for the use of crashworthy channelizers, signs, barricades, barriers, etc., in work zones. "Crashworthy" devices are those that have passed a crash test conducted under the guidance of National Cooperative Highway Research Program (NCHRP) Report 350. FHWA guidance on crash testing of work zone traffic control devices fall under four categories:

- Category I devices were those lightweight devices where self-certification is allowed.
- Category II devices were other lightweight devices which needed individual crash testing.
- Category III devices were barriers and other fixed or massive devices also needing crash testing.
- Category IV devices were trailer mounted lighted signs, arrow panels, etc.

4.3.2 Primary Work Zone Concerns

- Channelization devices
- Temporary barriers
- Portable sign stand
- Crash cushion and Truck Mounted Attenuators (TMAs)
- Pavement-edge drop-offs

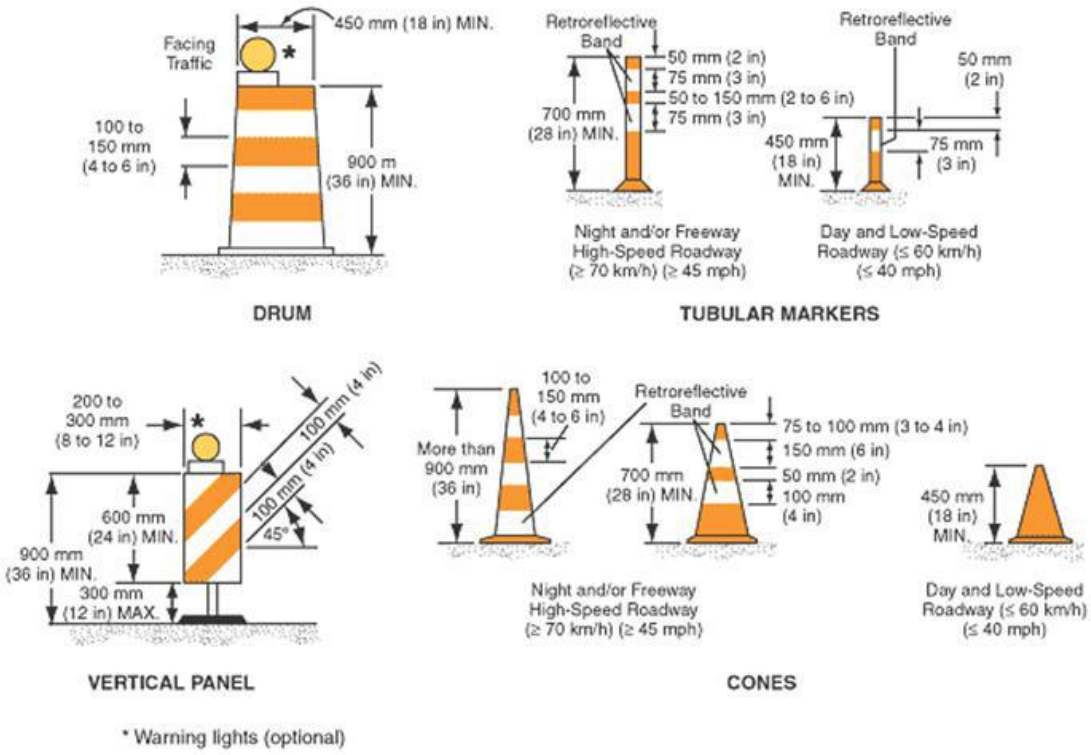
4.3.2.1 Work Zone <u>Category 1</u> Device

Cones, barrels, delineators

- Low-mass, single-piece traffic cones, tubular markers, single-piece drums and delineators
- Individual crash testing not needed
- Self-certify allowed
- Drums with lights firmly attached also in this category

Drum with Light

- Crash testing of drums with lights and various sign panels by Texas Transportation Institute showed that lights are OK as long as they are firmly attached to the drum, typically using the "vandal-resistant" cupped washer.



Note: If drums, cones, or tubular markers are used to channelize pedestrians, they shall be located such that there are no gaps between the bases of the devices, in order to create a continuous bottom, and the height of each individual drum, cone, or tubular marker shall be no less than 900 mm (36 in) to be detectable to users of long canes.

4.3.2.2 Work Zone Category 2 Device

Barricades, Sign Stands

- Cones with lights, Vertical Panels
- Type I, Type II, Type III Barricades
- Portable sign stands, including X-footprint
- 100 km/hr crash testing is required, with reduced instrumentation

Cone with Vertical Panel and Light

This shows the typical set up for a work zone device crash test. The 1800-pound vehicle, traveling at 100 km/hr. impacts the first device which is oriented properly. The next device is placed 6 meters downstream and is oriented perpendicular to the first. No low-speed testing is required for devices weighing less than 100 pounds that simply sit on the pavement.

Type II and Type III Barricades

The Type II is a proprietary plastic barricade, and the type III is the generic angle iron barricade. There are generic "angle-iron" Type II barricades also. Not all type II barricades have been crash tested with warning lights, so one must check the individual letters to see if they are acceptable. All crashworthy Type III barricades are acceptable with LIGHTWEIGHT warning lights (1.5 kg or less)

Barricade Type II

Barricade Type III

Portable Signs

Portable sign stands show the greatest number of variations in terms of steel or aluminum frame, sign size, height, sign substrate, flags. Most of the x-footprint stands that have been crash tested has used roll-up signs, but there have been a few with a breakaway feature at the base that can support rigid signs at 5 feet or higher

4.3.2.3 Work Zone Category 3 Device

Barriers, crash cushions, Truck Mounted Attenuators (TMAs)

- Water filled longitudinal guiding barricades and barriers
- Portable concrete "Jersey" barriers Crash cushions and TMAs
- This category also includes ground-mounted signs
- Full NCHRP Report 350 testing applies
- Category 3 devices are subject to the full crash testing requirements of NCHRP Report 350. For Test Level 3 this means a 25 degree hit at 100 kmh with a 4400 pound pickup, and a 20 degree hit with an 1800 pound car.
- Breakaway sign posts are tested with an 1800 pound car at 35 kmh and 100 kmh.

Barrier or Barricade

- A "Barrier" is a longitudinal device that has met the NCHRP Report 350 criteria for a re-directive barrier at Test Level-2 (TL-2) or above.

- A "Longitudinal Guiding Barricade" does NOT redirect a vehicle. It is tested at the same speeds and angles, but the vehicle penetrates the barrier without severe forces on the occupant.

Water Filled Longitudinal Guiding Barricade

Yodock Wall - Yodock units have been crash tested in three ways: as standalone barricade units, as longitudinal channelizers, as shown here, and with the addition of a steel box beam rail, as barriers. When deployed like this, water filled units are a good substitute for a line of drums. They are not re-directive vehicle barriers, as the vehicle may penetrate a longitudinal guiding barricade. Forces on the vehicle occupants must be below the limits acceptable for a barrier impact.

Water Filled Barriers

Road guard with highway kit and Triton barrier internally reinforced. Both of these proprietary systems have been accepted as BARRIERS. For water filled units to actually perform as a barrier, it must have a steel framework, internal or external.

Triton Barriers

Temporary Concrete Barrier

The typical pin and loop design that has been in use for years needs to be beefed up in order to meet current crash test criteria. Failures of pin and loop designs have been caused by thin pins pulling out of the loops, loops breaking, or concrete fracturing due to lack of reinforcement. There are nearly a dozen successfully crash tested designs of portable concrete barriers.

Temporary Concrete Barrier Temporary Barriers

- Barrier joints must provide tensile & moment capacity
- New units will be meet NCHRP 350
- Used where vehicle entry to the work zone must be avoided

Temporary Barricades

- Longitudinal Guiding Barricades
  - Must be tested using same NCHRP Report 350 tests as for a Barrier, but the test vehicle may penetrate the device. The vehicle may not roll over, nor can the device cause excessive forces on the vehicle occupants.
  - Used where vehicle entry behind the line of devices is acceptable.

Work Zone Crash Cushions

Energite III and Quad guard CZ Sand barrel attenuators are initially low-cost but they need nearly total replacement after a hit. More sophisticated attenuators like the Quad guard CZ are quite expensive, but can be restored quickly and cheaply, sometimes without the need to replace any parts at all.

- Sand Barrel attenuators usually require complete replacement. Should be used where you have the available width, and the frequency of impact will be low.

- More sophisticated attenuators are expensive, but easier to repair. They should be used when working widths are narrow and frequency of hits is likely to be high.

Sand Barrel Attenuator

Quad guard Construction Zone Sand Barrel Attenuator

4.3.2.4 Work Zone Category 4 Device

Trailer Mounted Devices

- Changeable message signs, flashing arrow panels, portable traffic signals, work area lighting
- Crash testing currently not required
- Should be shielded where possible
- Should be removed when not needed
- Must be delineated

4.4 Road Safety and Temporary Traffic Management Plan

Conceptual design of flyover has been prepared and reviewed from traffic safety point of view, completed by Traffic Engineer and Transport Planning Engineer. To ensure the road safety during the construction period temporary traffic management plans have been illustrated in different roadway sections.

4.4.1 Road Safety

The traffic control devices in the form of temporary signs and markings required for the construction phase are prepared based on Bangladesh Road Transport Authority (BRTA)'s Guidelines. Internationally, for a particular expressway or access control highway/flyover, signs are installed as per Manual on Uniform Traffic Control Devices (MUTCD) standards pertaining to expressway published by US Department of Transportation.

For our purpose, where for a particular sign, the sign notation/nomenclature is not available in BRTA's -Traffic Signs Manual II then it is adopted from MUTCD. The sign will show message in English and Bengali languages.

4.4.2 Traffic Management System

Accidents and other incidents on the highway/flyover may cause serious traffic congestion. To minimize the effects of such incidents on traffic operations, a specialized traffic monitoring system is required to detect and respond to incidents. This system is called the Traffic Management System (TMS). TMS uses a serious of advanced technology of close circuit cameras with data processing techniques to detect incidents and other irregularities that may affect traffic movements. These road/flyover conditions can be remotely monitored from the Control Centre using surveillance cameras and in order for operators to view any affected location of interest respective staffs at the Control Centre will take action to alert the appropriate agencies to handle the situation. TMS also provide facilities to the road/flyover users to make emergency calls through Emergency Call Booths (ECBs) to control centre in case of accidents, break down of vehicle and fire and to pre-warn the users about unexpected conditions. It shall provide information I data to traffic managers on traffic flow, conditions, speed and weather conditions, location of any incident and help required and on incoming calls. Based on these, the traffic operation managers should be able to control the variable message signs, mobilising the movement. TMS shall also provide on-line recording and reviewing of the voice and individual information for record and analysis.

4.4.3 Traffic Management and Safety Plan during Construction

During construction of the Dhaka Elevation Expressway PPP Project, the structure will intersect many existing roads, Mass Rapid Transit Corridors and other flyovers. Grade separation is required at strategic locations to ensure unhindered traffic movement on the proposed alignment. Moreover, the prospective flyover will traverse through several localities of habitations within or outskirts of Dhaka. It is important to ensure that the flyover should not cause any separation effect during the construction and during the service period. In addition to that, as the flyover will be constructed over the busiest roadway of Dhaka, it is very important to ensure the free movement of the vehicles during the construction period. Therefore, during this period Temporary Traffic Control (TTC) measures is relevant to ensure the sound traffic movement, safety of the construction workmen and professionals to be

involved in the construction work. Moreover, once the construction will be completed, for maintenance operation, utility works, and the management of traffic incidents on the flyover, the Temporary Traffic Control (TTC) area consideration should be necessary for road users, workmen and responders' safety.

The primary function of Temporary Traffic Control (TTC) is to provide for the reasonably safe and efficient movement of road users through or around TTC zones while reasonably protecting workmen, responders to traffic incidents, and equipment. Therefore, the objective of the TTC is the efficient construction and maintenance of the highway and efficient resolution of traffic incidents. As such, the efficiency of road user flow is an integral element of every TTC zone, from planning through completion.

Therefore, when the normal function of the roadway is suspended, TTC planning provides for continuity of the movement of traffics, transit operations; and access to property and utilities.

However, no one set of TTC devices can satisfy all conditions for a given project or incident. At the same time, defining details that would be adequate to cover all applications is not practical. Instead, typical applications that depict common applications of TTC devices are more relevant. The TTC selected for each situation depends on type of highway, road user conditions, duration of operation, physical constraints, and the nearness of the work space or incident management activity to road users.

The Traffic Management Plan should be comprehensive and responsive. The plan identifies strategic traffic control measures to keep traffic moving.

4.4.3.1 Temporary Traffic Control Plans (TTC Plans)

A TTC plan describes traffic control measures to be used for facilitating road users through a work zone or an incident area. TTC plans play a vital role in providing continuity of reasonably safe and efficient road user flow when a work zone, incident, or other event temporarily disrupts normal road user flow. Basically the degree of detail in the TTC plan depends on the nature and complexity of the situation.

The design, selection and placement of TTC devices for a TTC plan should be based on real time situation that may arise during the construction of the flyover. Traffic control planning should be completed for highway construction, utility work, maintenance operations, and incident management including minor maintenance and utility projects prior to occupying the TTC zone. Planning for all road users should be included in the process. Modifications of TTC plans may be necessary because of changed conditions or a determination of better methods of safely and efficiently handling road users.

Reduced speed limits should be used only in the specific portion of the TTC zone where conditions or restrictive features are present. But, frequent changes in the speed limit should be avoided. A TTC plan should be designed so that vehicles can reasonably safely travel through the TTC zone with a speed limit reduction of no more than 25 km/h (15 mph) within Construction Working Area.

A reduction of more than 25 km/h (15 mph) in the speed limit should be used only when required by restrictive features in the TTC zone. Where restrictive features justify a speed reduction of more than 25 km/h (15 mph), additional driver notification should be provided. The speed limit should be stepped down in advance of the

location requiring the lowest speed, and additional TTC warning devices should be used.

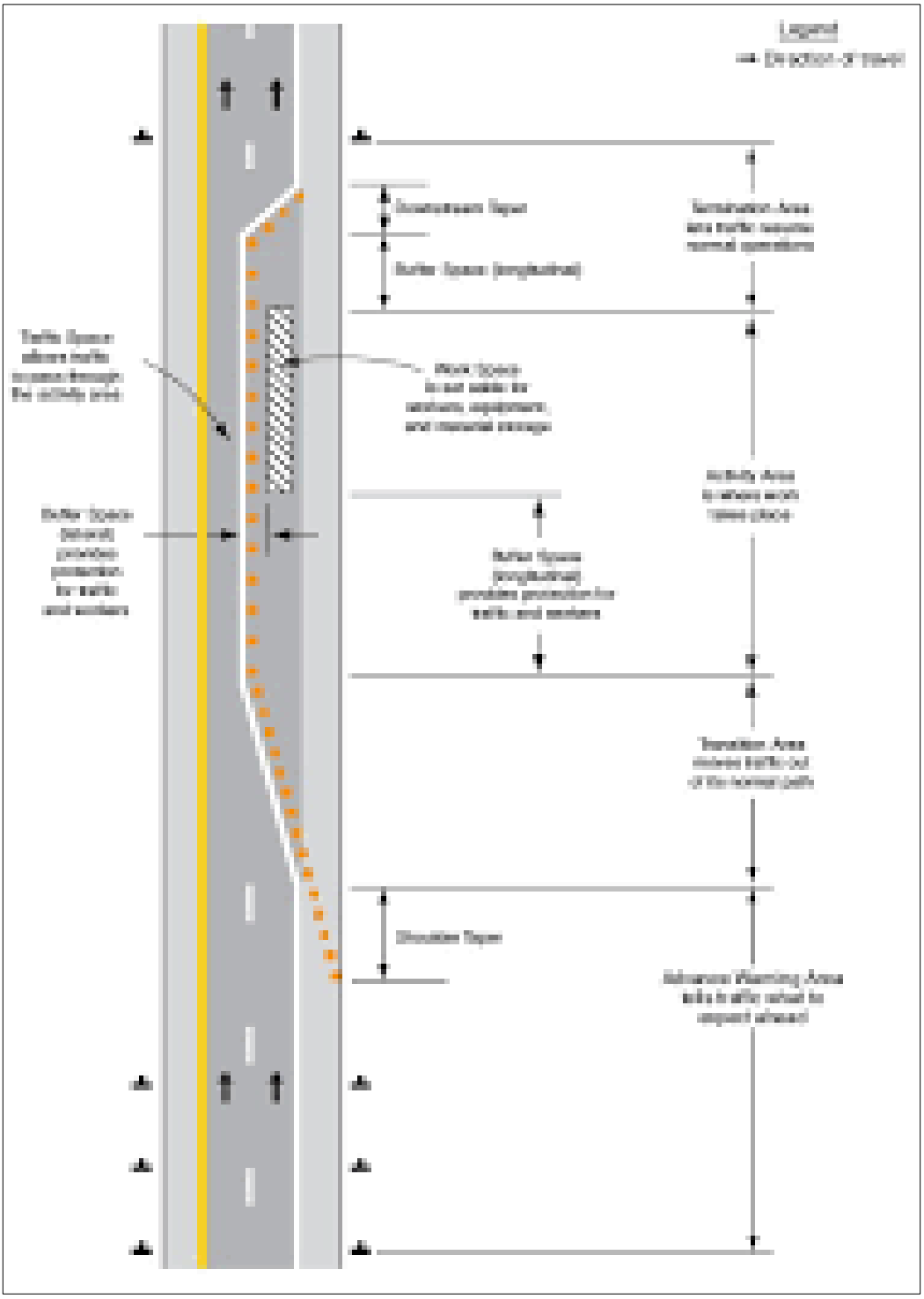
Reduced speed zoning (lowering the regulatory speed limit) should be avoided as much as practical because drivers will reduce their speeds only if they clearly perceive a need to do so. It has been observed that large reductions in the speed limit, increase potential for crashes. Therefore, it is advised to reduce the speed gradually from afar of the construction site and necessary sign posting is also quite efficient to reduce the speed in the construction area.

During actual construction of each specific area, EPC Contractor in association with FDEE will be coordination and submitted sub-plan for seeking advance consent from the relevant authorities and the Traffic Police as well.

4.4.3.2 Temporary Traffic Control Zones

A TTC zone is an area of a roadway where road user conditions are changed because of a work zone or an incident through the use of TTC devices. It is also considered as the construction, maintenance, or utility work activities. The work zones should be typically marked by signs, guiding devices, barriers, pavement markings, and/or work vehicles.

Most TTC zones are divided into four areas: the advance warning area, the transition area, the activity area, and the termination area. The figure illustrates these four areas.



Component Parts of a Temporary Traffic Control Zone

4.4.3.2.1 Advance Warning Area

The advance warning area is the section of roadway where road users are informed about the upcoming work zone or incident area. Typical distances for placement of advance warning signs on freeways and highways should be longer because drivers are conditioned to uninterrupted flow. Therefore, the advance warning sign placement should extend on these facilities as far as 45-200m or more. Advance warning may be eliminated when the activity area is sufficiently removed from the road users' path so that it does not interfere with the normal flow.

4.4.3.2.2 Transition Area

The transition area is that section of roadway where road users are redirected out of their normal path. Transition areas usually involve strategic use of tapers. When redirection of the road users' normal path is required, they shall be channelized from the normal path to a new path.

Tapers may be used in both the transition and termination areas. Whenever tapers are to be used in close proximity to an interchange ramp, crossroads, curves, or other influencing factors, the length of the tapers may be adjusted. Tapers are created by using a series of guiding devices and/or pavement markings to move traffic out of or into the normal path.

Even the termination areas are also known as the area where the vehicles return to the normal path. The termination area shall extend from the downstream end of the work area to the last TTC device such as END ROAD WORK signs, if posted. An END ROAD WORK sign, a Speed Limit sign, or other signs may be used to inform road users that they can resume normal operations. A longitudinal buffer space may be used between the work space and the beginning of the downstream taper.

4.4.3.2.3 Activity Area

The activity area is the section of the roadway where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space. While the work space is that portion of the highway closed to road users and set aside for workmen, equipment, and material. Work spaces are usually delineated for road users by guiding devices or, to exclude vehicles and pedestrians, by temporary barriers. The work space may be stationary or may move as work progresses. Traffic space is used for traffic movement beside the ongoing construction.

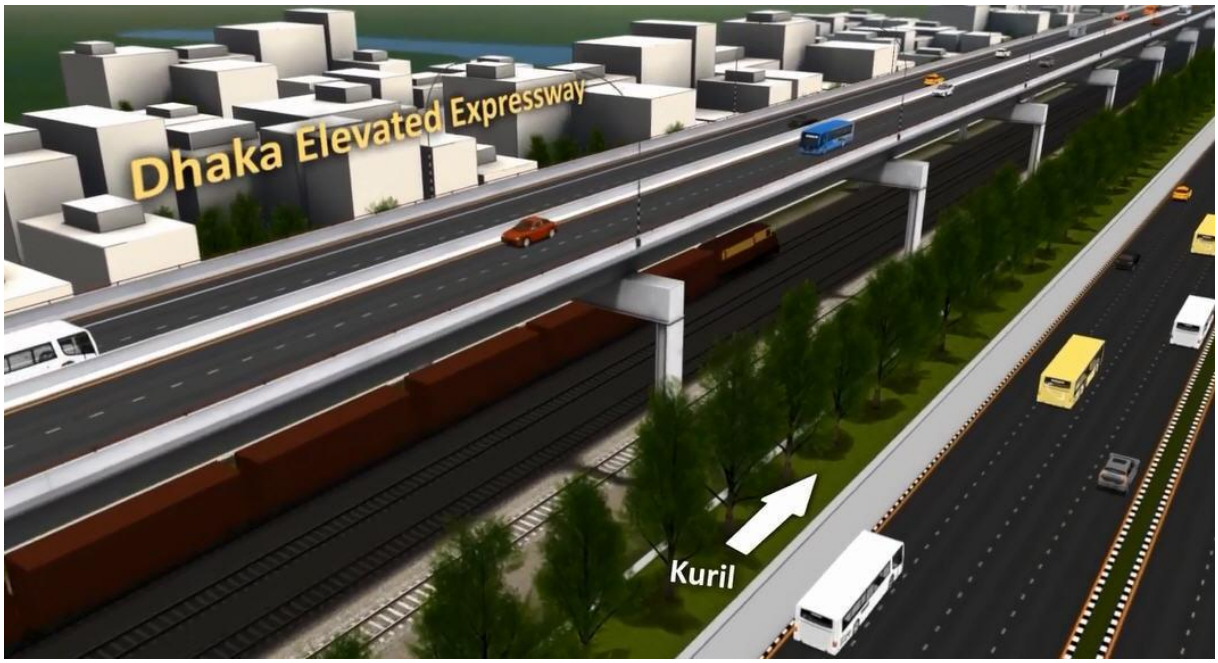
A minimum lane width of 3.5m each direction should be kept to allow traffic movement. The buffer space is a lateral and/or longitudinal area that separates road user flow from the work space or an unsafe area, and might provide some recovery space for an errant vehicle. The width of a lateral buffer space should be determined by engineering judgment.

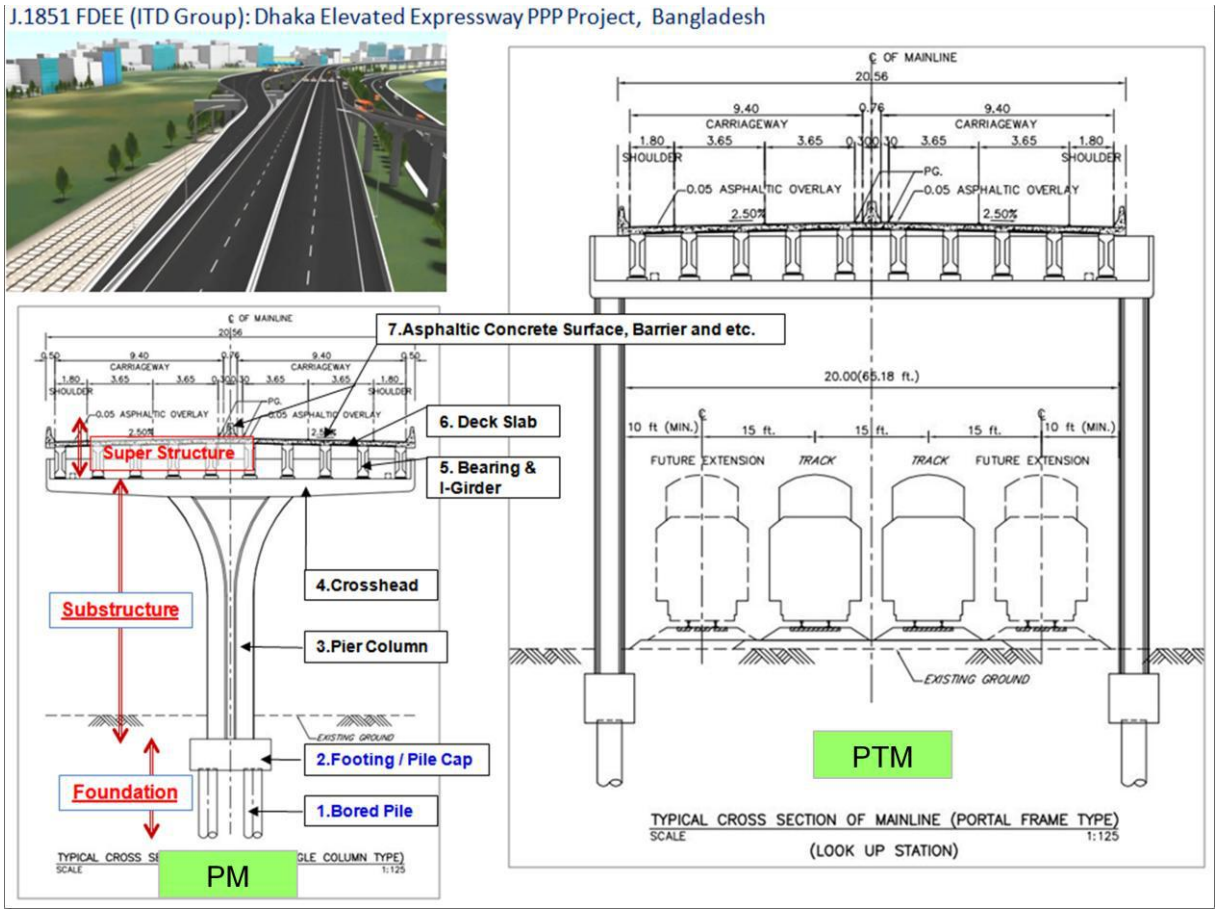
To maintain a reasonable free flow of the vehicles during the construction of the flyover different management techniques are applied. Basically the techniques are determined by the engineers" judgments approved by the supervision consultants and the respective authority.

4.4.3.2.4 Termination Area

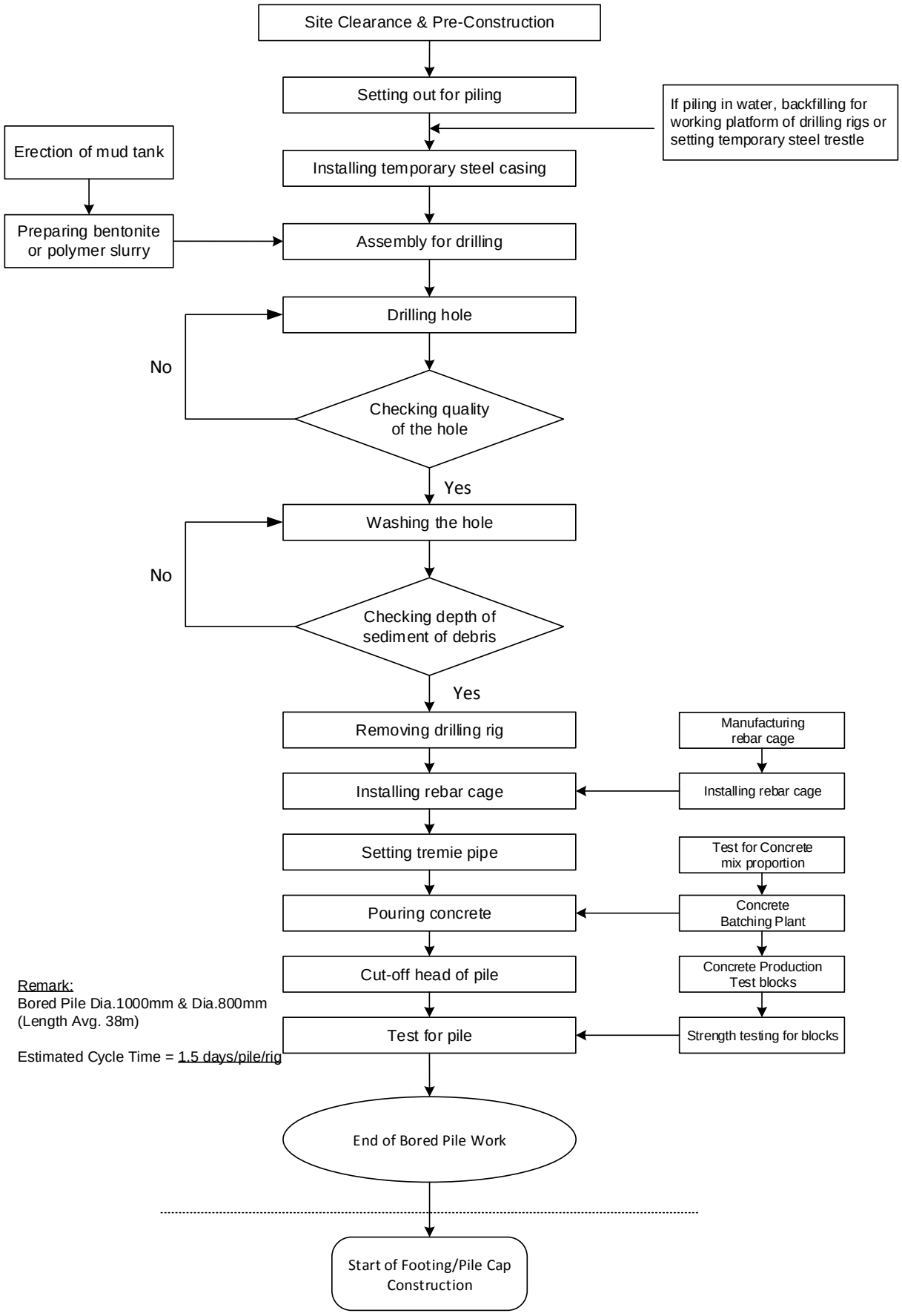
The termination area shall be used to return road users to their normal path. The termination area shall extend from the downstream end of the work area to the last TTC device such as END CONSTRUCTION WORK signs, if posted. An END CONSTRUCTION WORK sign, a Speed Limit sign, or other signs may be used to inform road users that they can resume normal operations. A longitudinal buffer space may be used between the work space and the beginning of the downstream taper.

4.5 Summary of Construction Methodology Steps

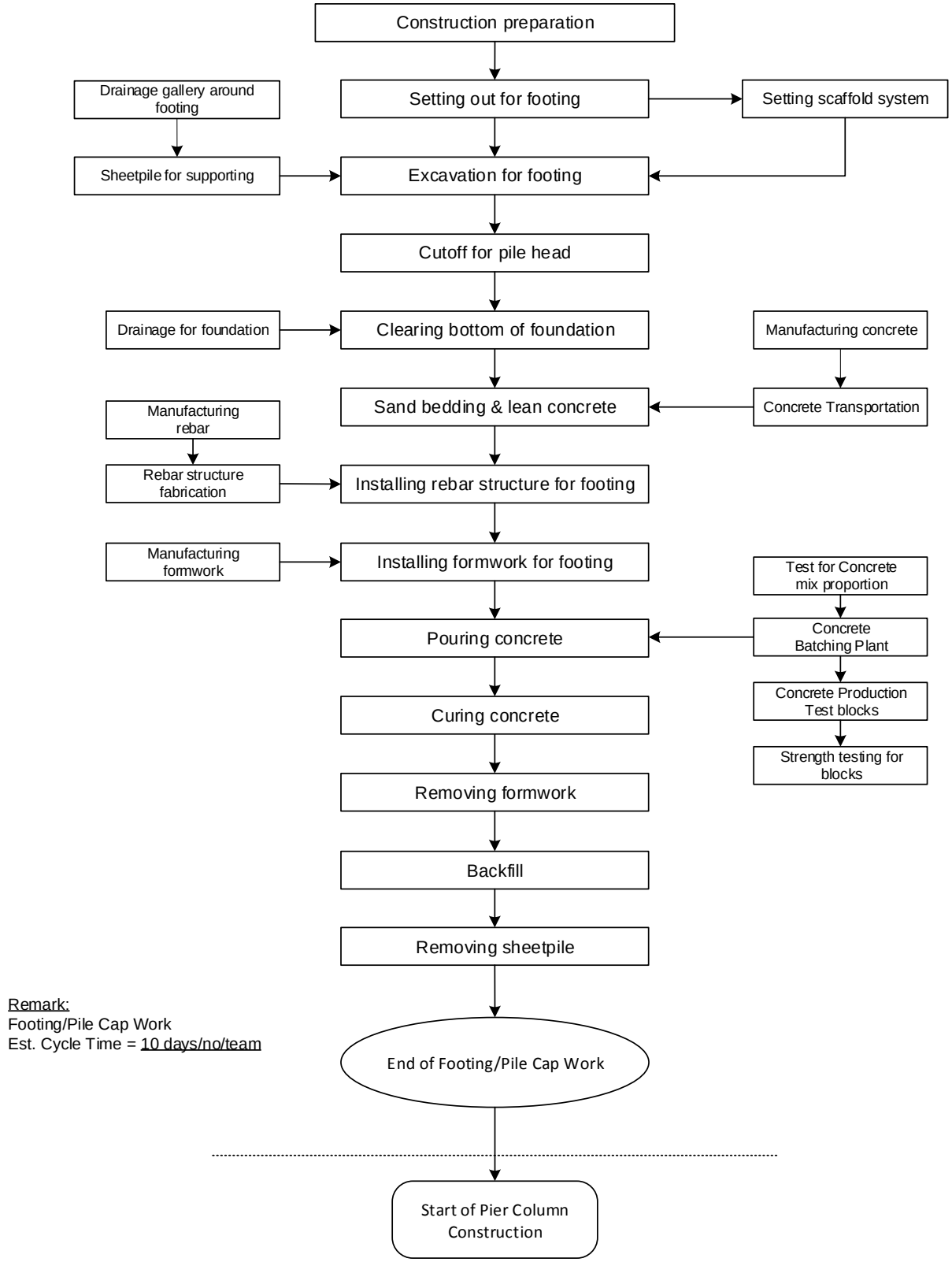




4.5.1 Bored Pile Work:

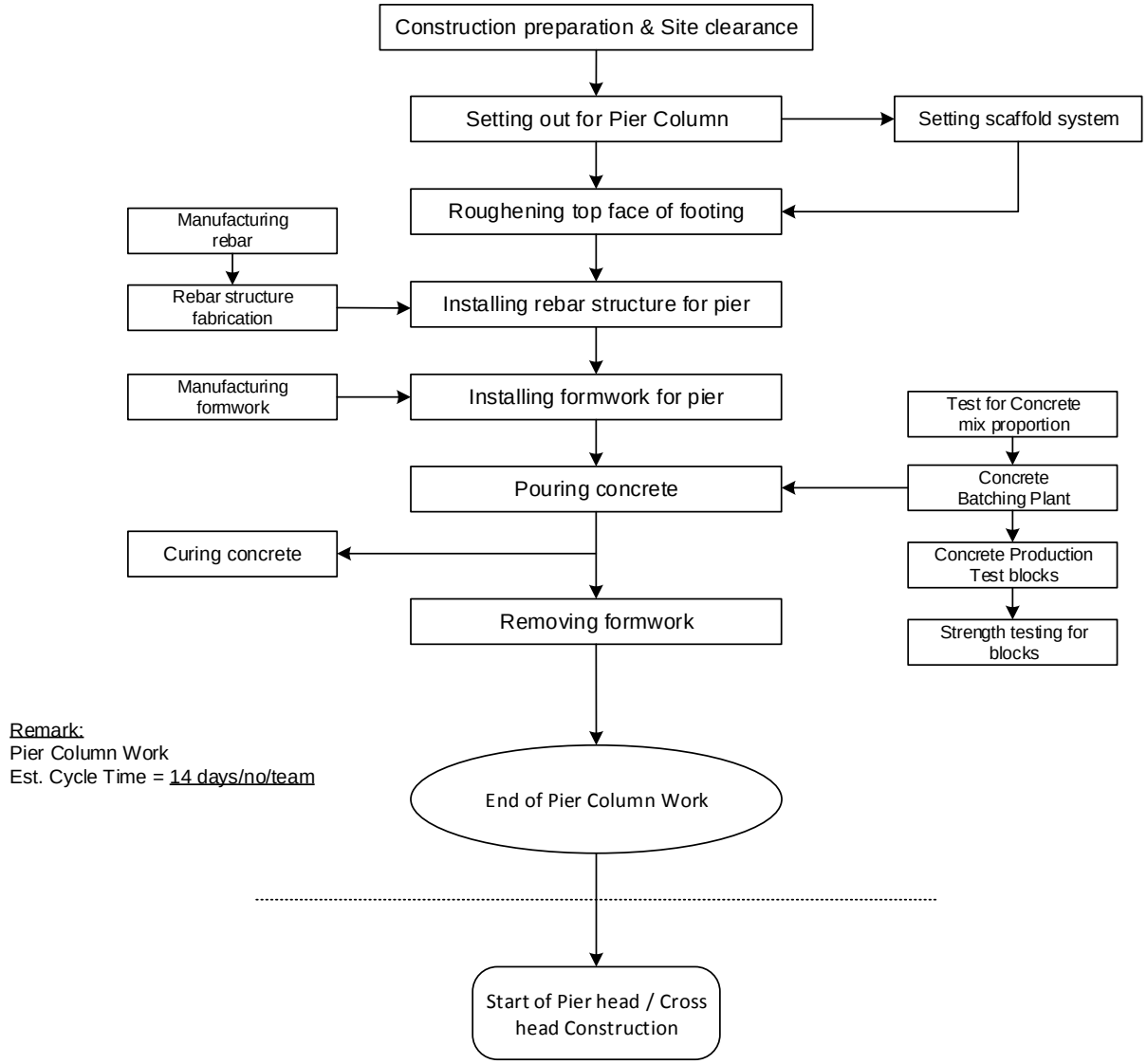


4.5.2 Footing/Pile Cap Work:

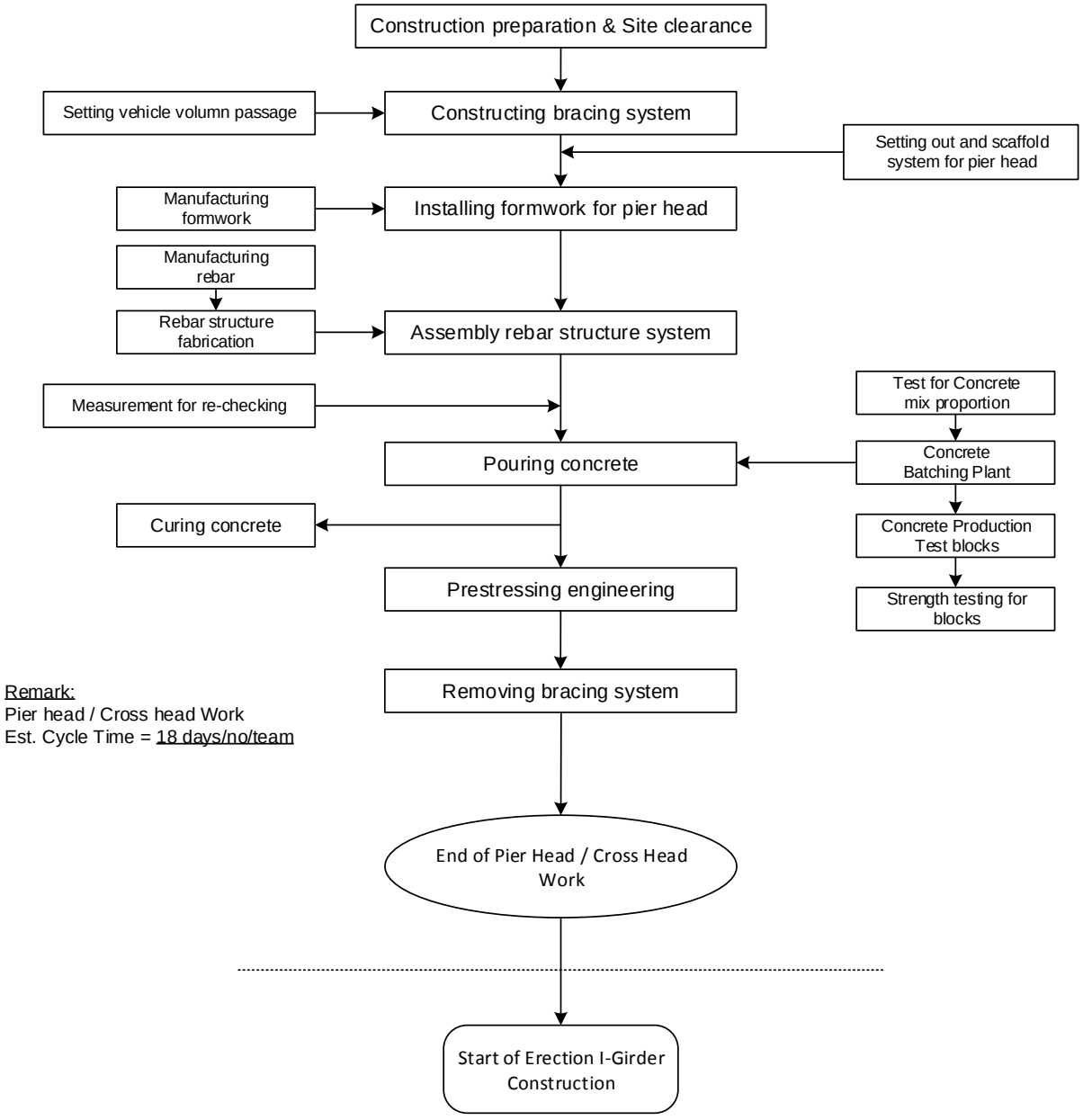


Remark:
Footing/Pile Cap Work
Est. Cycle Time = 10 days/no/team

4.5.3 Pier Column Work:

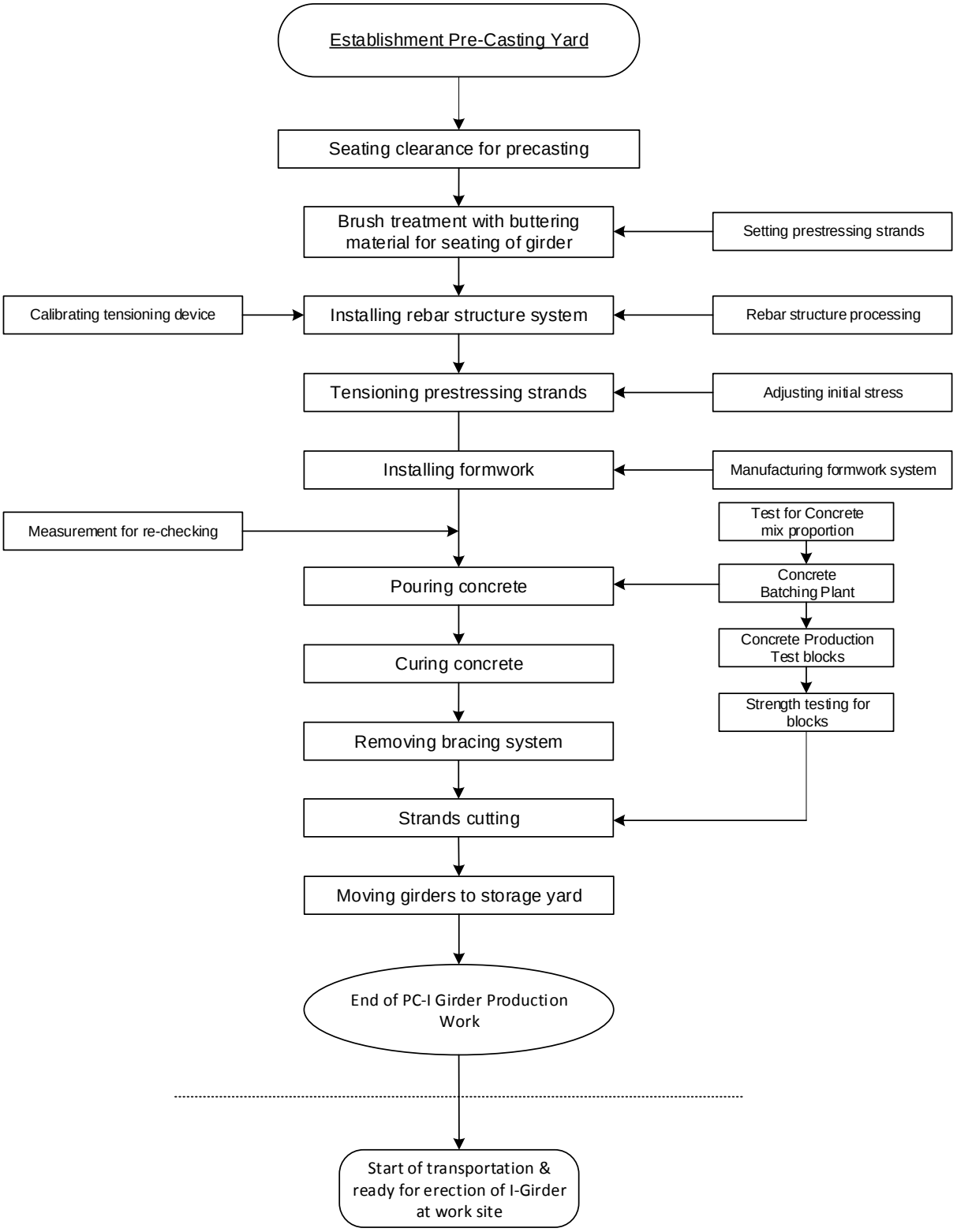


4.5.4 Pier Head / Cross Head Work:

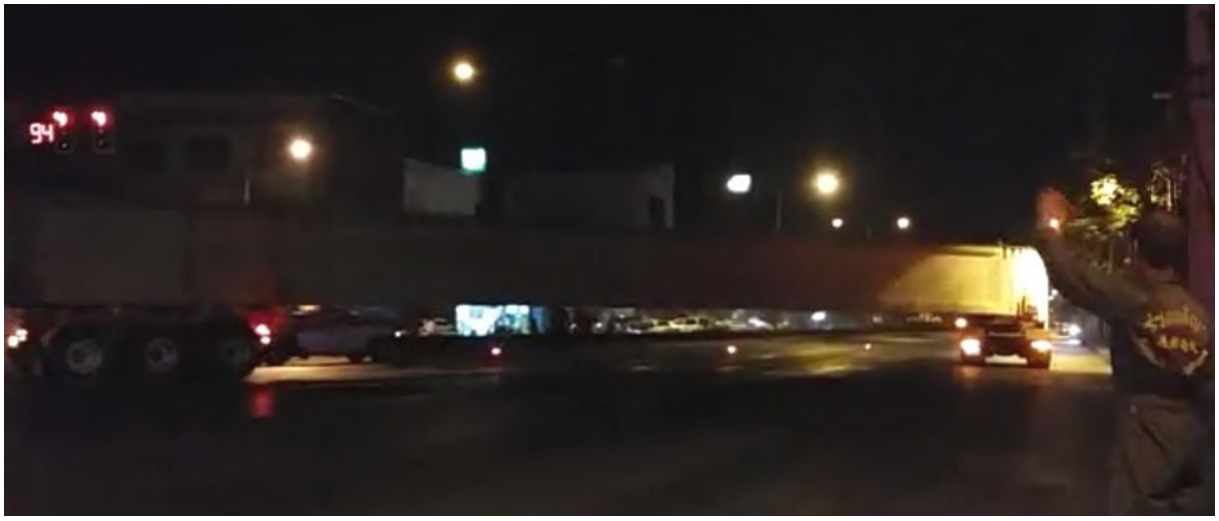


Remark:
Pier head / Cross head Work
Est. Cycle Time = 18 days/no/team

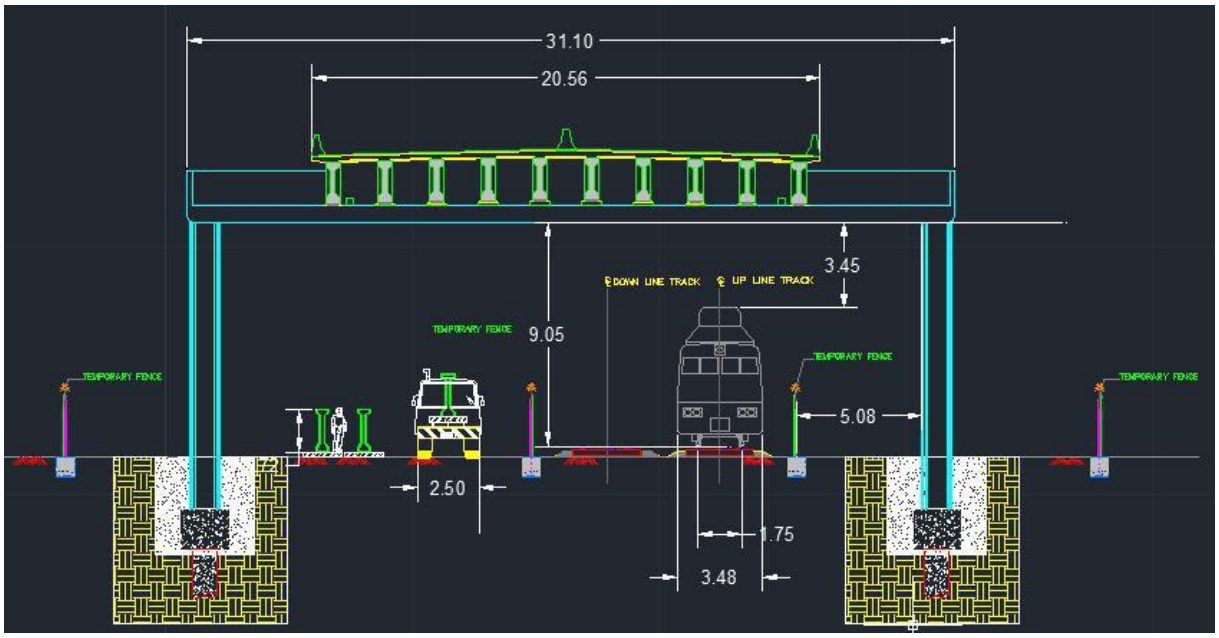
4.5.5 Pre Cast I-Girder Production Work:



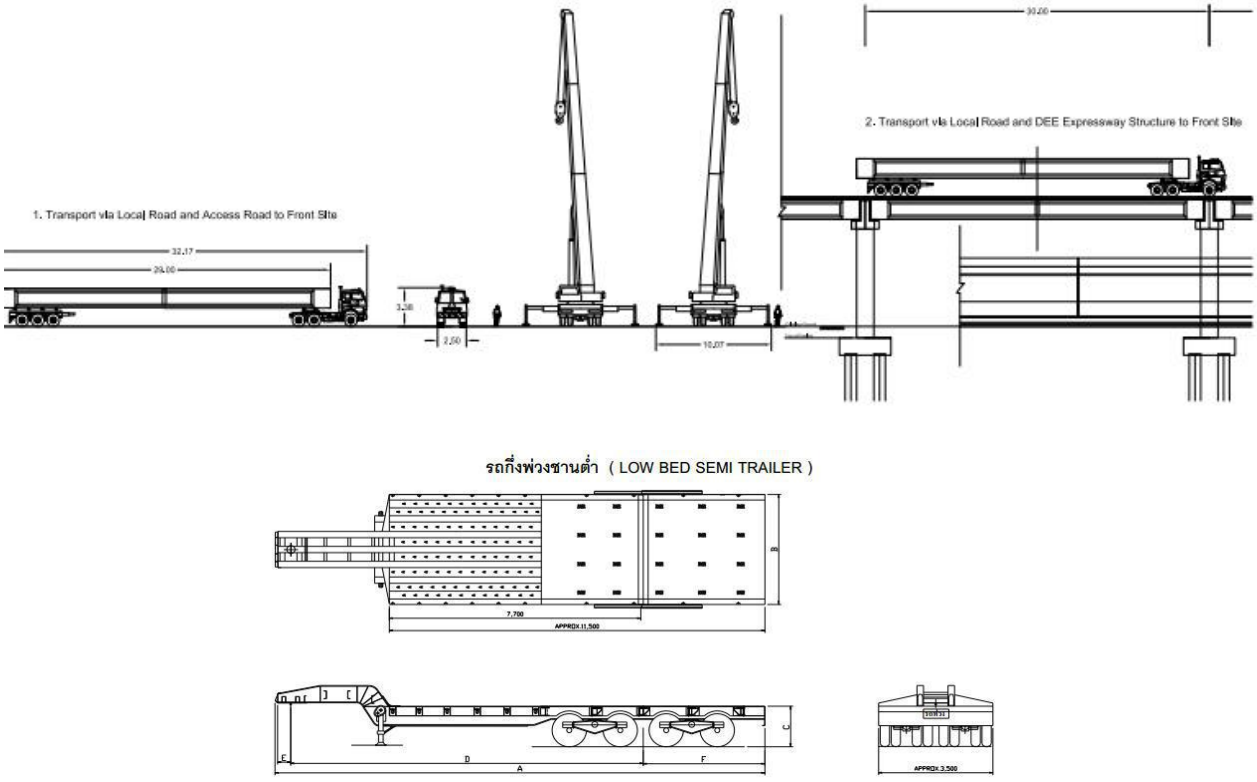
4.5.6 I-Girder & Superstructures Installation Work:



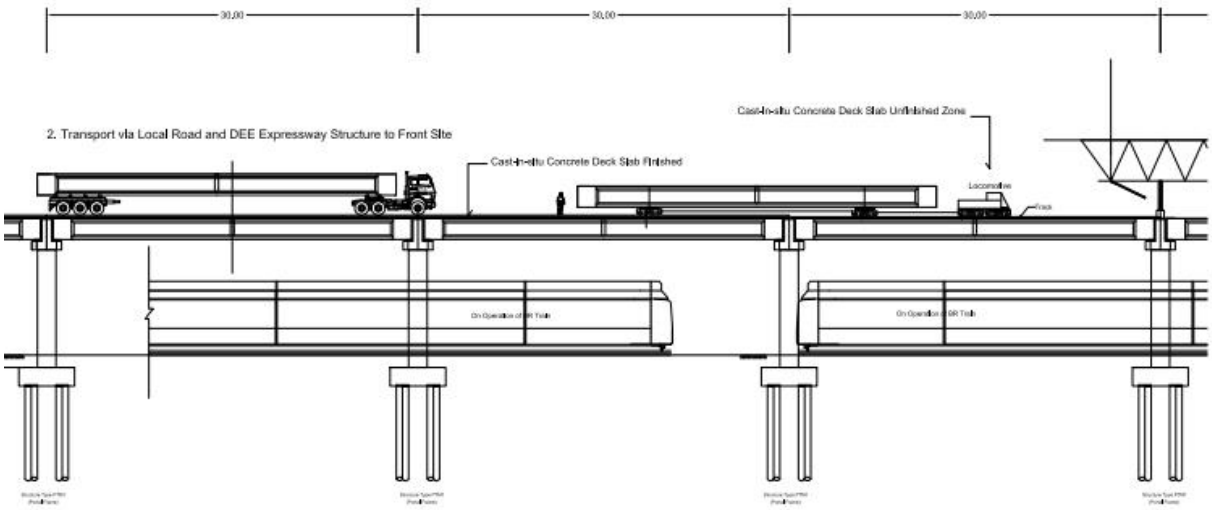
Night Time Delivery I-Girders to Front Site via Public Road

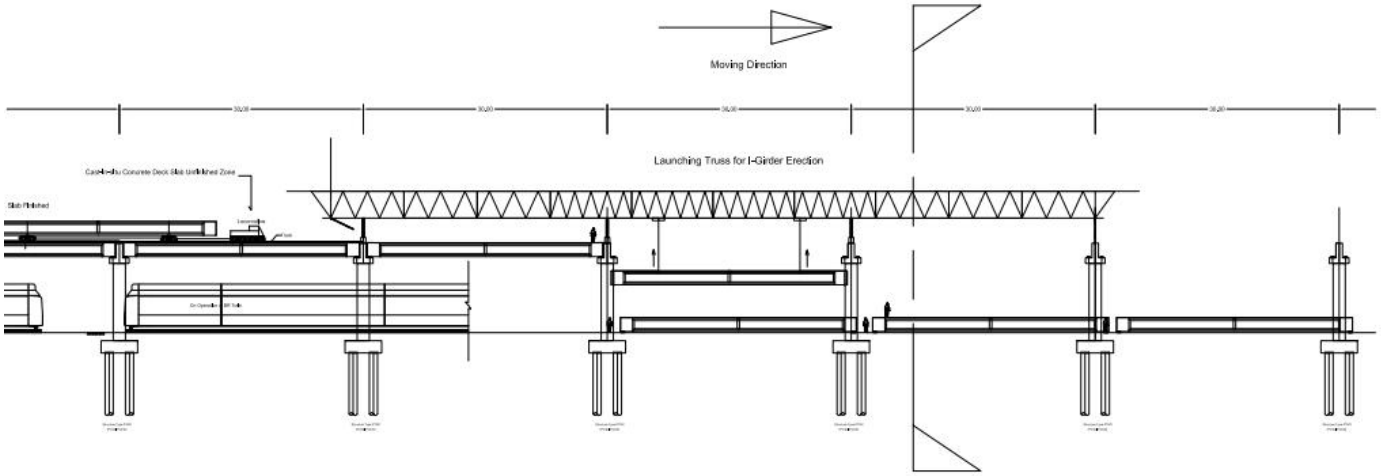


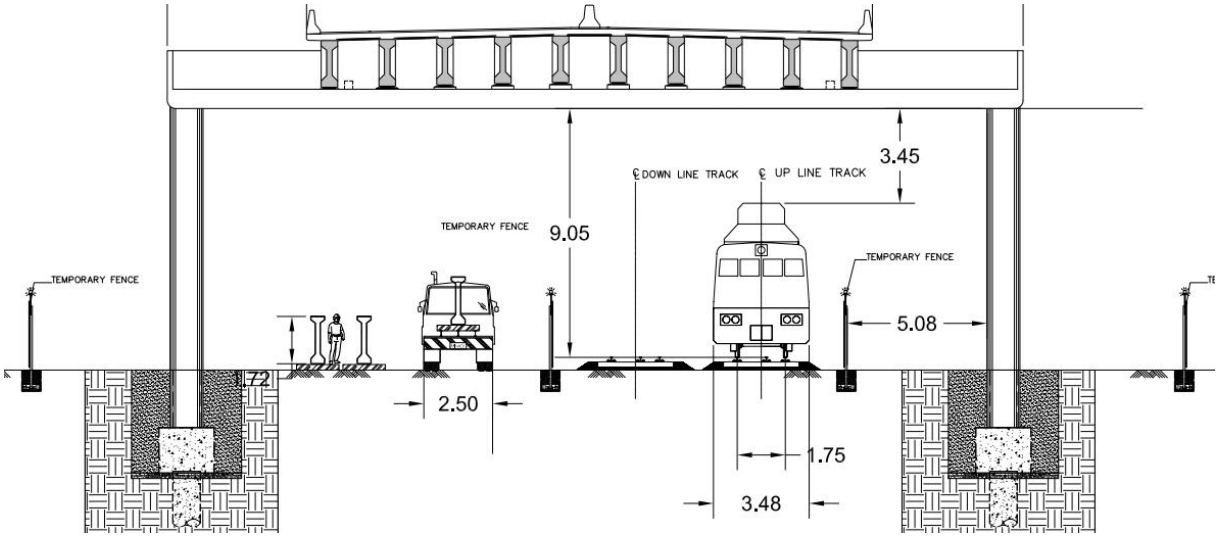
- Horizontal clearance 3.00m as per BR's approval will be obtained for this temporary condition. (details please refer to: FDEE/DEE/TMP-002 "Railway Traffic Management Plan")



Pole Trailer – Low Bed Semi-Trailer


30.00
30.00
30.00
2. Transport via Local Road and DEE Expressway Structure to Front Site
Cast-in-situ Concrete Deck Slab Unfinished Zone
Cast-in-situ Concrete Deck Slab Finished
Locomotive
Track
On Operation of BR Track
On Operation of BR Track


Moving Direction
Launching Truss for I-Girder Erection
Cast-in-situ Concrete Deck Slab Unfinished Zone
Slab Finished

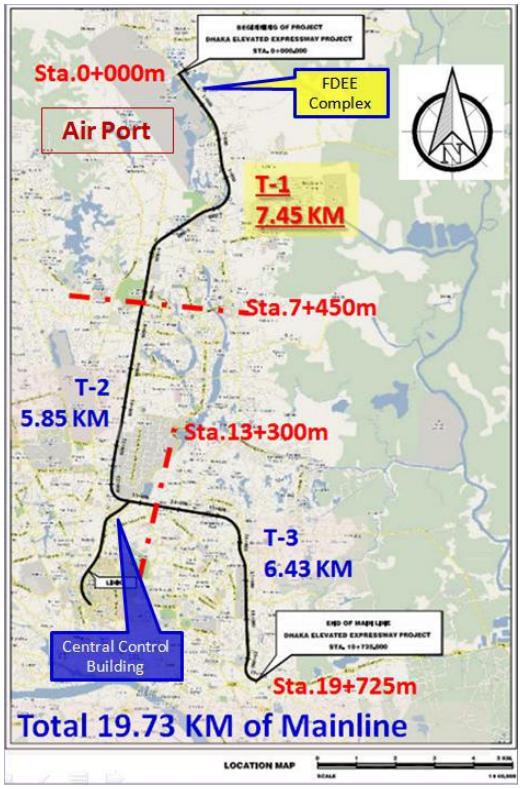

3.45
℄ DOWN LINE TRACK
℄ UP LINE TRACK
TEMPORARY FENCE
9.05
TEMPORARY FENCE
TEMPORARY FENCE
5.08
.72
2.50
1.75
3.48

Example of Portal Beam and I-Girder Installation

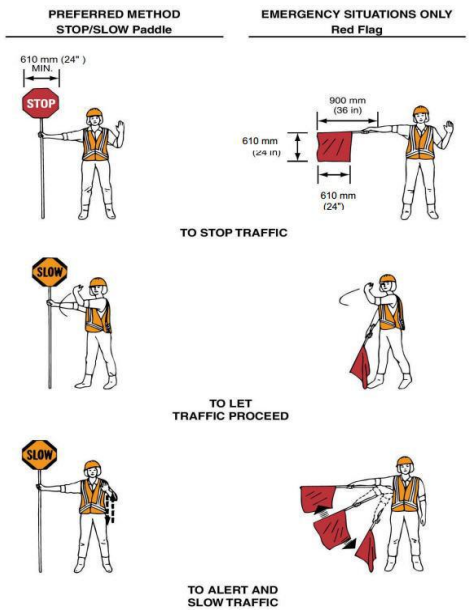
5 The Detailed Drawings of Road Traffic Management Plan:

5.1 RD-TMP Cover Sheet (Symbol List and Sign Legend)

DHAKA ELEVATED EXPRESSWAY PPP PROJECT
ROAD TRAFFIC MANAGEMENT PLAN DURING CONSTRUCTION



Symbol List:	
	Work Area (See Note 1)
	Railway Track
Note 1:	Work Area Shall be Separated and Protected by Zone Fence or Barrier

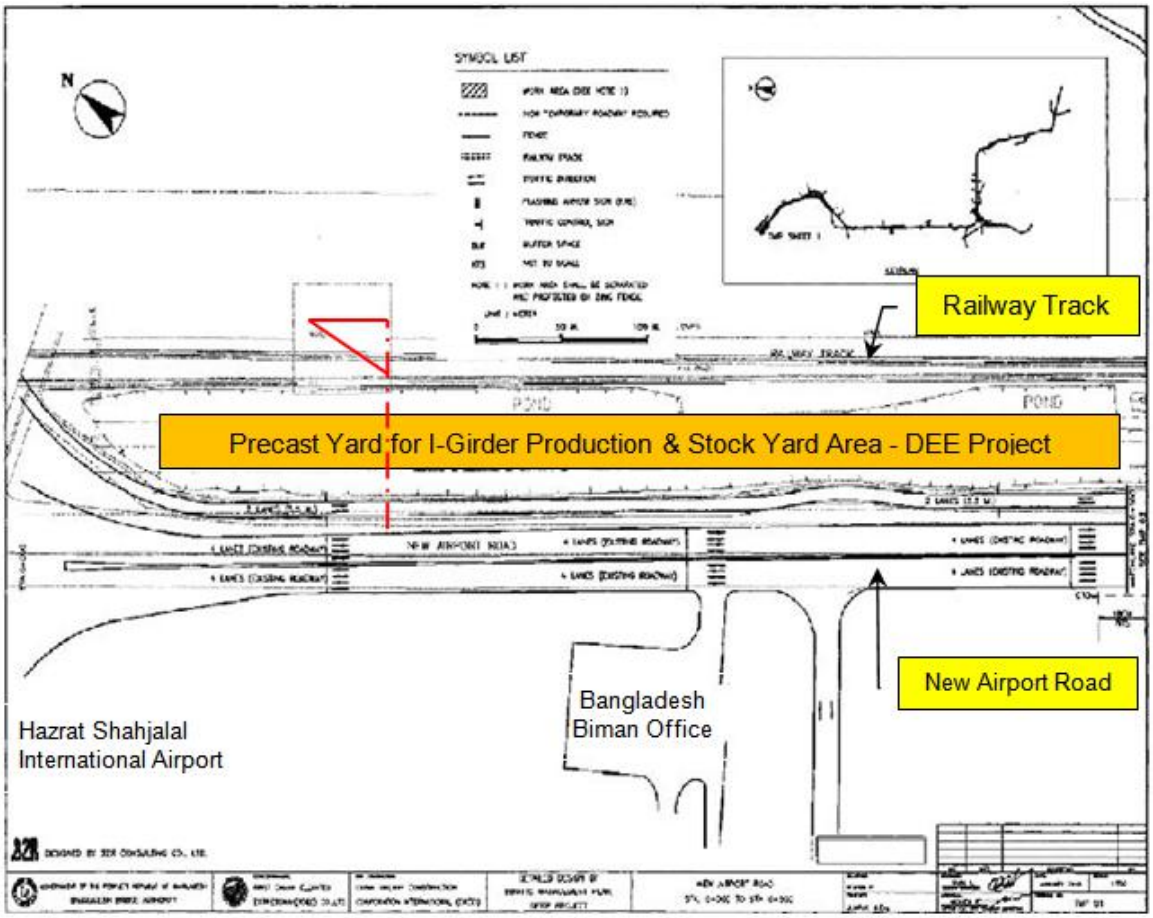


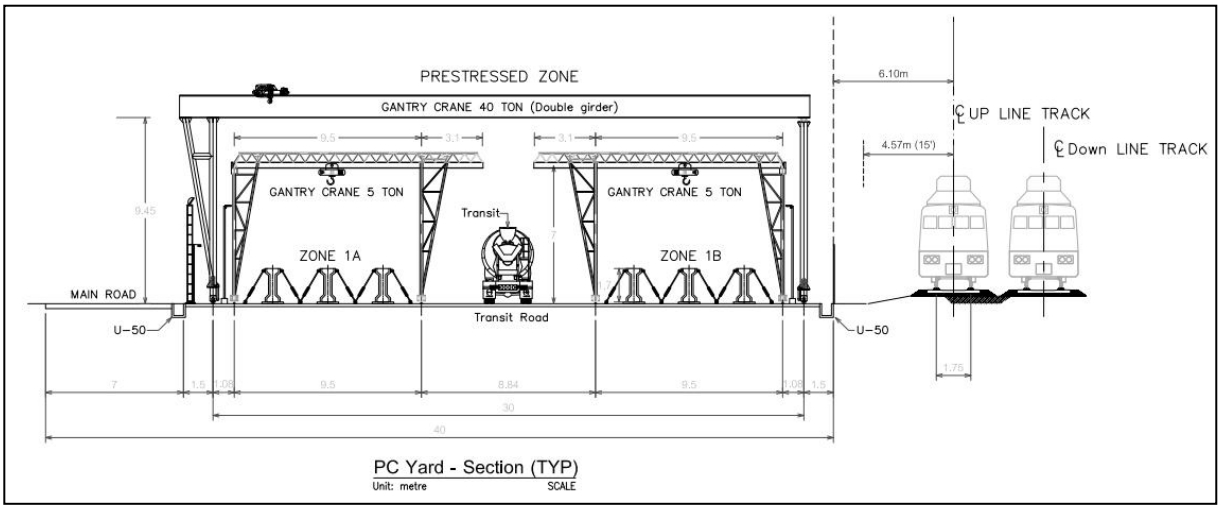
BANGLADESH ROAD SIGN MANUAL

Note: Bangladesh National Traffic Management Manual will be using to guide line for the TMP.

5.2 RD-TMP 01 (STA.0+000m TO STA.0+550m)

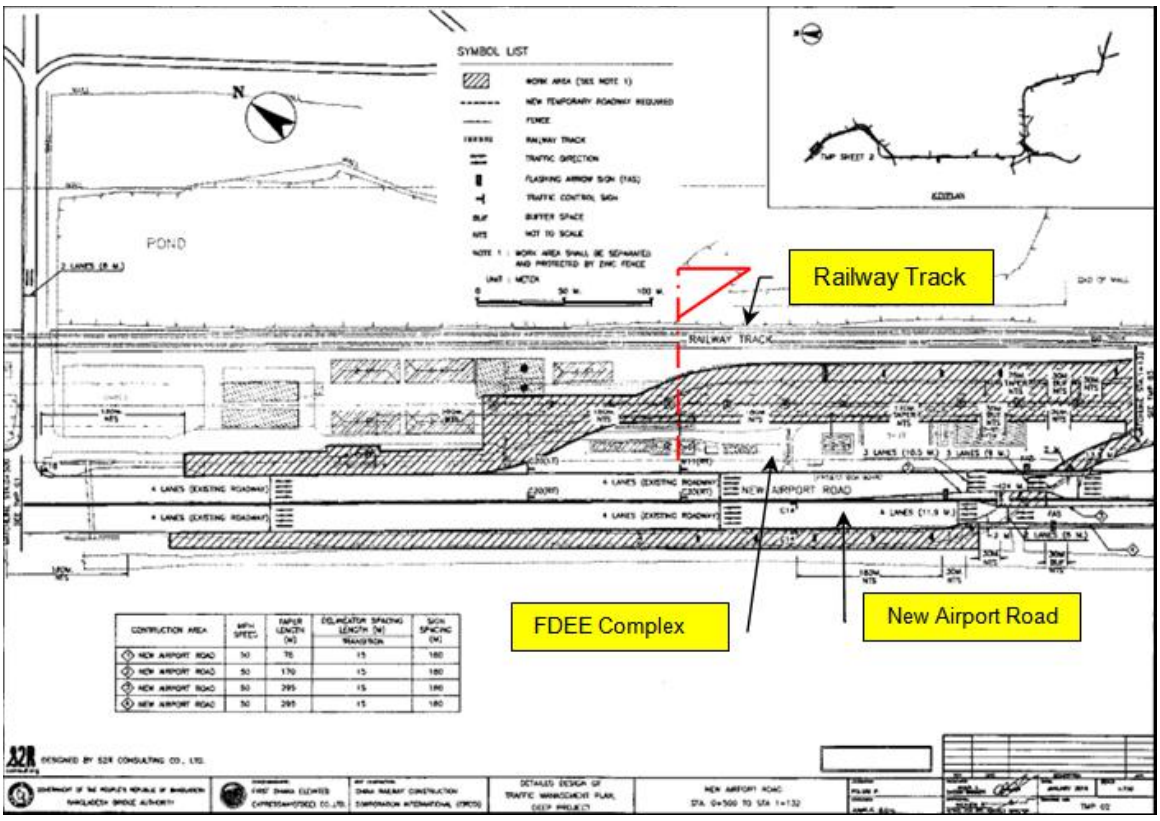
This drawing sheet shows the beginning of starting work zone at STA.0+000m and ending the work zone at STA. 0+550m. This sheet also shows the Location of the traffic control sign on New Airport Road.

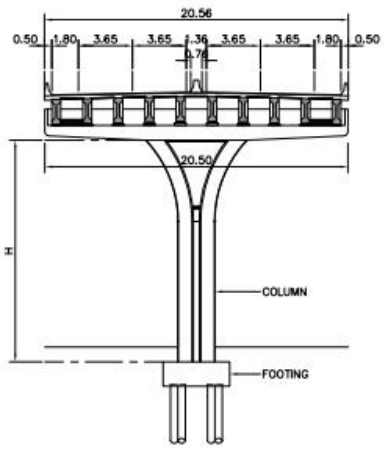


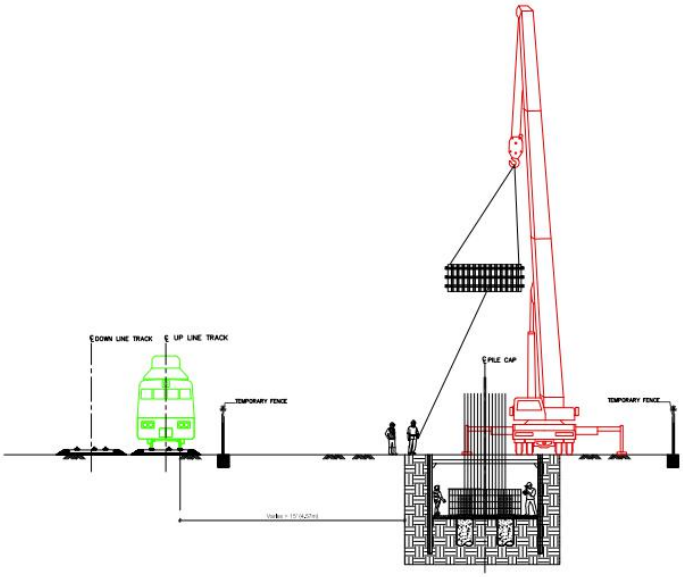


5.3 RD-TMP 02 (STA.0+500m TO STA.1+132m)

This drawing sheet shows the work zone between STA.0+500 to STA.1+132 mostly on the sideway both sides of New Airport Road. In addition, it has on work zone area in the middle of the median of the road. The road traffic management approach will need to reduce from 4 traffic Lanes to 3 with all the required signage and necessary equipments.

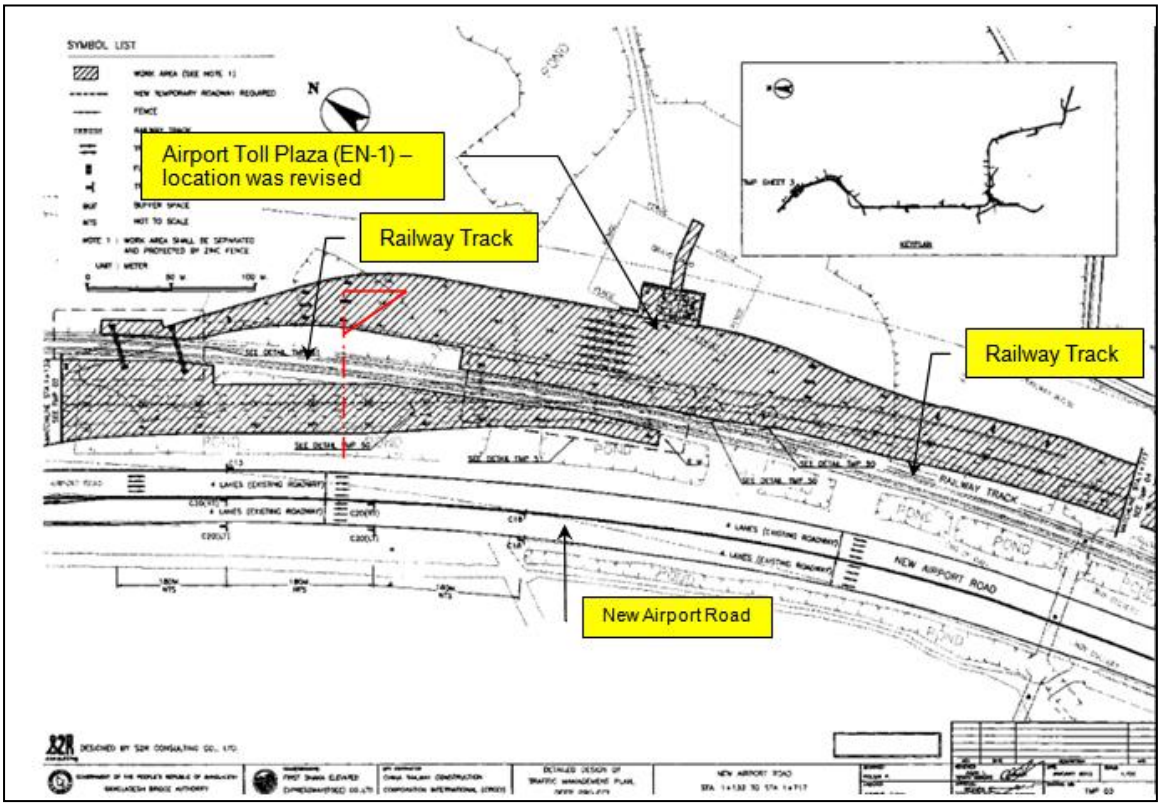


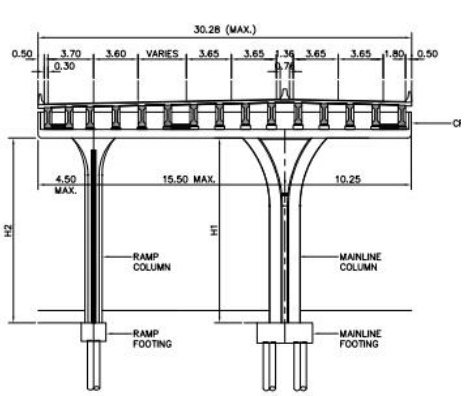


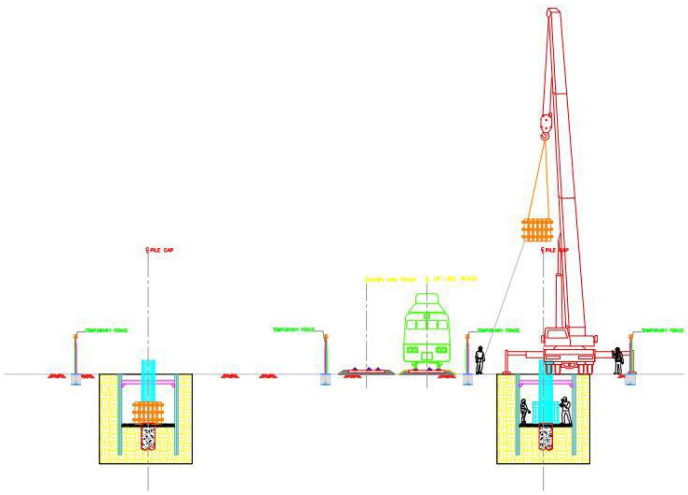


5.4 RD-TMP 03 (STA.1+132m TO STA.1+717m)

This drawing sheet shows the work zone between STA.1+132 to STA.1+717. The work zone is set outside the main road-New Airport Road. Therefore the new airport road will not be affected according to the work zone. However, the train traffic management needs to be considered as shown in this drawing plan and the work zone needs to be set up as shown Chapter 6 in order to ensure the safety of the train operation during the construction.

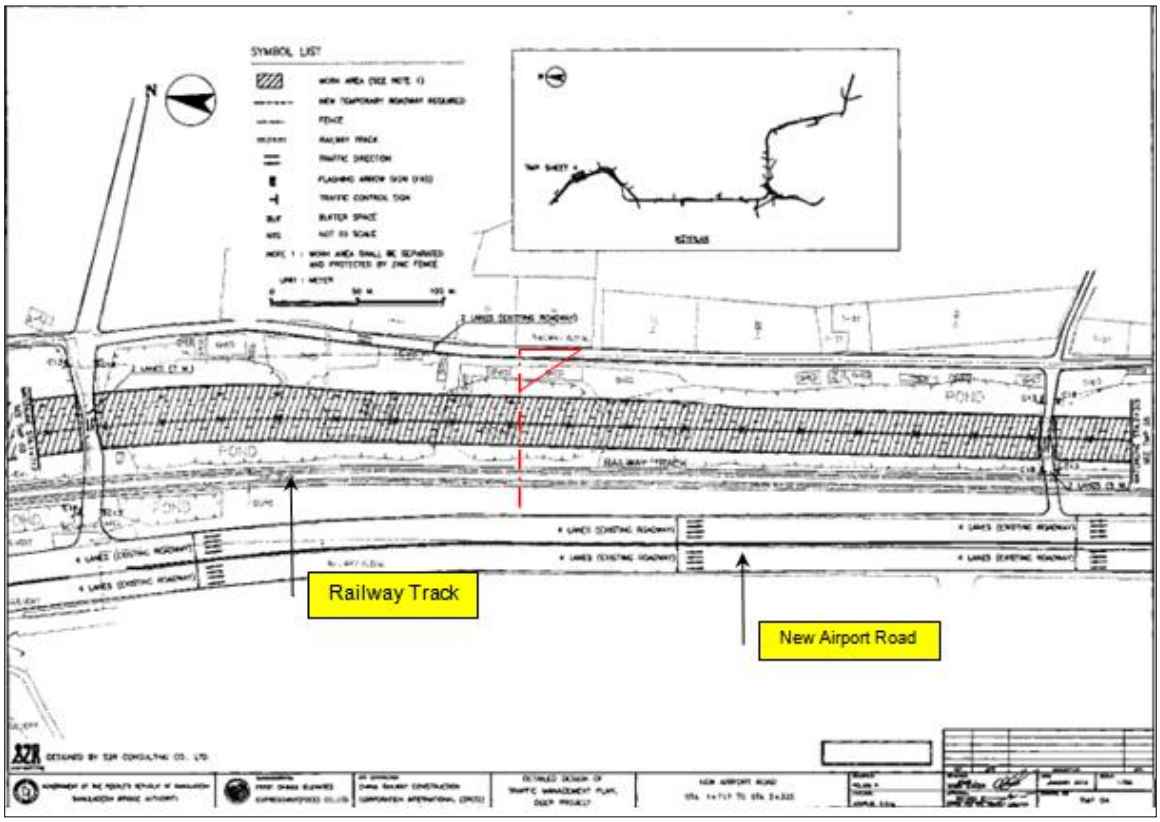


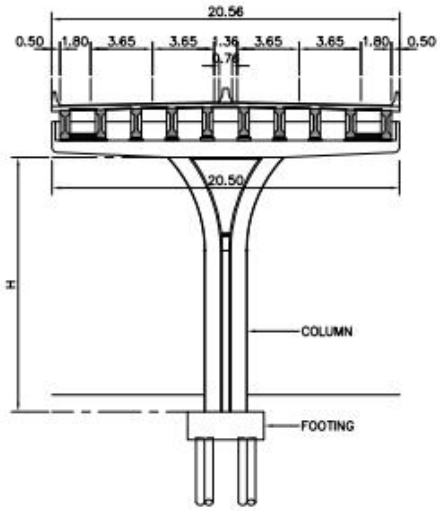


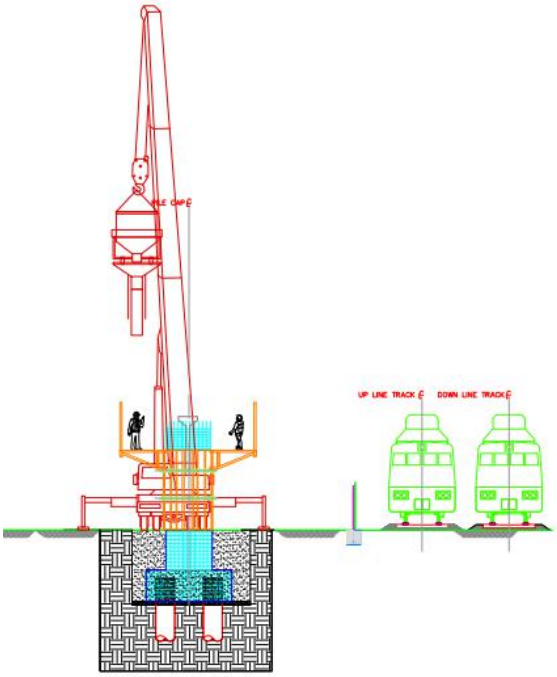


5.5 RD-TMP 04 (STA.1+717m TO STA.2+325m)

This drawing sheet shows the work zone between STA.1+717 to STA.2+325. The work zone is set outside the main road-New Airport Road. Therefore the New Airport Road will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction). The side street heading to New Airport Road needs to be managed in order to ensure the safety of the traffic operation within the work zone of this construction site.

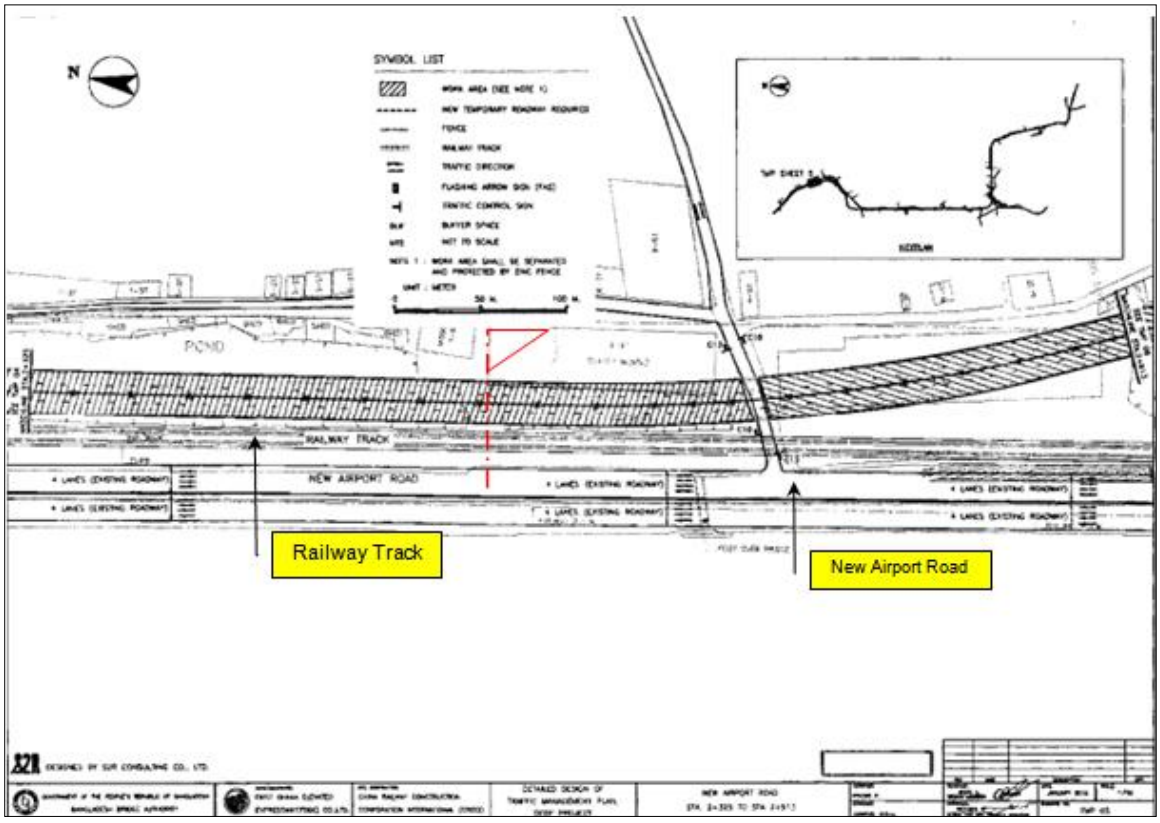


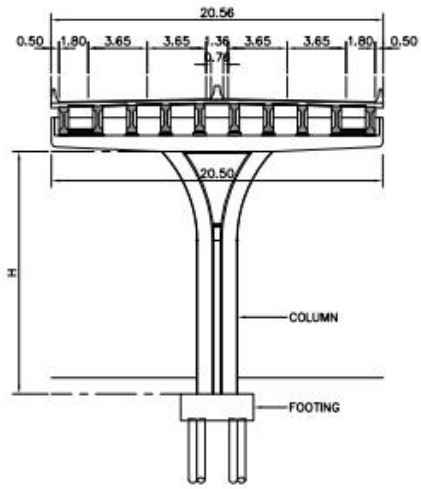


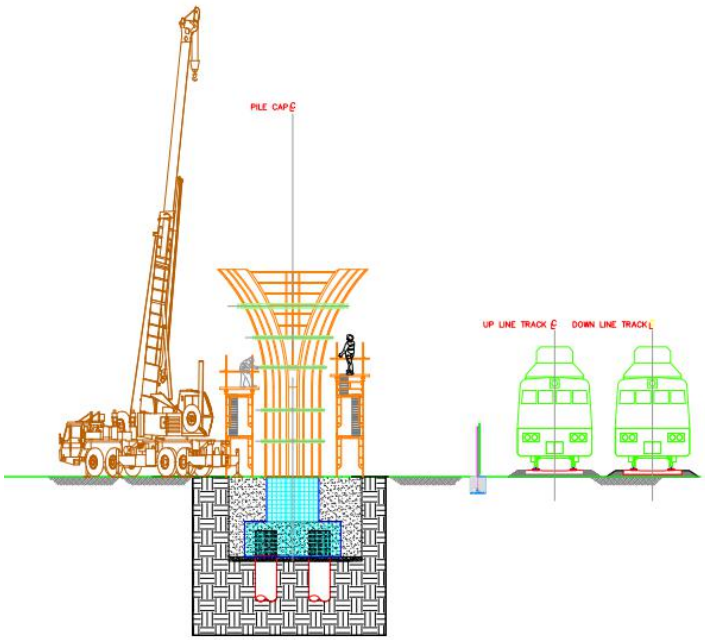


5.6 RD-TMP 05 (STA.2+325m TO STA.2+913m)

This drawing sheet shows the work zone between STA.2+325 to STA.2+913. The work zone is set outside the main road-New Airport Road. Therefore the New Airport Road will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction). The side street heading to New Airport Road needs to be managed in order to ensure the safety of the traffic operation within the work zone of this construction site.

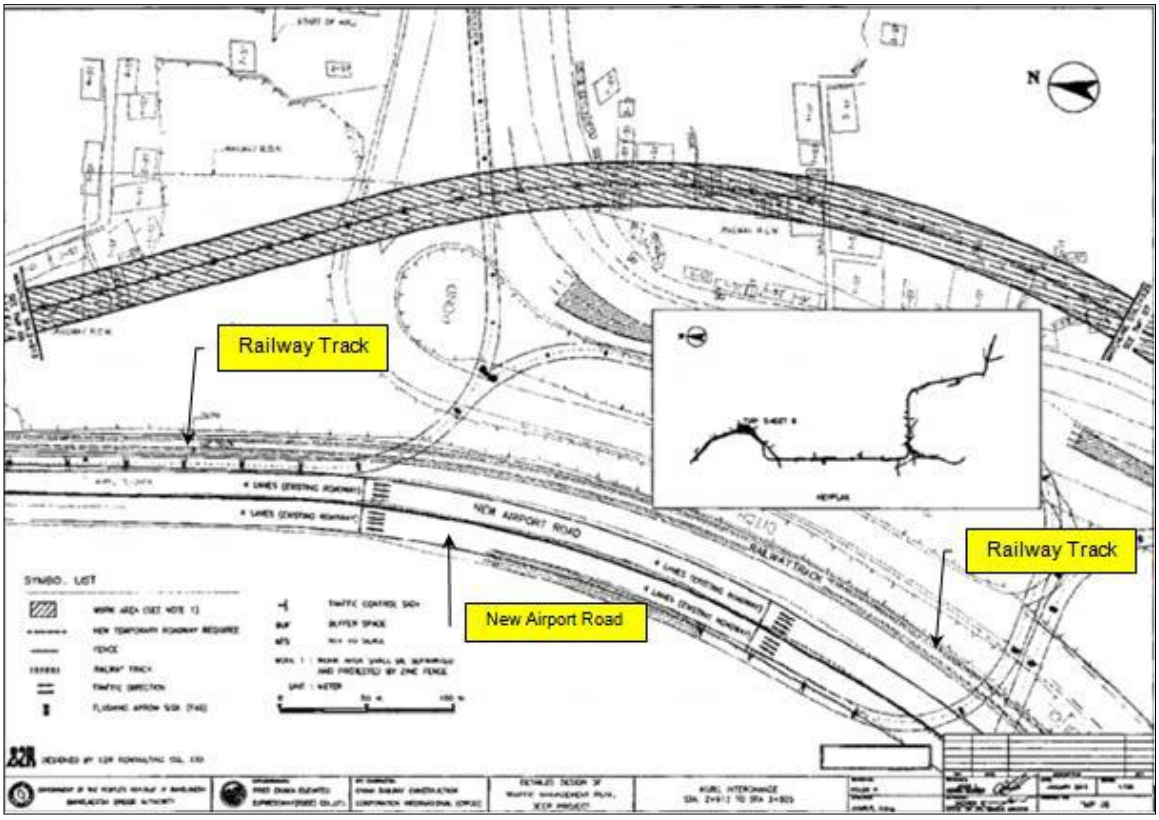


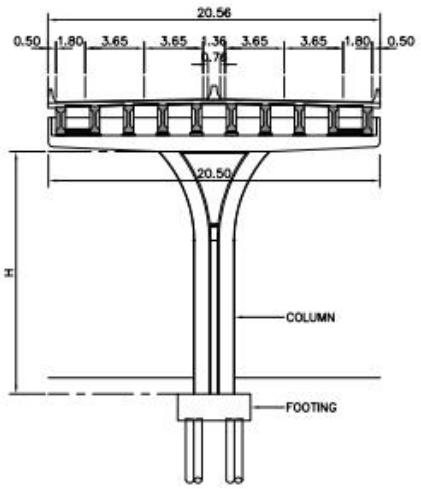


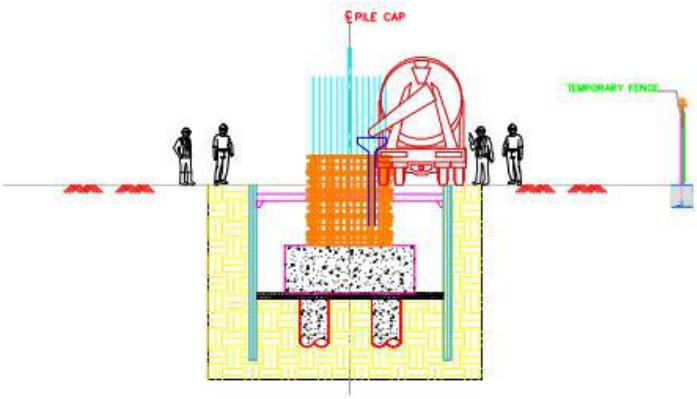


5.7 RD-TMP 06 (STA.2+913m TO STA.3+525m)

This drawing sheet shows the work zone between STA.2+913 to STA.3+525. The work zone is set outside the main road-New Airport Road and the train track areas. However, setting a proper works within the Kuril Flyover area will need to be done in order to ensure the traffic safety during the construction of this project, Therefore the New Airport Road and the train traffic operation will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction).

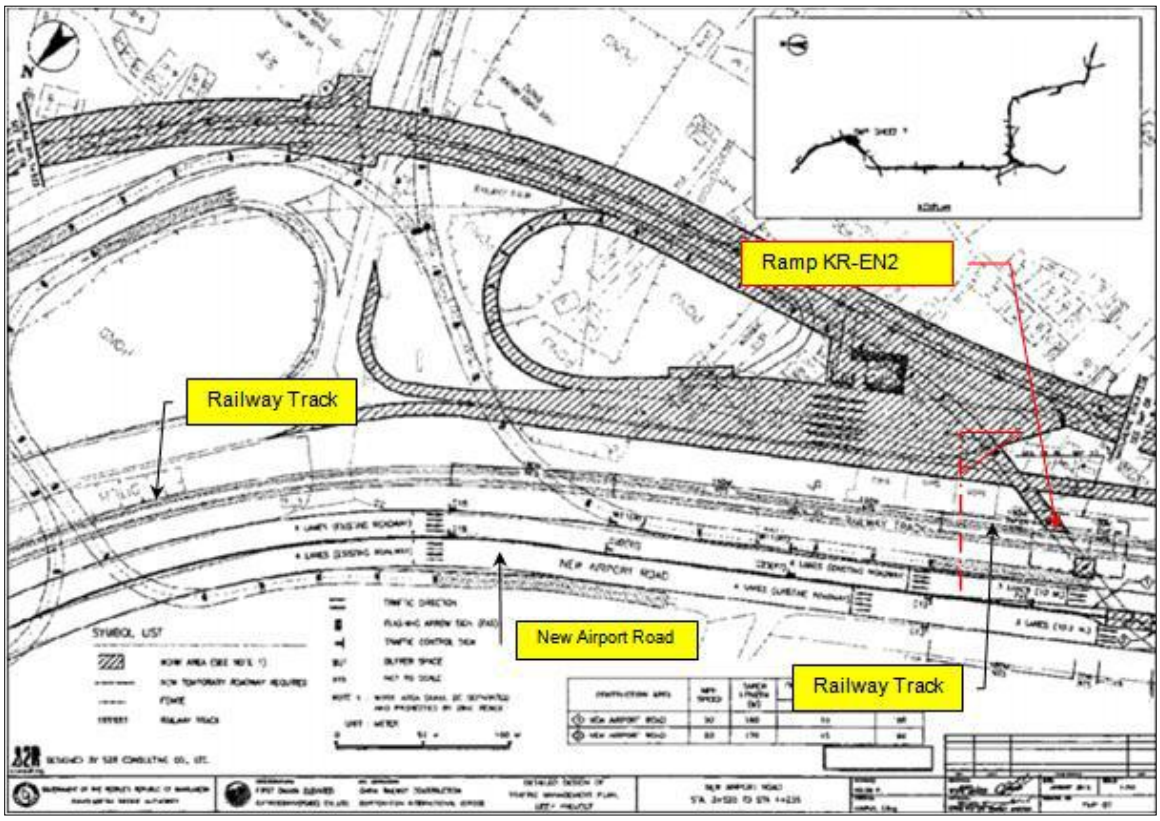


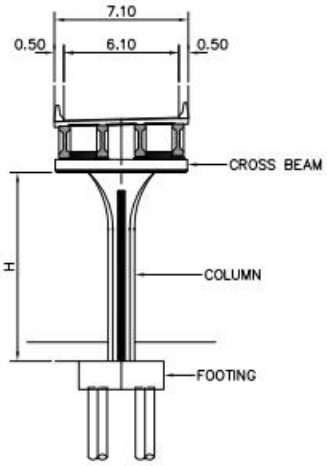


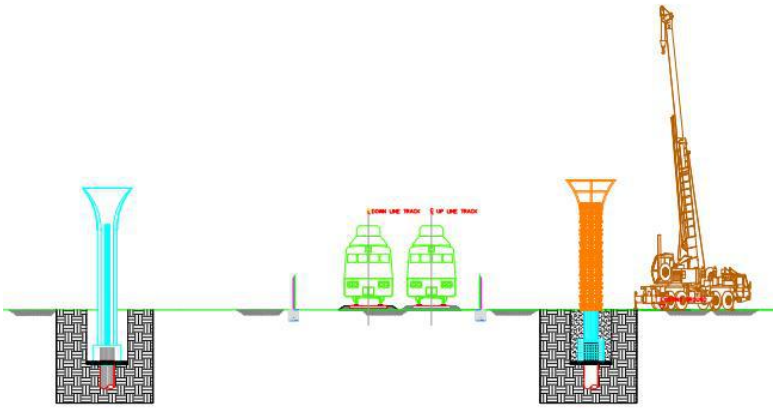


5.8 RD-TMP 07 (STA.3+525m TO STA.4+236m)

This drawing sheet shows the work zone between STA.3+525 to STA.4+236. Most of the work zone is set outside the main road-New Airport Road. However, setting a proper works within the Kuril Flyover area will need to be done in order to ensure the traffic safety during the construction of this project. Therefore most of the New Airport Road will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction), except some portion of the New Airport Road will be reduced from 4 Lanes in each direction to 3 Lanes due to the work zone has to be set in the middle of the roadway. This is to ensure the safety of the traffic operation within the work zone of this construction site.

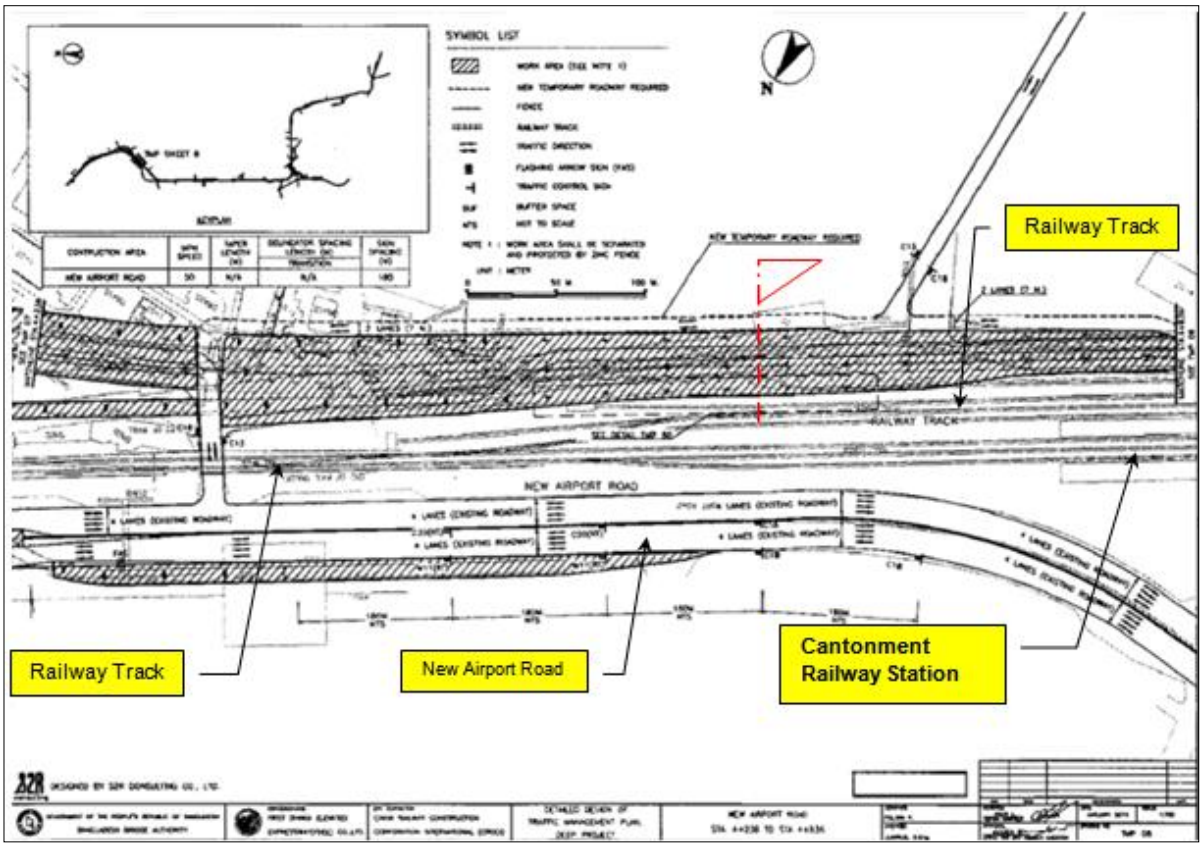


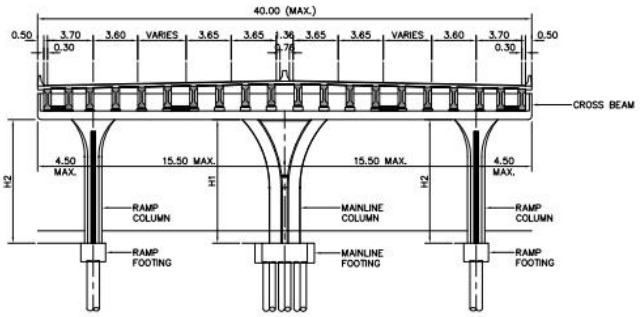


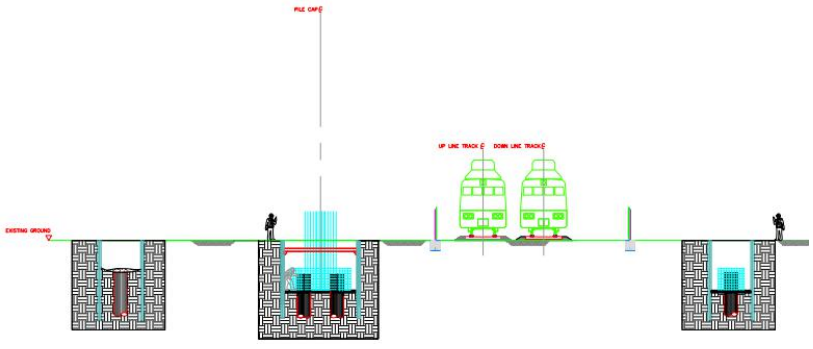


5.9 RD-TMP 08 (STA.4+236m TO STA.4+836m)

This drawing sheet shows the work zone between STA.4+236 to STA.4+836. The work zone is set outside the main road-New Airport Road. Therefore the New Airport Road will not be affected according to the work zone, still maintain 8 lanes on this road (4 Lanes in each direction). The side street heading to New Airport Road needs to be managed in order to ensure the safety of the traffic operation within the work zone of this construction site.

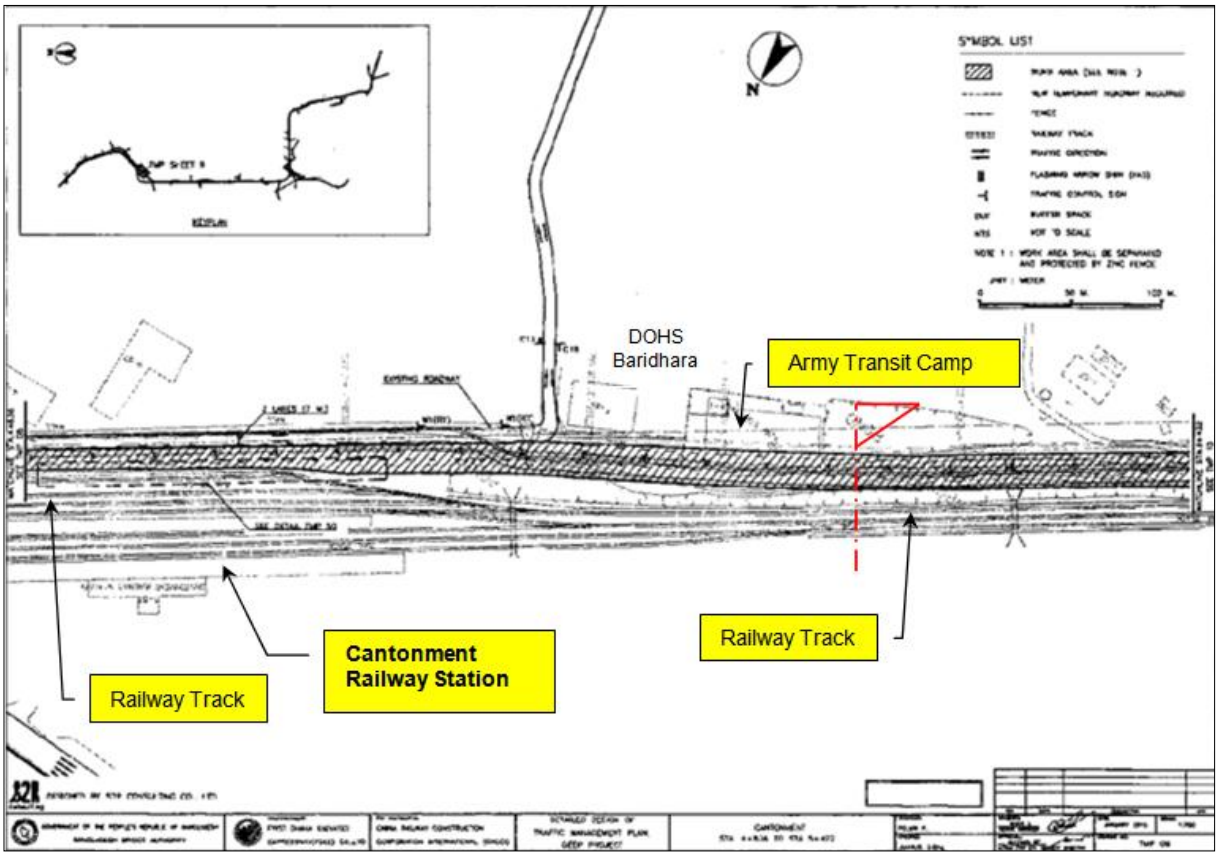


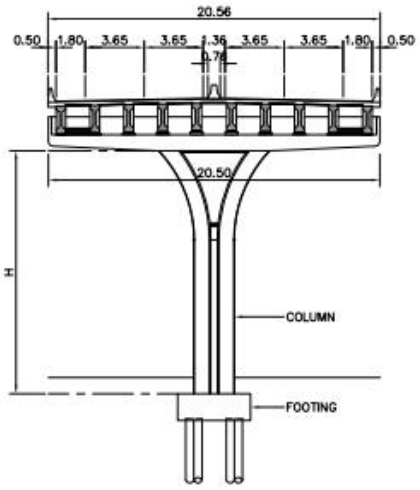


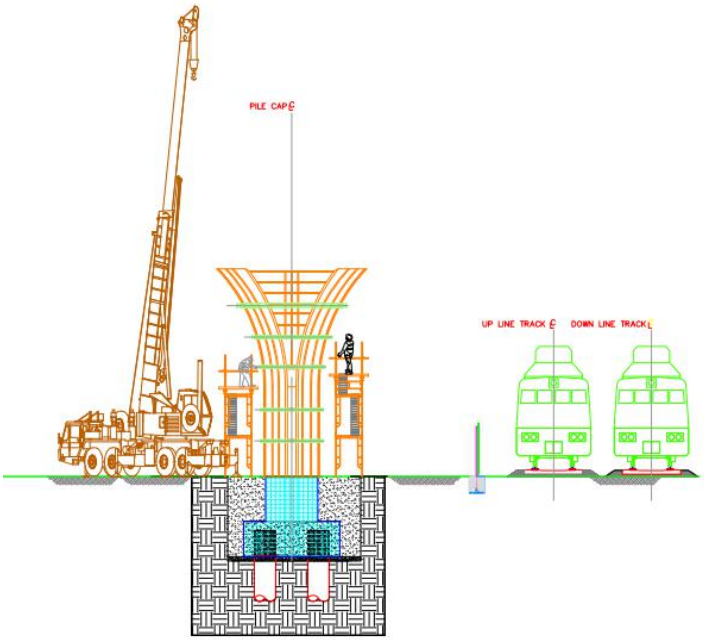


5.10 RD-TMP 09 (STA.4+836m TO STA.5+422m)

This drawing sheet shows the work zone between STA.4+836 to STA.5+422 On Main Route. Most of the work zone is set outside the main road-New Airport Road. Therefore the new airport road will not be affected according to the work zone. However, the train traffic management needs to be considered as shown in this drawing plan and the work zone needs to be set up as shown in Chapter 6 in order to ensure the safety of the train operation during the construction. The side street also needs to be managed to ensure the safety of the traffic operation within the work zone of this construction.

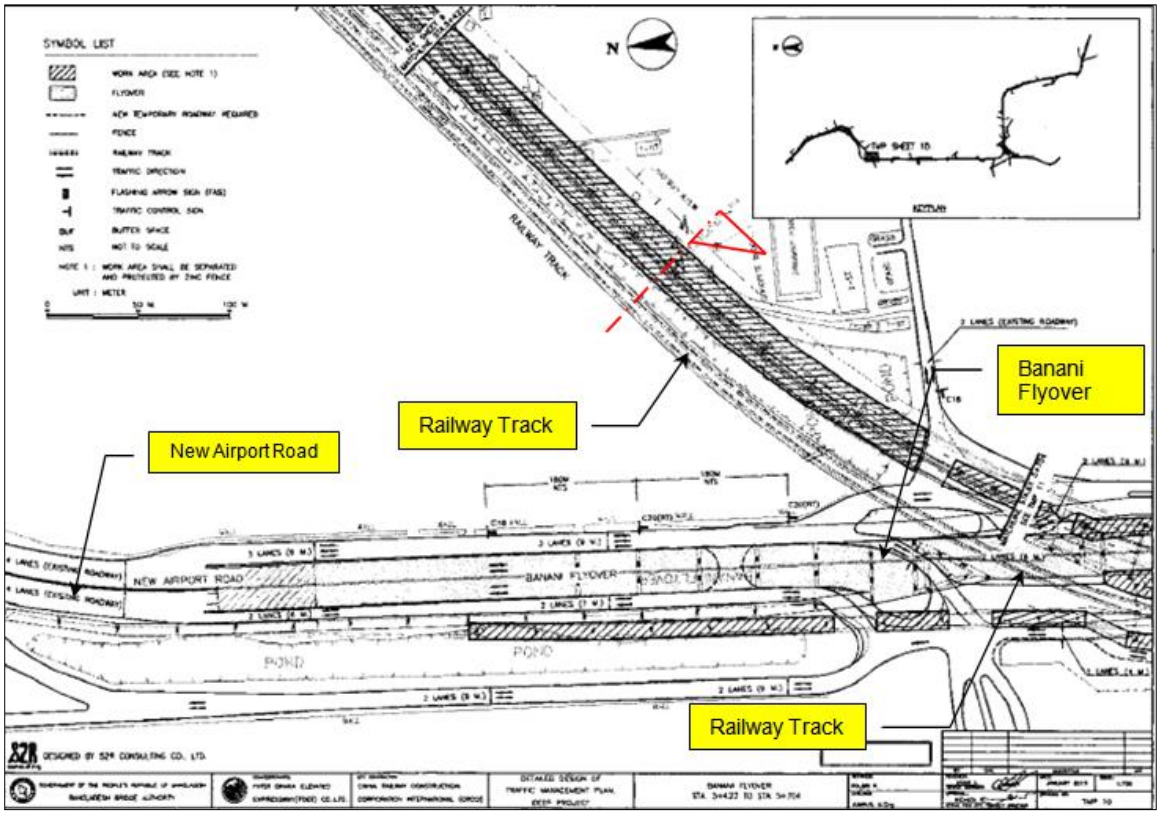


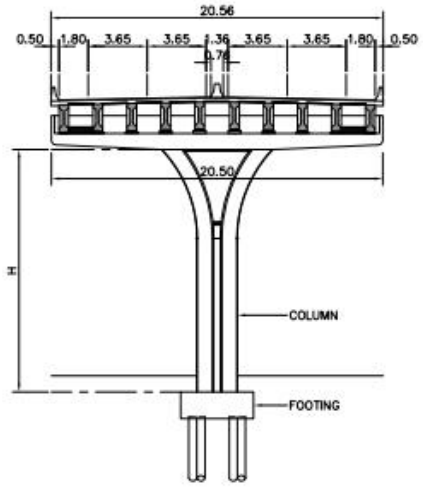


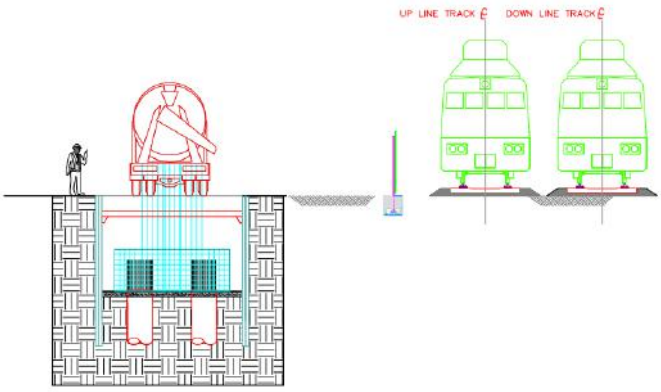


5.11 RD-TMP 10 (STA.5+422m TO STA.5+845m)

This drawing sheet shows the work zone between STA.5+422 to STA.5+845 On Main Route. Most of the work zone is set outside the main road-New Airport Road, still maintain 8 Lanes on this road (4 Lanes in each direction). Therefore the new airport road will not be affected according to the work zone. However, the side streets will need to be managed in order to ensure the traffic safety during the construction of this project.

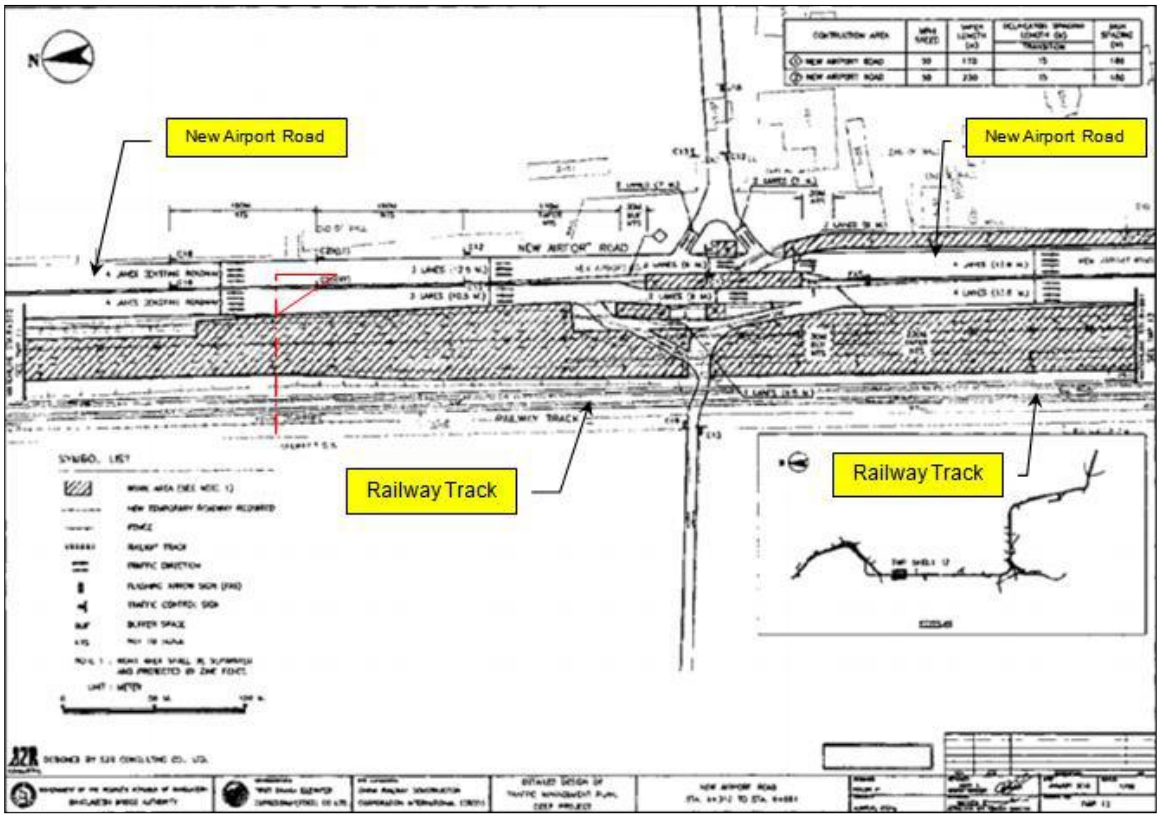


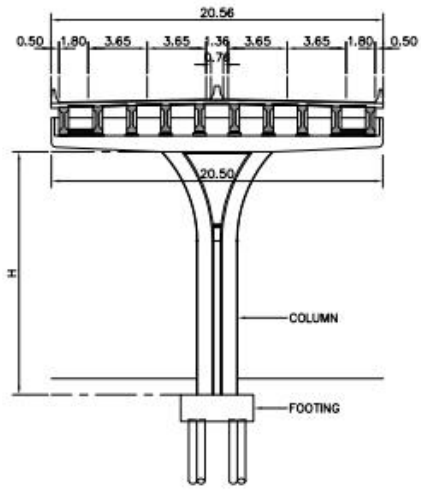


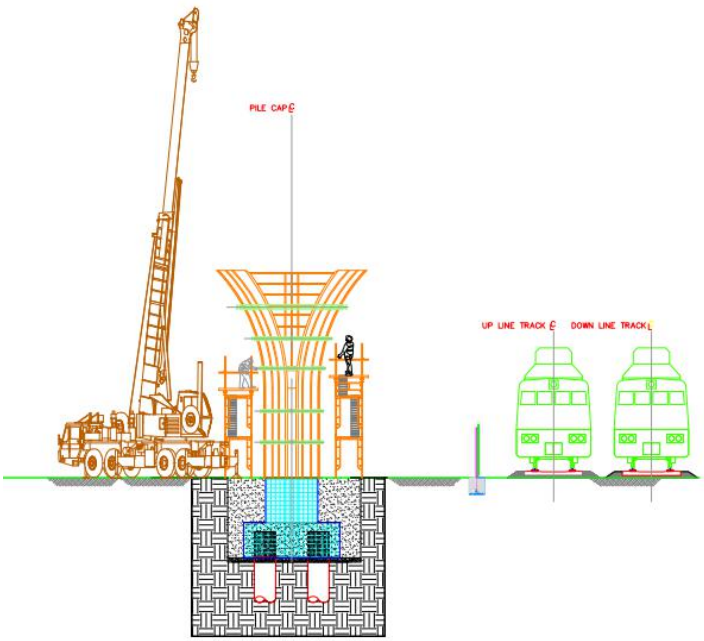


5.12 RD-TMP 11 (STA.5+845m TO STA.6+312m)

This drawing sheet shows the work zone between STA.5+845 to STA.6+312 On Main Route and is involved the Banani Fly Over area. Most of the work zone is set outside the main road-New Airport Road, still maintain 8 Lanes on this road (4 Lanes in each direction). Therefore the new airport road will not be affected according to the work zone. However, setting a proper works within the side streets and the train traffic tracks will need to be done in order to ensure the traffic safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

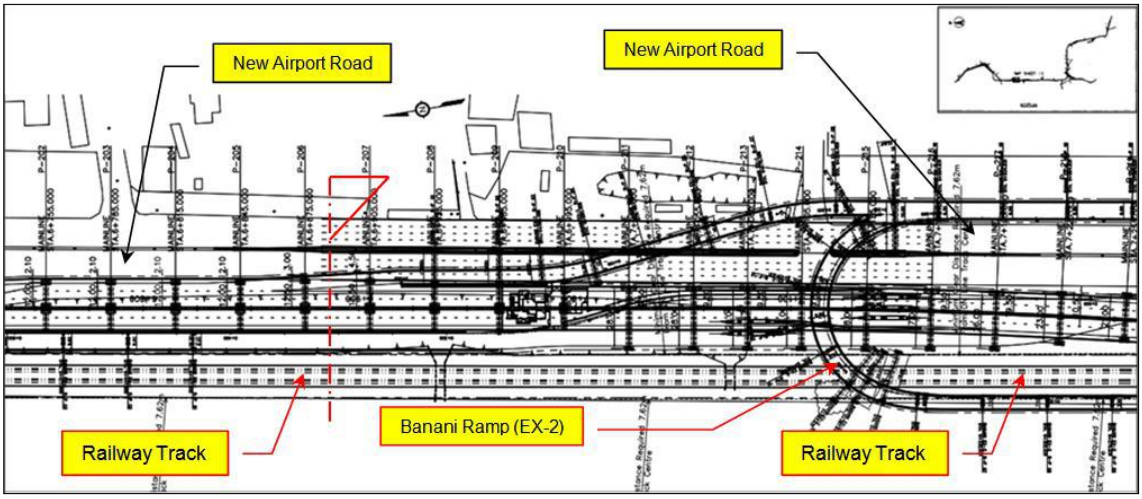


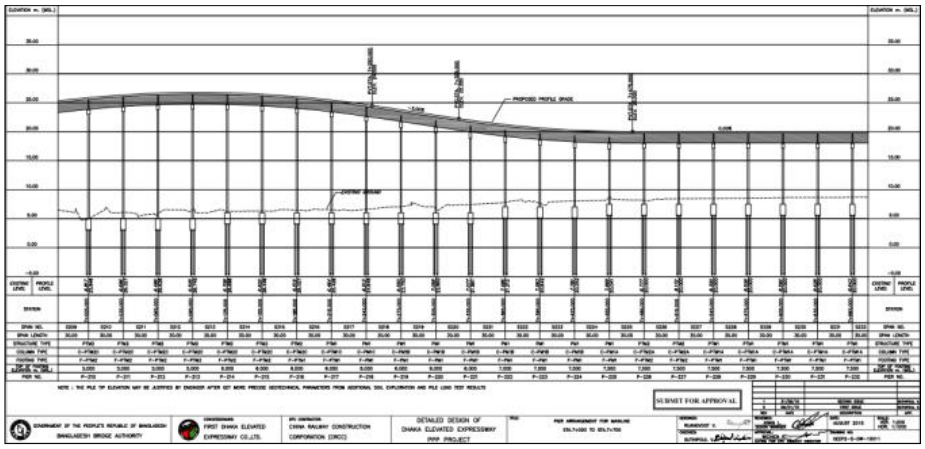


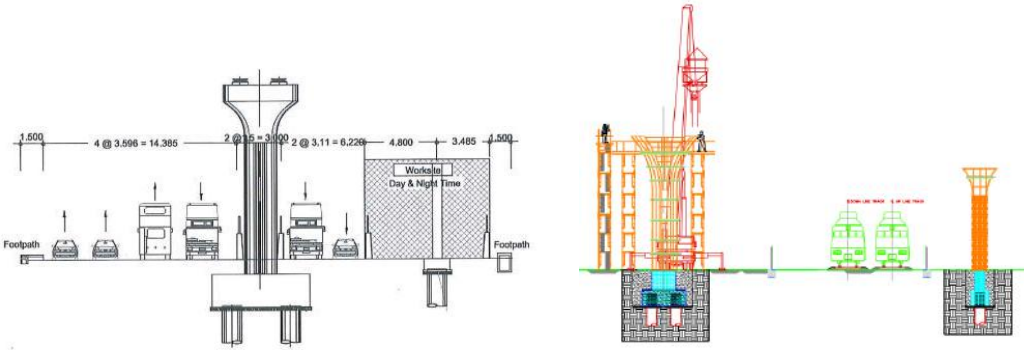


5.13 RD-TMP 12 (STA.6+312m TO STA.6+891m)

This drawing sheet shows the work zone between STA.6+312 to STA.6+891 On Main Route and is involved the Banani Fly Over area. Most of the work zone is set outside the main road-New Airport Road. Therefore most of the New Airport Road will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction), except some portion of the New Airport Road will be reduced from 4 Lanes in each direction to 2 Lanes and 3 Lanes due to the work zone being set in the middle of the roadway. This is to ensure the safety of the traffic operation within the work zone of this construction site.

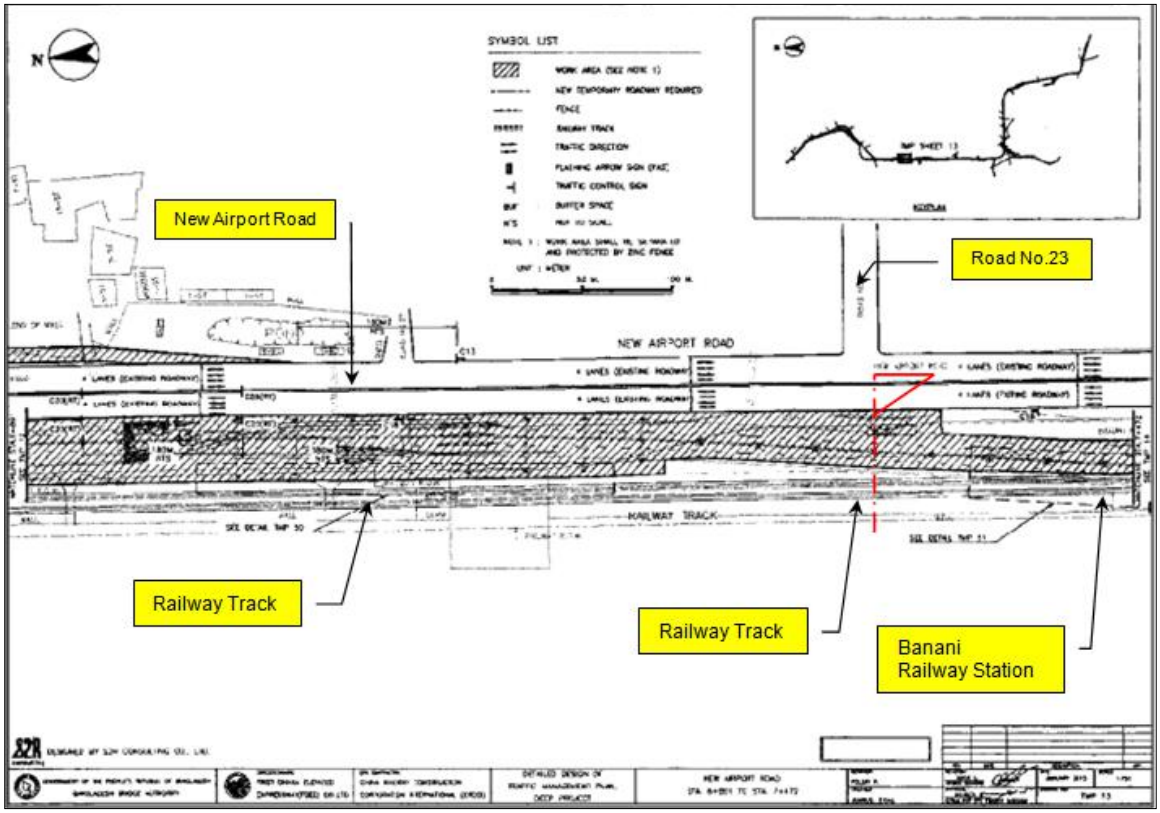


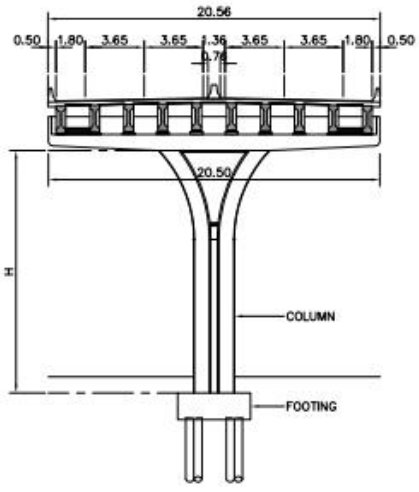


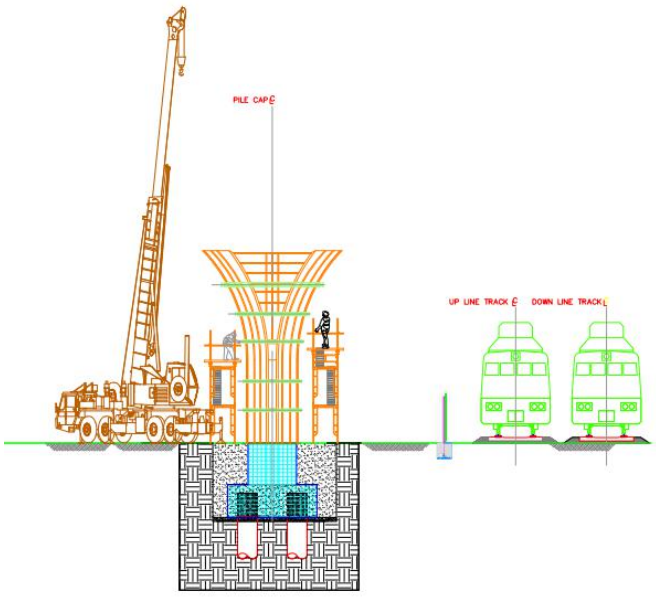


5.14 RD-TMP 13 (STA.6+891m TO STA.7+472m)

This drawing sheet shows the work zone between STA.6+891 to STA.7+472 On Main Route. Most of the work zone is set outside the main road-New Airport Road, still maintain 8 Lanes on this road (4 Lanes in each direction). Therefore the new airport road will not be affected according to the work zone. However, setting a proper works within the side streets and the train traffic tracks will need to be done in order to ensure the traffic safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

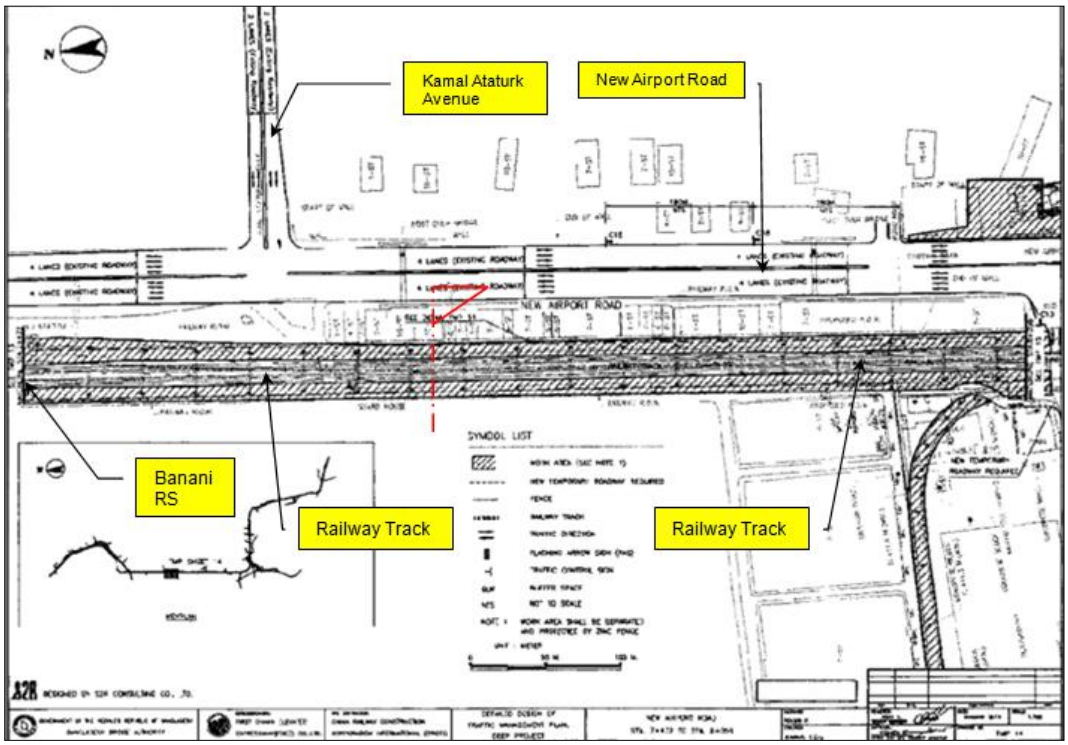


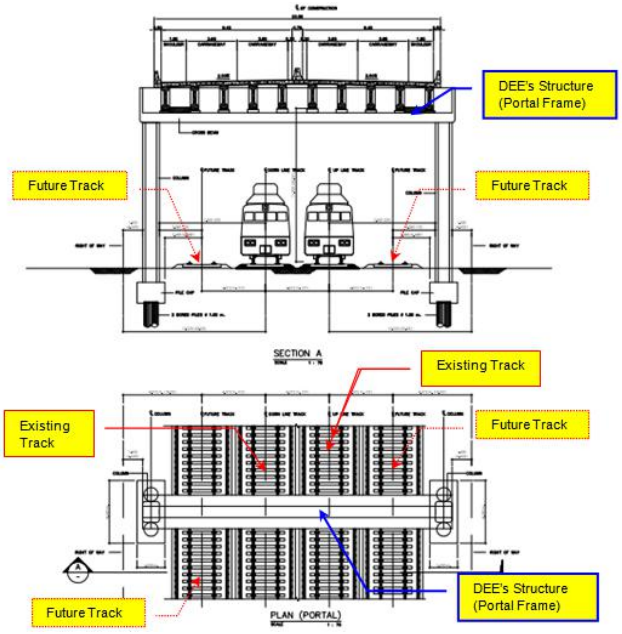




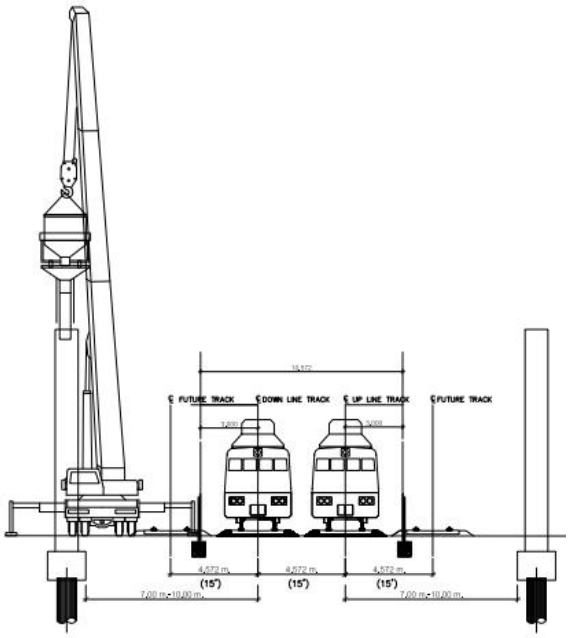
5.15 RD-TMP 14 (STA.7+472m TO STA.8+056m)

This drawing sheet shows the work zone between STA.7+472 to STA.8+056 On Main Route. The work zone is set outside the main road-New Airport Road, still maintain 8 Lanes on this road (4 Lanes in each direction). Therefore the new airport road will not be affected according to the work zone. However, setting a proper works within the side streets and the train track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation. This is to ensure the safety of the traffic operation within the work zone of this construction site.





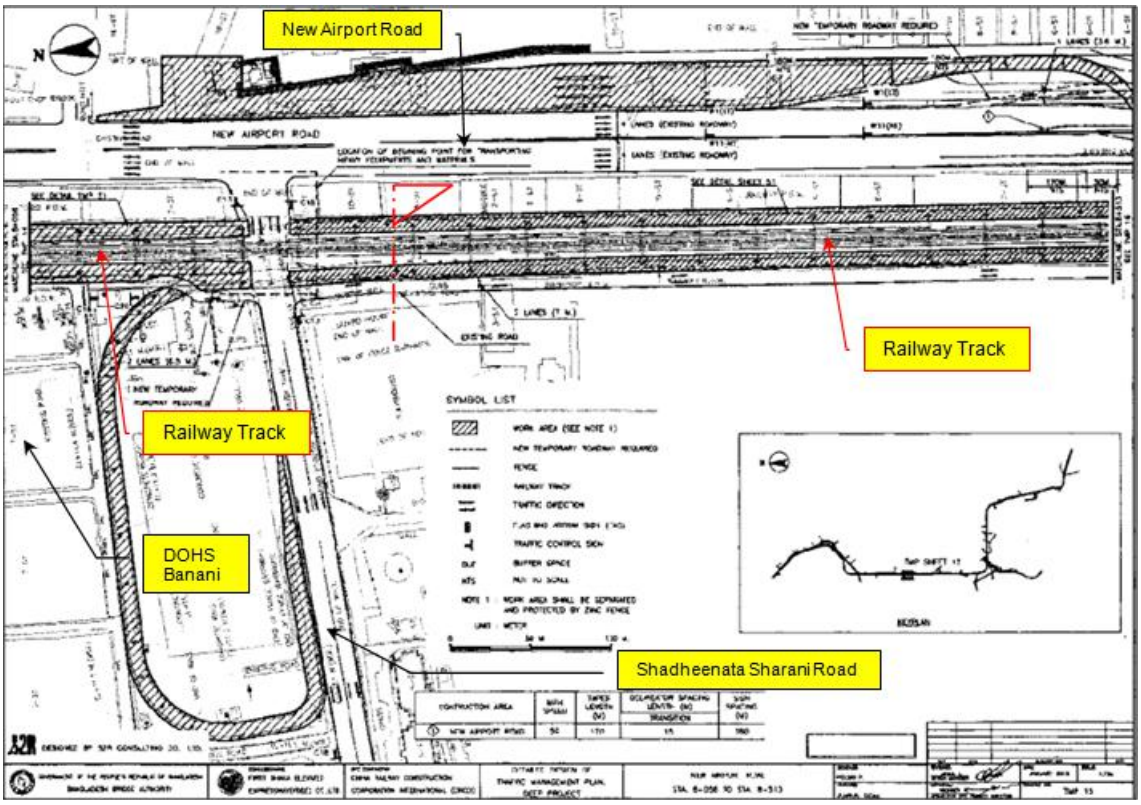
Portal Frame Type - Section & Plan Model

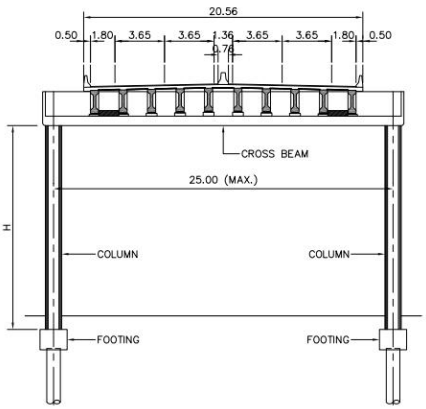


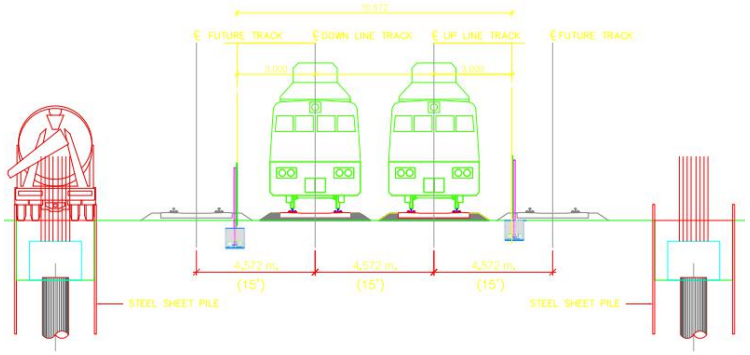
Portal Frame Type – Under Construction Step

5.16 RD-TMP 15 (STA.8+056m TO STA.8+513m)

This drawing sheet shows the work zone between STA.8+056 to STA.8+513 On Main Route. Most of the work zone is set outside the main road-New Airport Road, still maintain 8 Lanes on this road (4 Lanes in each direction). Therefore the new airport road will not be affected according to the work zone. However, setting up a proper work zone within the side streets and the train track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Sheet No. 51 for setting up the work zone for proper and safe train traffic operation. This is to ensure the safety of the traffic operation within the work zone of this construction site.

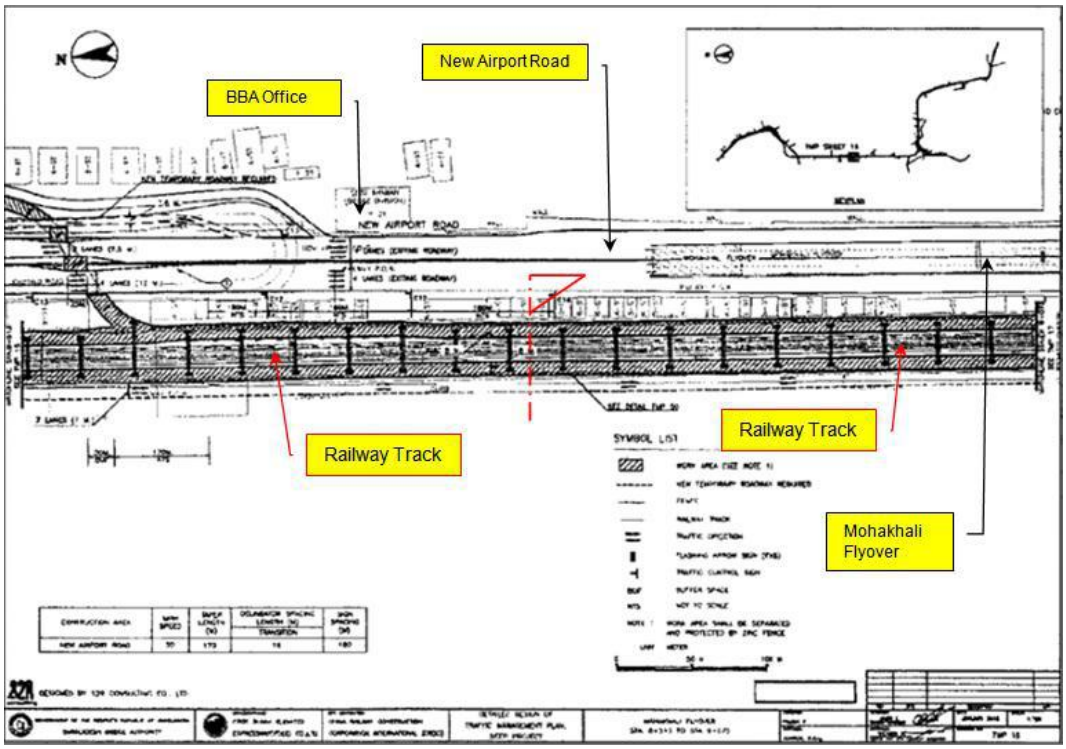


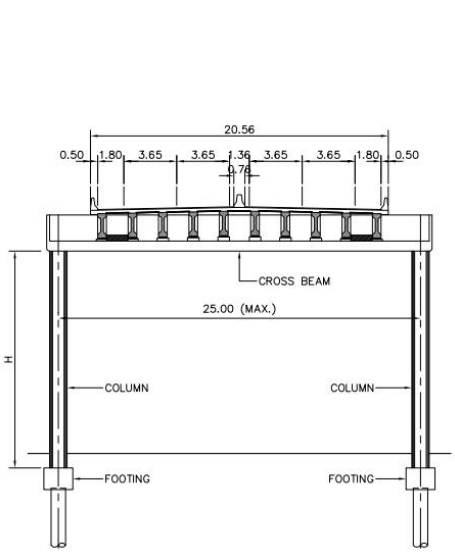


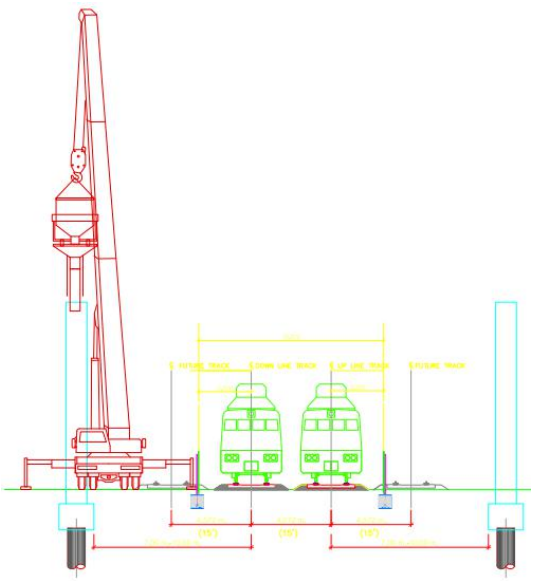


5.17 RD-TMP 16 (STA.8+513m TO STA.9+075m)

This drawing sheet shows the work zone between STA.8+513 to STA.9+075 On Main Route. Most of the work zone is set outside the main road-New Airport Road. Therefore most of the New Airport Road will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction), except some portion of the New Airport Road will be reduced from 4 Lanes in each direction to 2 Lanes and 4 Lanes (narrow Lanes) due to the work zone being set in the middle of the roadway. However, setting up a proper work zone within the side streets and the train traffic tracks will need to be done in order to ensure the traffic safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation. This is to ensure the safety of the traffic operation within the work zone of this construction site.

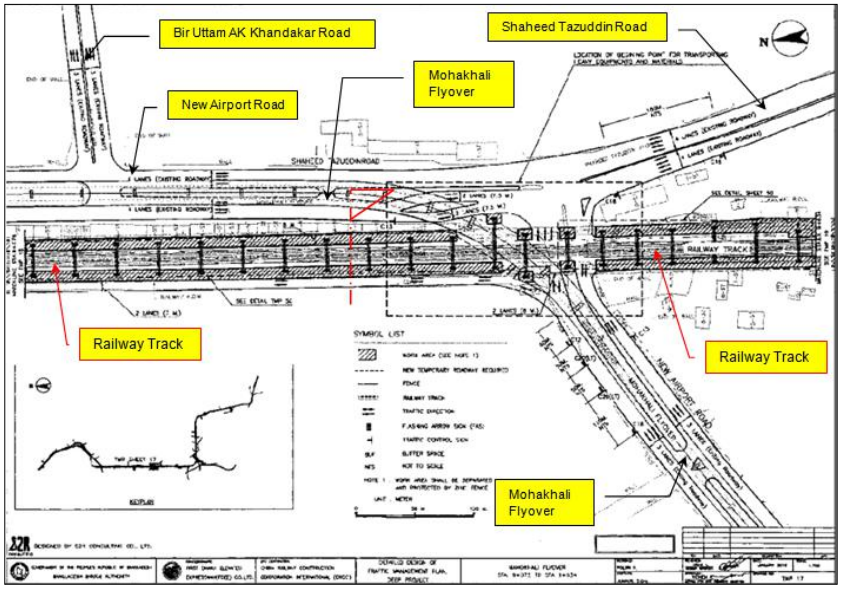


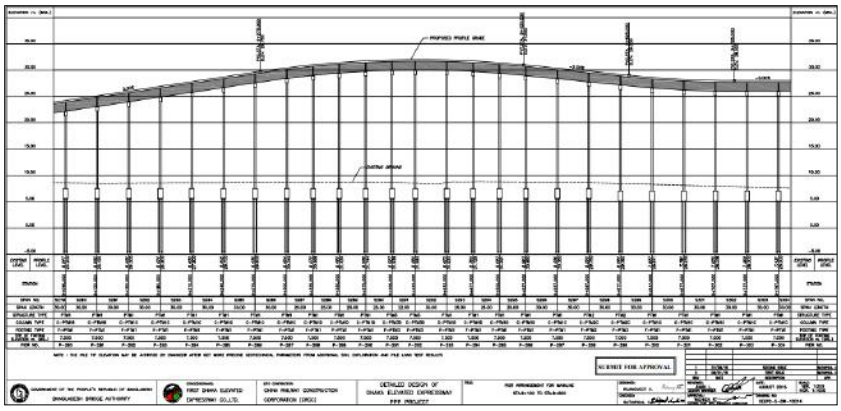


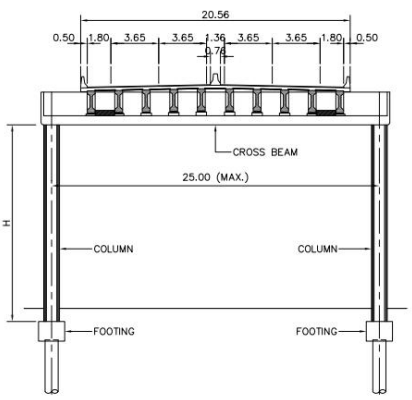


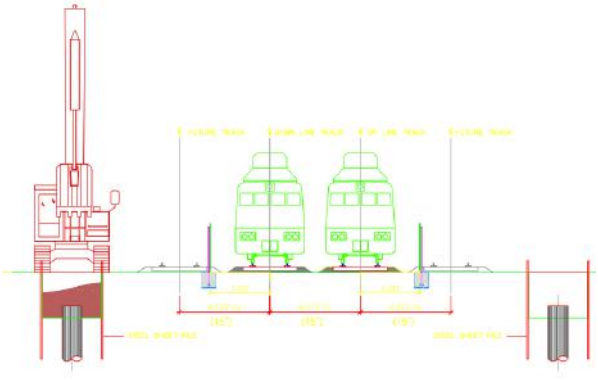
5.18 RD-TMP 17 (STA.9+075m TO STA.9+634m)

This drawing sheet shows the work zone between STA. 9+075 to STA. 9+634 On Main Route and is involved the Mohakhali Fly Over area. Most of the work zone is set outside the main road-New Airport Road. Therefore most of the New Airport Road will not be affected according to the work zone, still maintain 8 lanes on this road (4 lanes in each direction). However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.



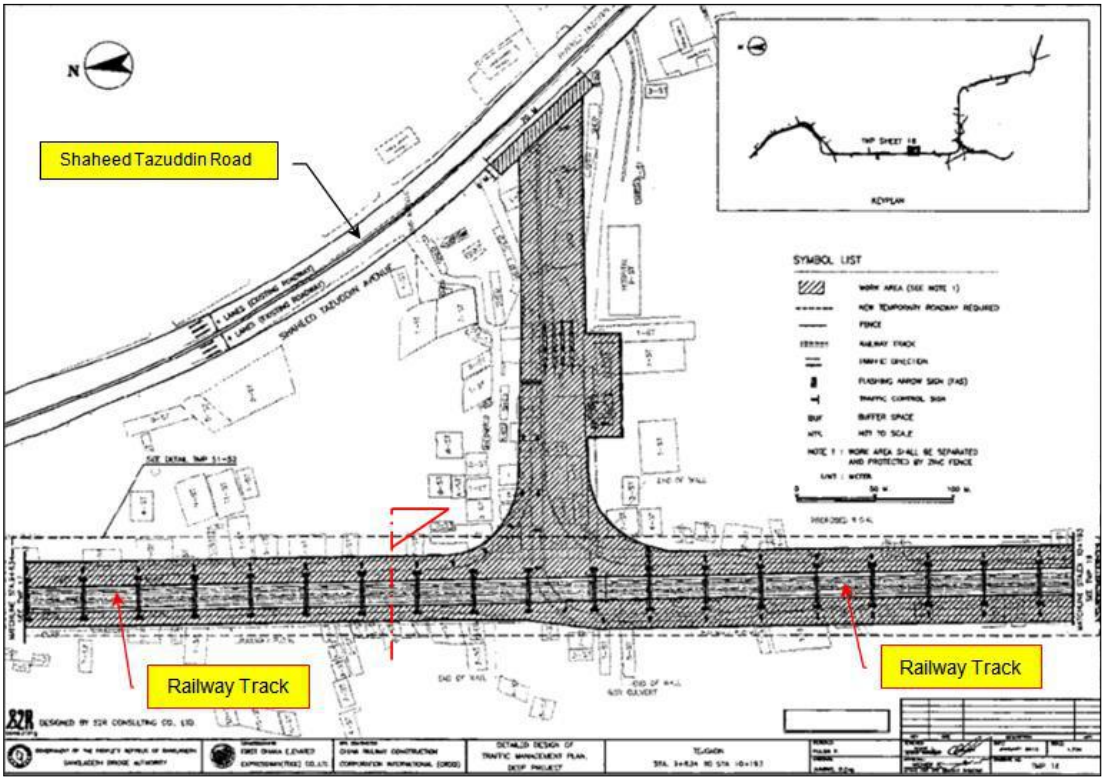


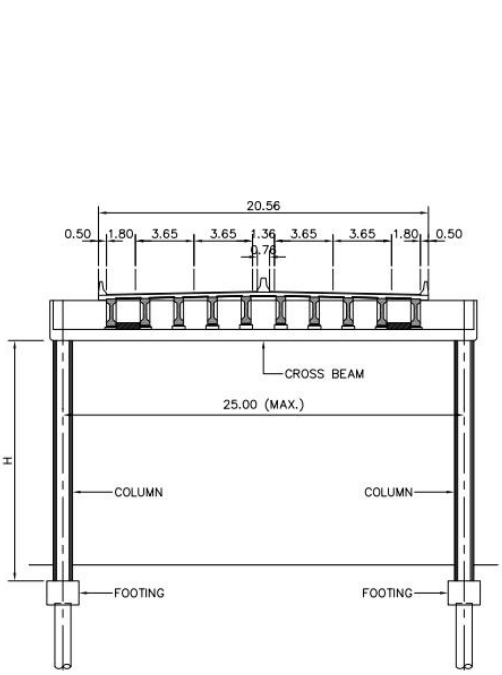


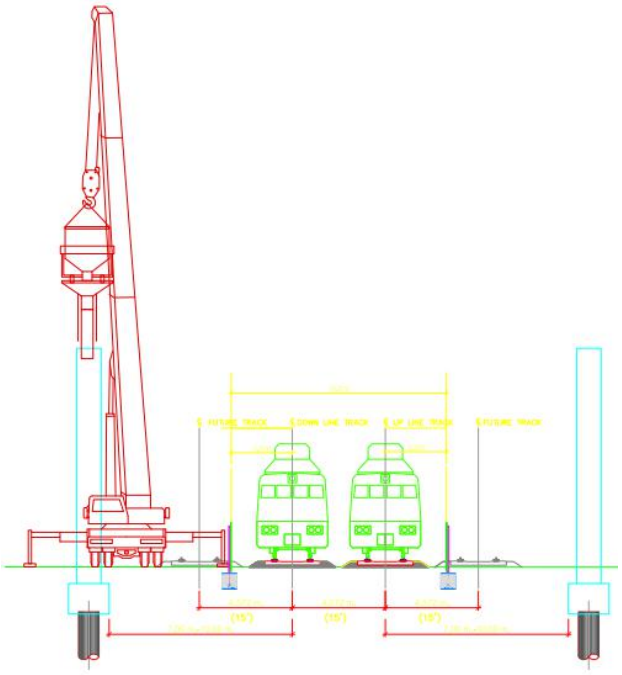


5.19 RD-TMP 18 (STA.9+634m TO STA.10+193m)

This drawing sheet shows the work zone between STA.9+634 to STA.10+193 On Main Route. Most of the work zone is set outside the main road-Shaheed Tazuddin Avenue. Therefore most of the Shaheed Tazuddin Avenue will not be affected according to the work zone, still maintain 6 Lanes on this road (3 Lanes in each direction). However, setting up a proper work zone within the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe.

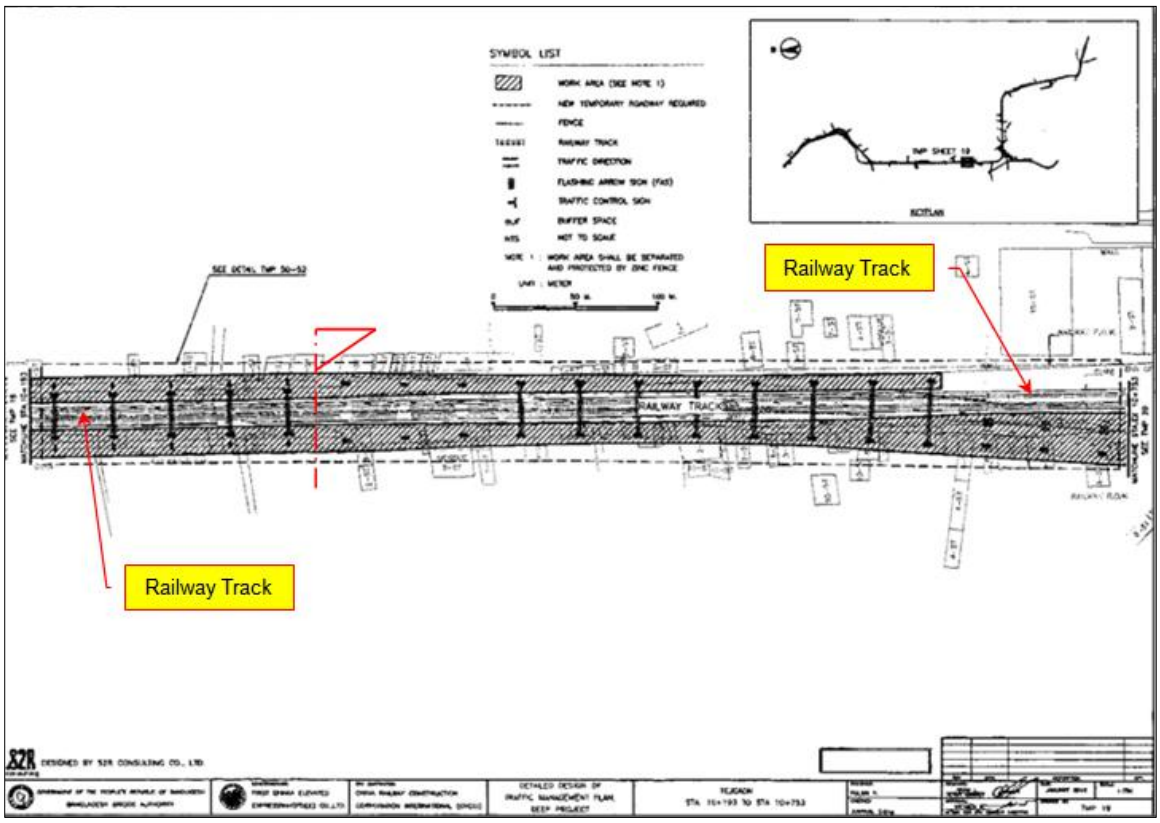


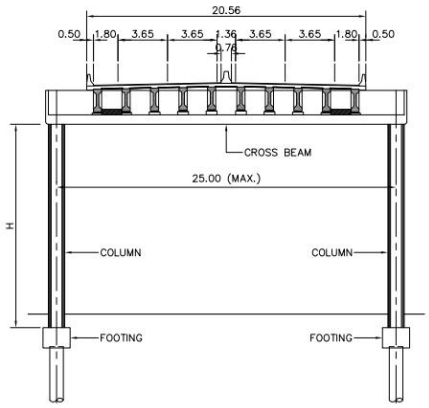


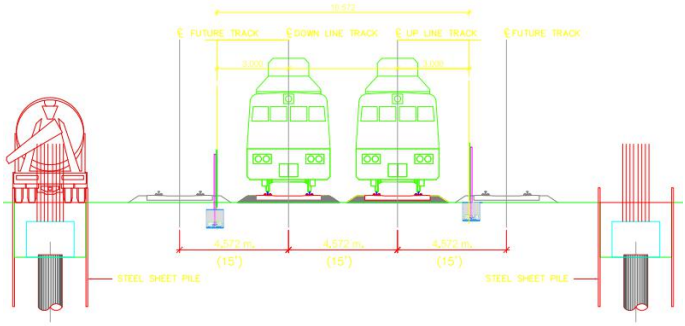


5.20 RD-TMP 19 (STA.10+193m TO STA.10+753m)

This drawing sheet shows the work zone between STA. 10+193 to STA. 10+753 On Main Route. The work zone is set outside the main road but within the train track area. However, setting up a proper work zone within the train traffic track area will need to be done in order to ensure the train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

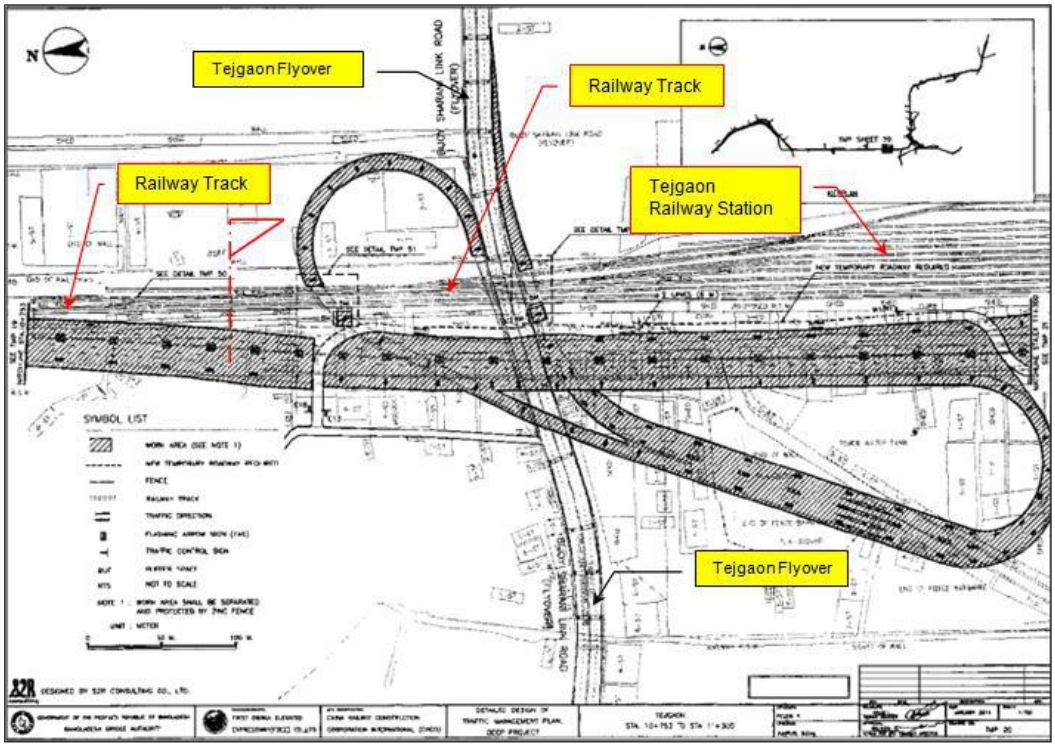


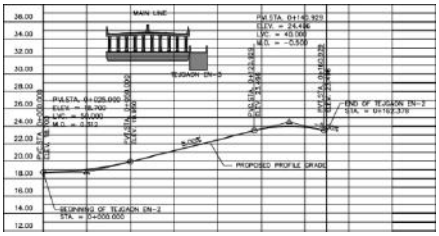


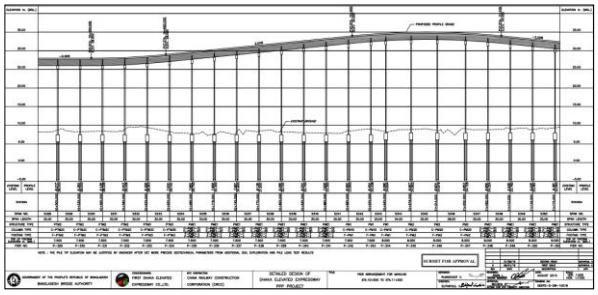


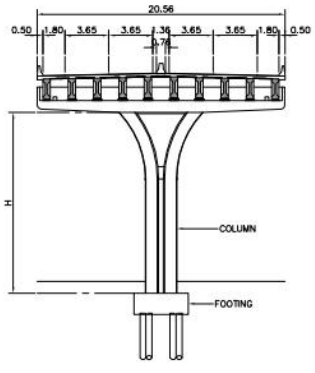
5.21 RD-TMP 20 (STA.10+753m TO STA.11+300m)

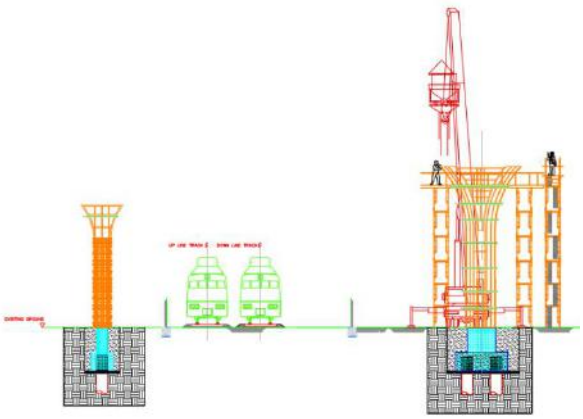
This drawing sheet shows the work zone between STA. 10+753 to STA. 11+300 On Main Route. The work zone is set outside the main road but within the train track area. However, setting up a proper work zone within the train traffic track area will need to be done in order to ensure the train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.





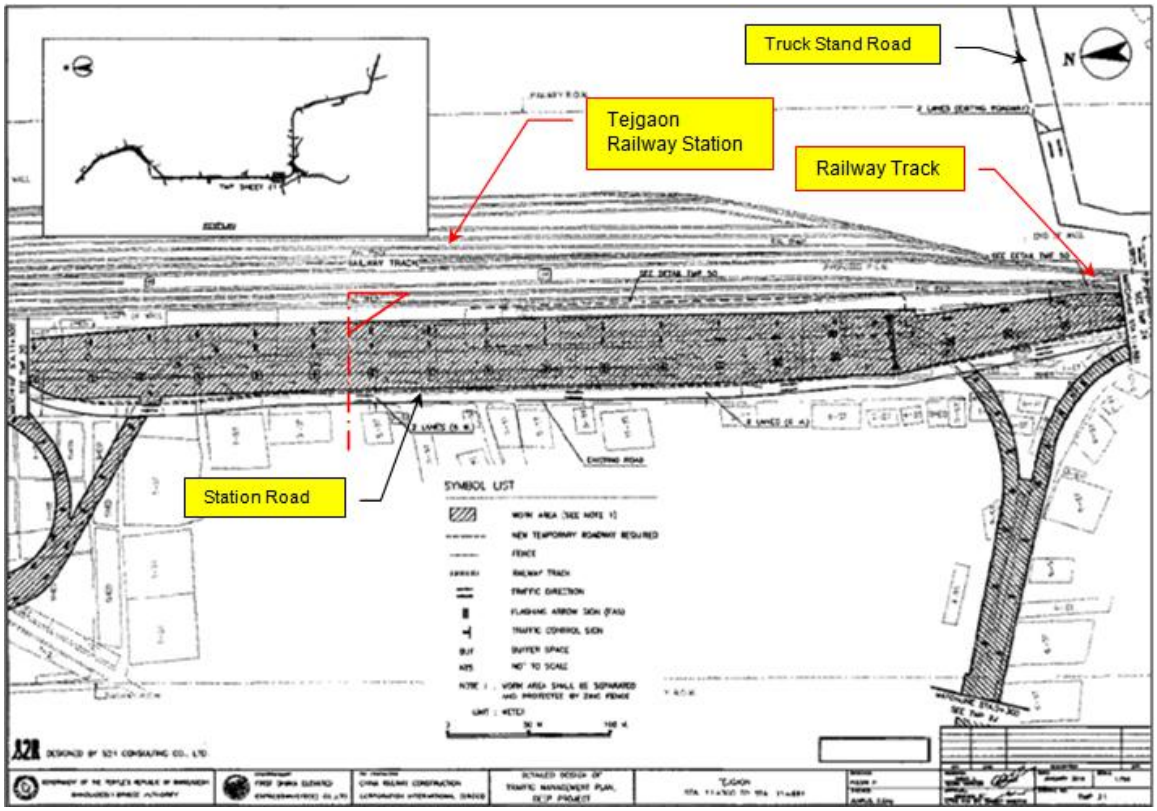


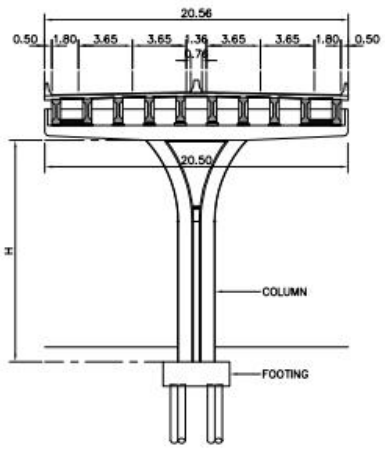


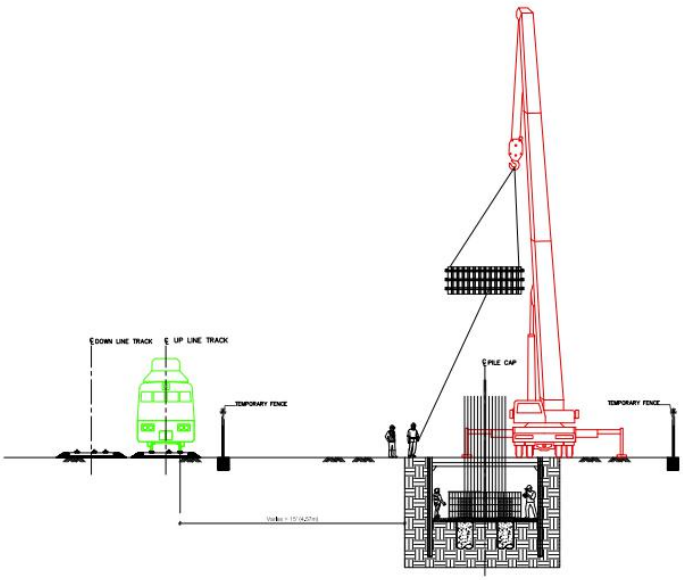


5.22 RD-TMP 21 (STA.11+300m TO STA.11+881m)

This drawing sheet shows the work zone between STA.11+300 to STA.11+881 and Tejgaon Exit Ramp. The work zone is set outside the main road, but within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation. This is to ensure the safety of the traffic operation within the work zone of this construction site.

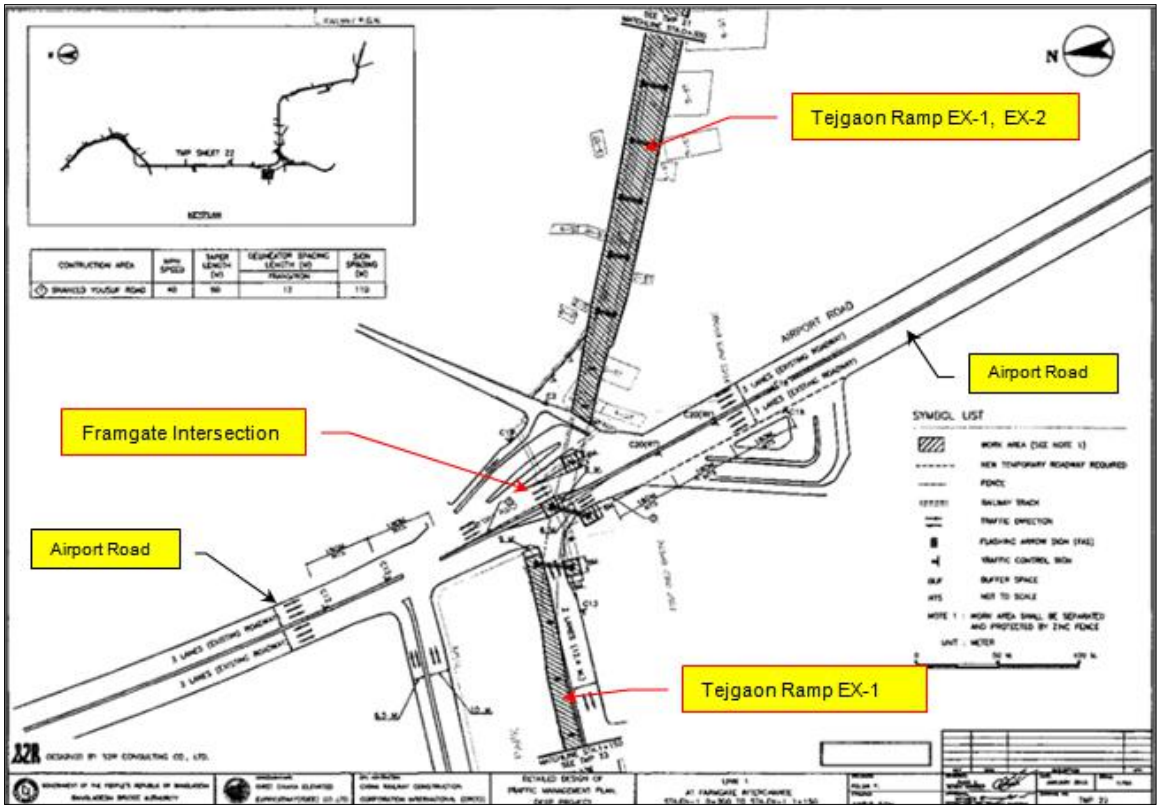


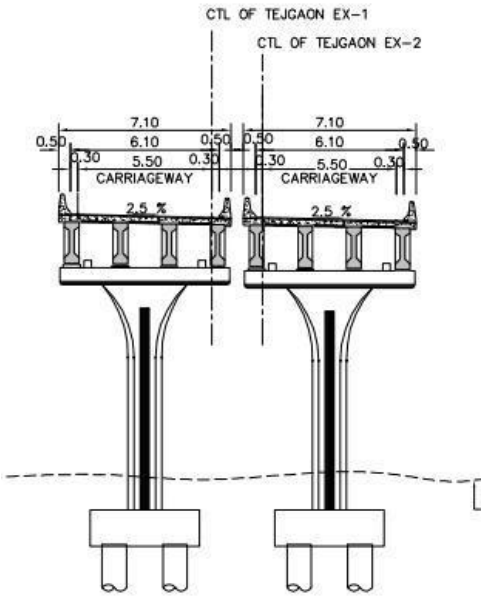


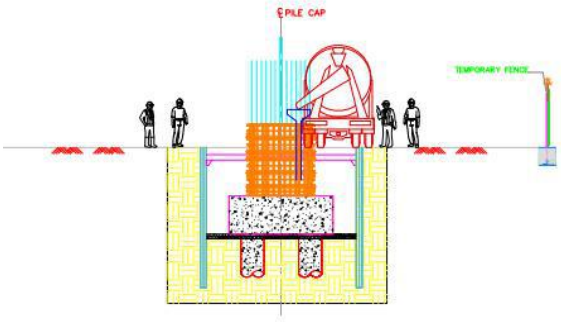


5.23 RD-TMP 22 (STA.0+300m TO STA.1+150m, TEJGAON RAMP)

This drawing sheet shows the work zone between STA.0+300 to STA. 1+150 at Tejgaon Exit Ramp. Most of the work zone is set outside the main road-Airport Road except some portion of the Airport Road will be reduced from 3 lanes in each direction to 2 Lanes during the construction. However, setting up a proper work zone within the side streets will need to be done in order to ensure the traffic safety during the construction of this project.

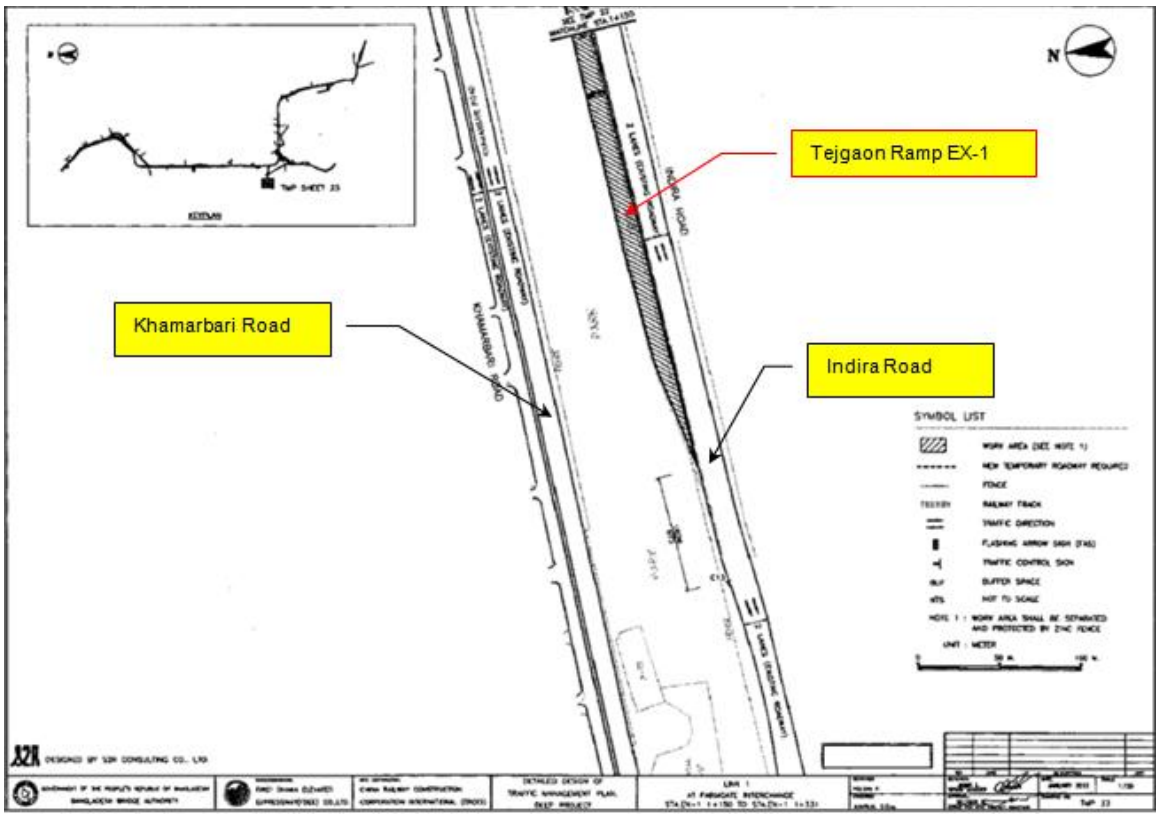


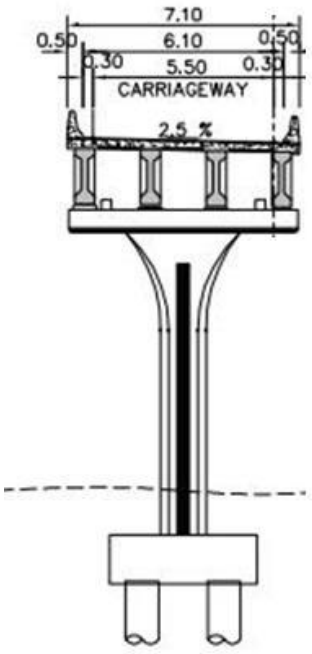


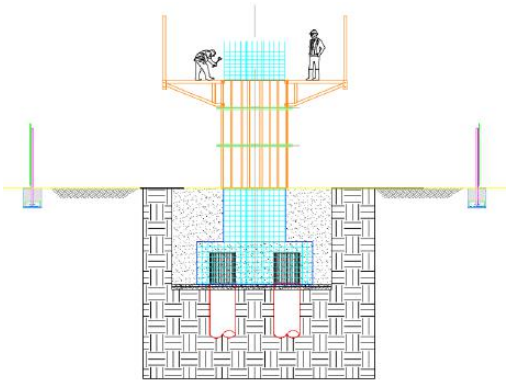


5.24 RD-TMP 23 (STA.1+150m TO STA.1+331m, TEJGAON RAMP)

This drawing sheet shows the work zone between STA.1+150 to STA.1+331 at Tejgaon Exit Ramp. Most of the work zone is set outside the main road-Indira Road. However, setting up a proper work zone with on this Indira Road will need to be done in order to ensure the traffic safety during the construction of this project.

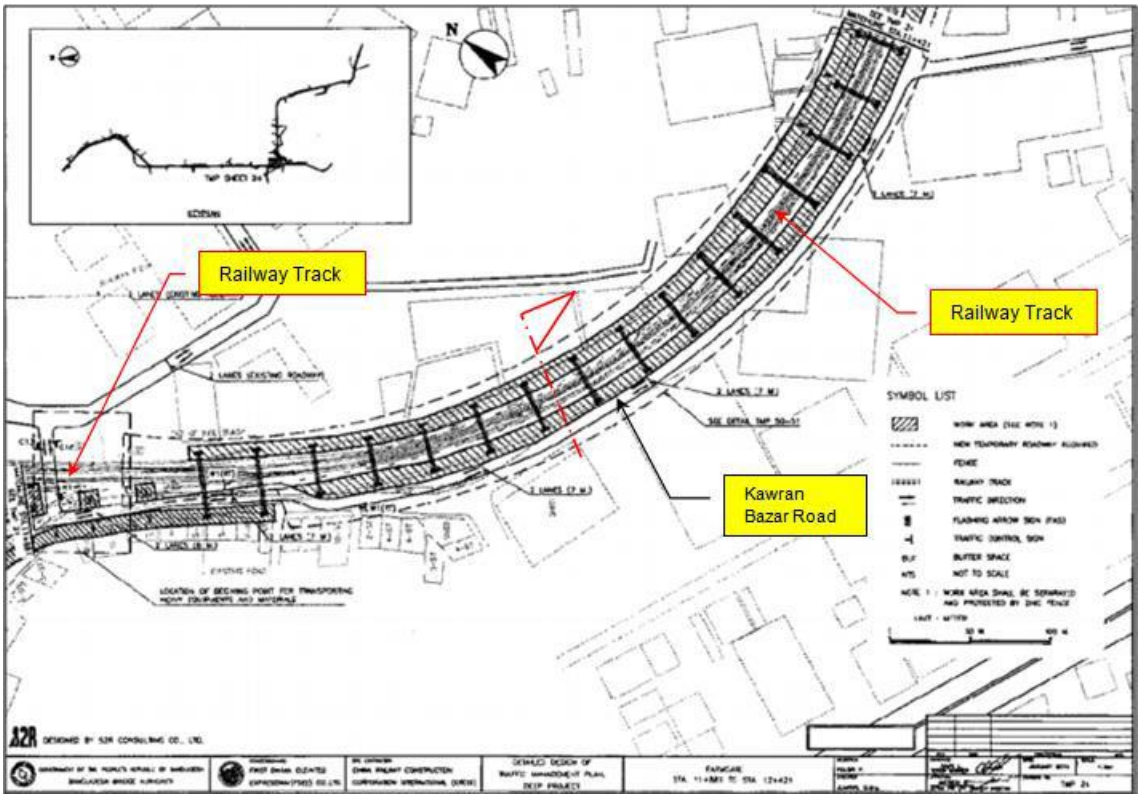


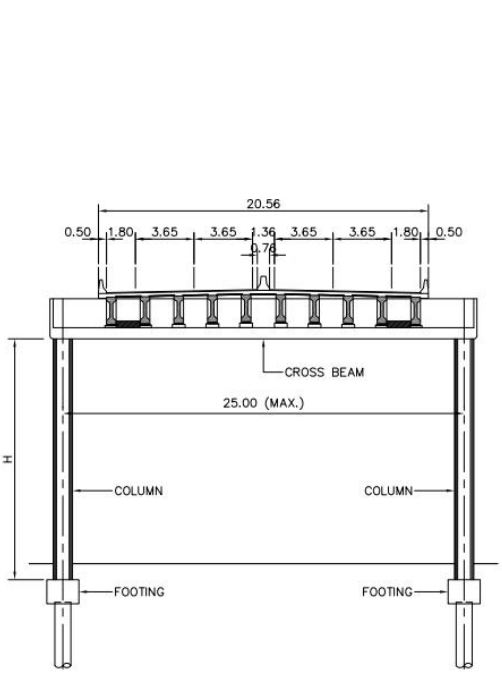


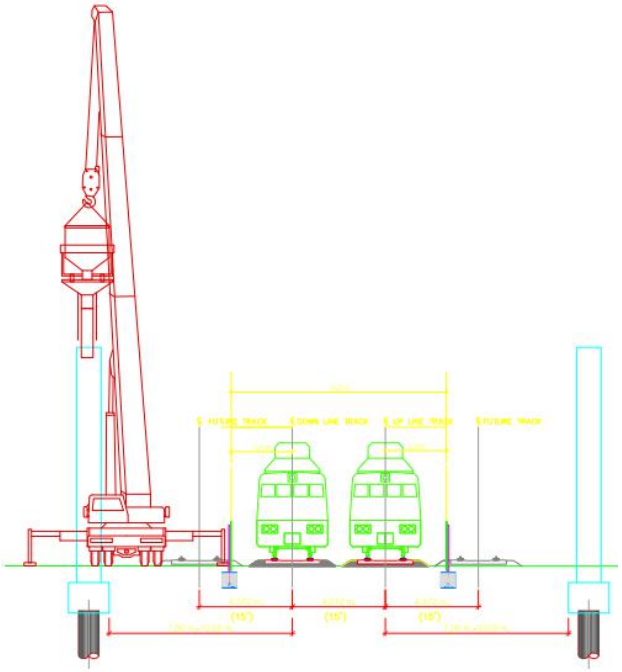


5.25 RD-TMP 24 (STA.11+881m TO STA.12+421m)

This drawing sheet shows the work zone between STA.11+856 to STA.12+421 On Main Route. Most of the work zone is set outside the main road, but within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train operation. This is to ensure the safety of the traffic operation within the work zone of this construction site.

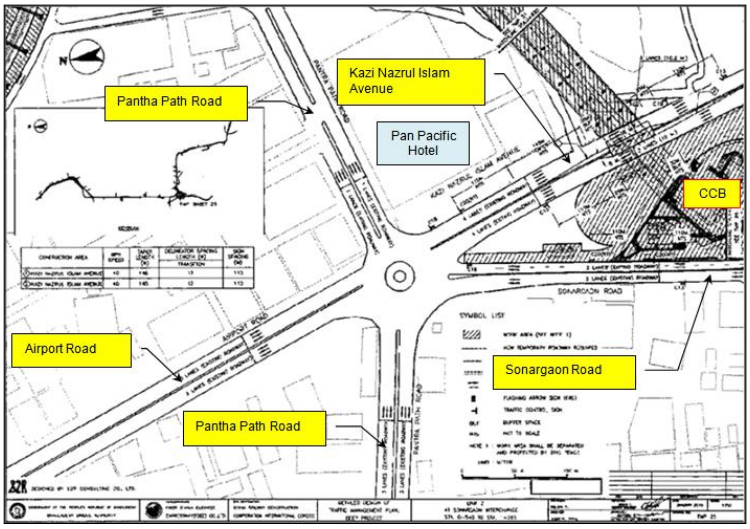






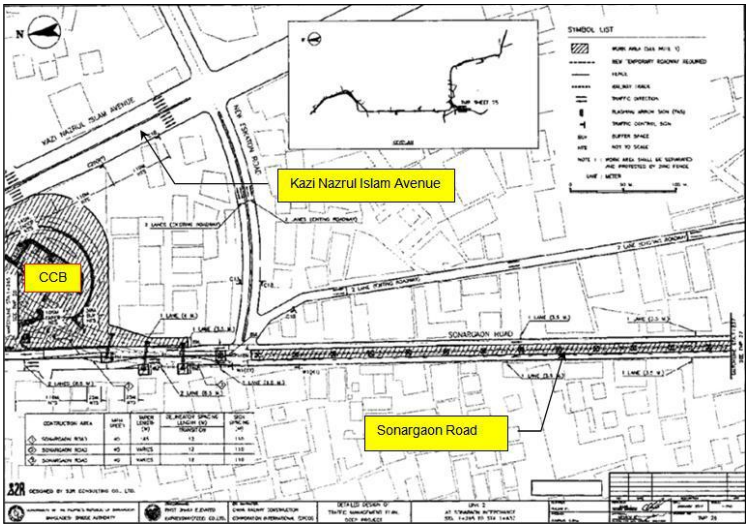
5.26 RD-TMP 25 (STA.0+540m TO STA.1+265m) (BUET Link)

This drawing sheet shows the work zone between STA. 0+540 to STA. 1+265 On Link 2 Route (BUET Link). Most of the work zone is set outside the main road-Airport Road and Kazi Nazrul Islam Avenue. Therefore most of the Airport Road will not be affected according to the work zone, still maintain 6 Lanes on this road (3 Lanes in each direction) for Airport Road and 8 Lanes for Kazi Nazrul Islam Avenue, except some portion of the Kazi Nazrul Islam Avenue will be reduced from 4 Lanes to 3 Lanes in each direction. However, setting up a proper work zone within the main and side and main streets will need to be done in order to ensure the traffic safety during the construction of this project.



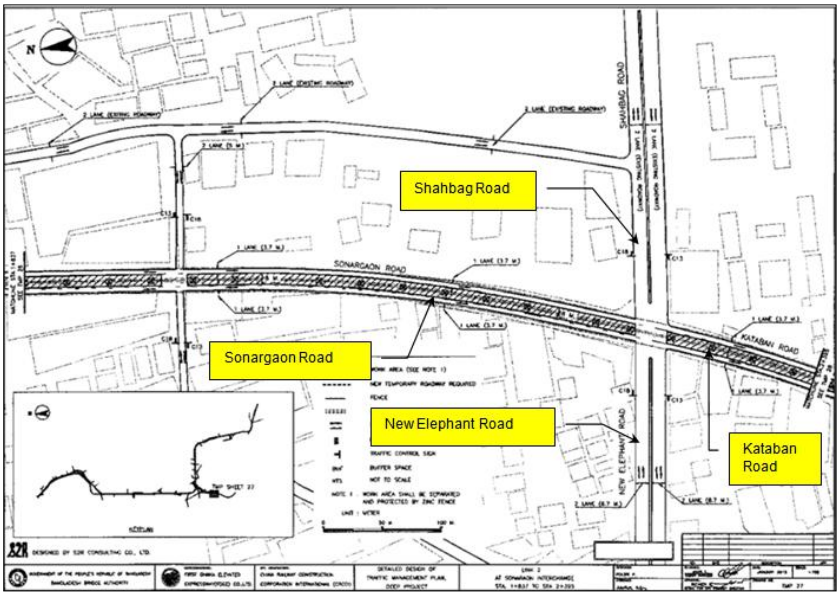
5.27 RD-TMP 26 (STA.1+265m TO STA.1+837m) (BUET Link)

This drawing sheet shows the work zone between STA. 1+265 to STA.1+837 On Link 2 Route (BUET Link) along Sonargaon Road. Most of the work zone is set outside the main road-Kazi Nazrul Islam Avenue, within the Sonargaon Road (Link 2 route). Therefore most of the Kazi Nazrul Islam Avenue will not be affected according to the work zone, still maintain 8 Lanes on this road (4 Lanes in each direction), except Sonargaon Road will be reduced from 4 Lanes (2 Lanes in each direction) to 2 lanes (1 Lane in each direction) However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



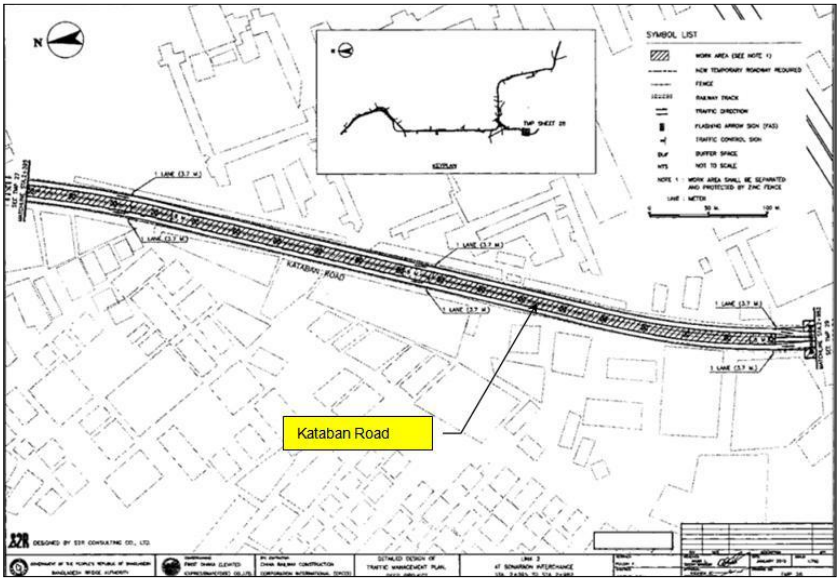
5.28 RD-TMP 27 (STA.1+837m TO STA.2+395m) (BUET Link)

This drawing sheet shows the work zone between STA.1+837 to STA.2+395 On Link 2 Route (BUET Link). Most of the work zone is set within Sonargaon Road. Therefore Sonargaon Road will be reduced from 4 Lanes (2 Lanes in each direction) to 2 Lanes (1 Lane in each direction). However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



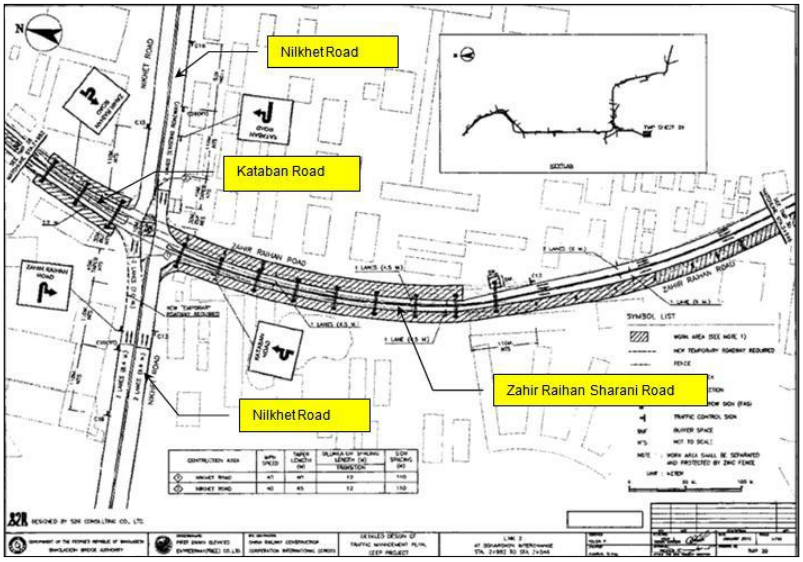
5.29 RD-TMP 28 (STA.2+395m TO STA.2+982m) (BUET Link)

This drawing sheet shows the work zone between STA.2+395 to STA.2+982 On Link 2 Route (BUET Link) along the Kataban Road. Most of the work zone is set within Kataban Road, therefore Kataban Road will be reduced from 4 Lanes (2 Lanes in each direction) to 2 Lanes (1 Lane in each direction). However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



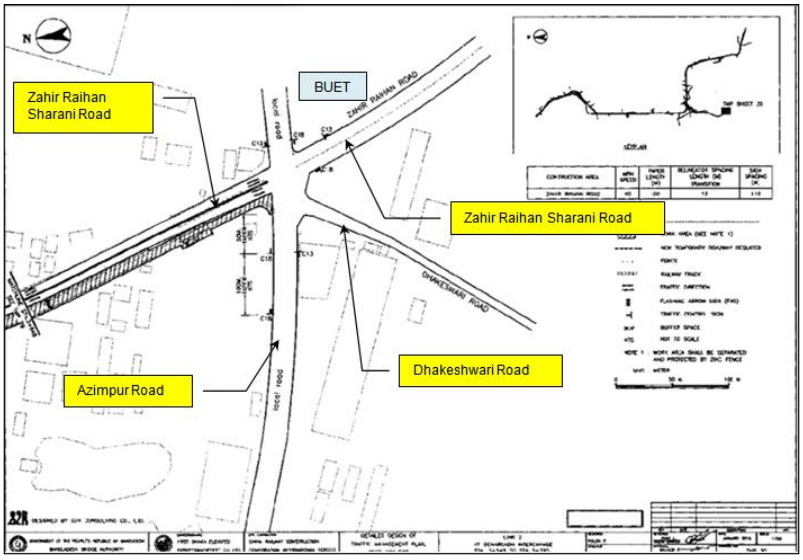
5.30 RD-TMP 29 (STA.2+982m TO STA.3+548m) (BUET Link)

This drawing sheet shows the work zone between STA.2+982 to STA.3+548 On Link 2 Route (BUET Link) along the Kataban Road and Zahir Raihan Road. Most of the work zone is set within Kataban Road and Zahir Raihan Road, therefore Kataban Road and some portion of Zahir Raihan Road will be reduced from 4 Lanes (2 Lanes in each direction) to 2 Lanes (1 Lane in each direction) and to 3 Lanes (2 for southbound and 2 for northbound on Zahir Raihan Road. However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



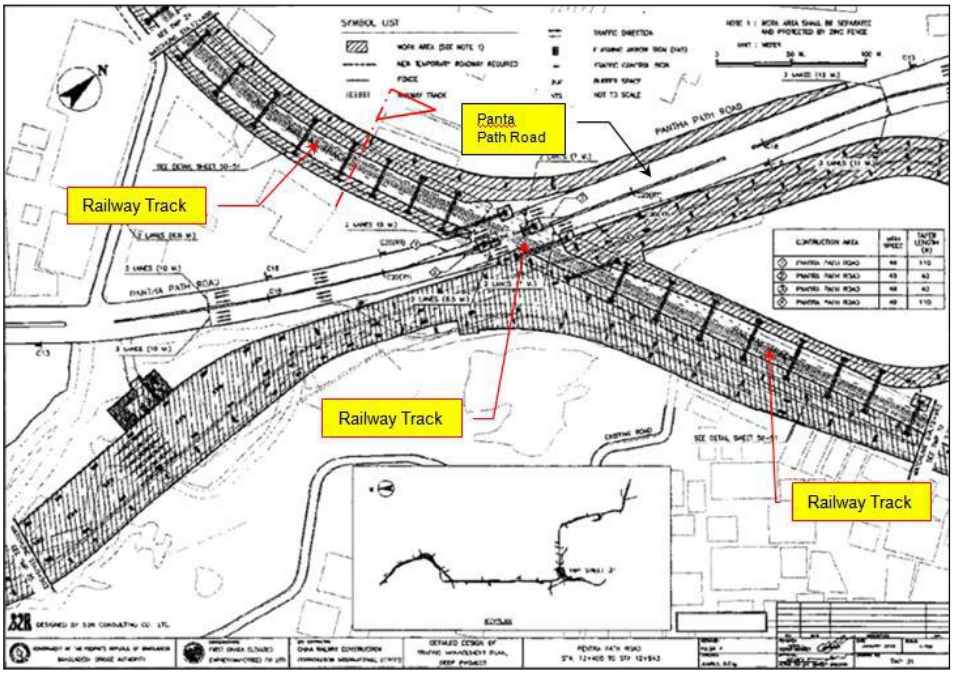
5.31 RD-TMP 30 (STA.3+548m TO STA.3+785m) (BUET Link)

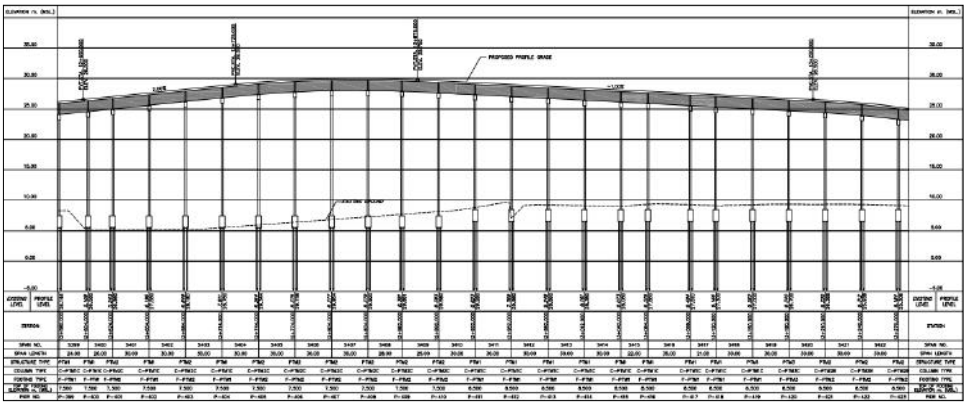
This drawing sheet shows the work zone between STA.3+548 to STA. 3+785 (end of Link 2 Route) along the Zahir Raihan Road. Most of the work zone is set within Zahir Raihan Road, therefore some portion of Zahir Raihan Road will be reduced from 4 Lanes (2 Lanes in each direction) to 3 Lanes (2 for southbound and 2 for northbound on Zahir Raihan Road. However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.

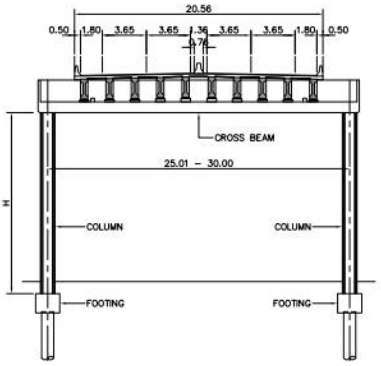


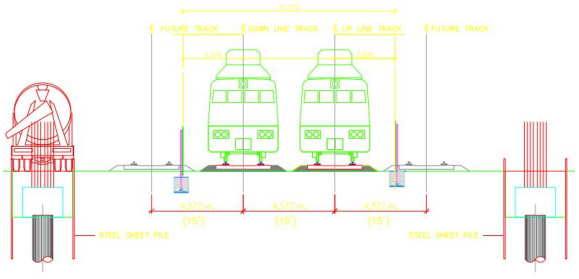
5.32 RD-TMP 31 (STA.12+421m TO STA.12+943m)

This drawing sheet shows the work zone between STA.12+421 to STA.12+943 On Main Route. Most of the work zone is set outside the main road-Pantra Path Road, still maintain 6 lane road, except some port of this road will be reduced from 6 Lanes (3 in each direction) to 4 lanes (2 in each direction), but the work zone is set within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.



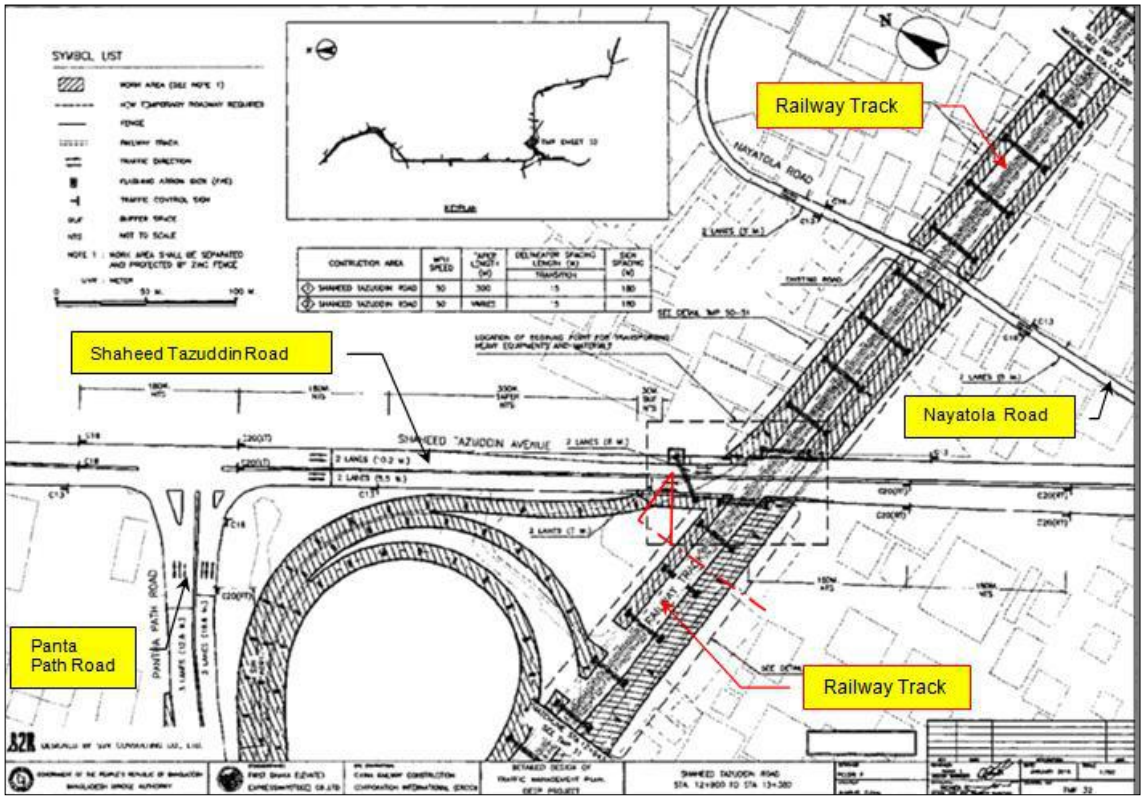


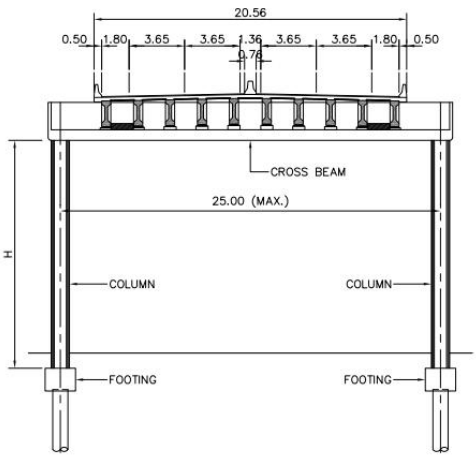


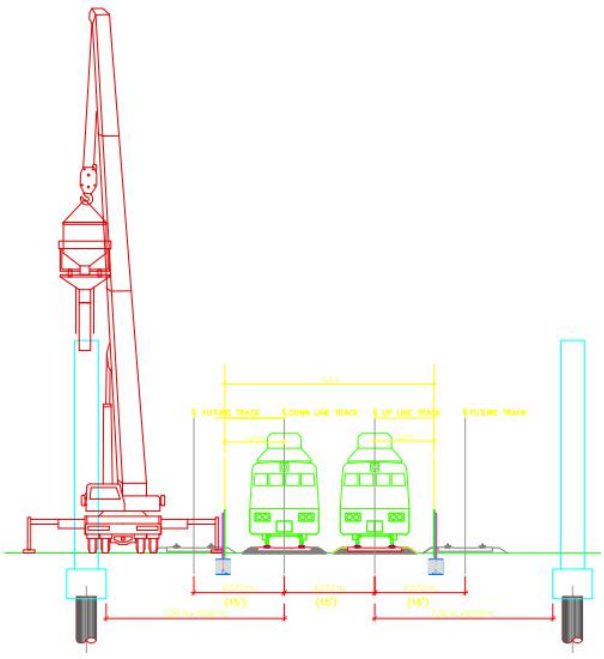


5.33 RD-TMP 32 (STA.12+943m TO STA.13+380m)

This drawing sheet shows the work zone between STA.12+943 to STA.13+380 On Main Route. Most of the work zone is set outside the main road-Shaheed Tazuddin Road, still maintain 4 Lane road, but the work zone is set within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

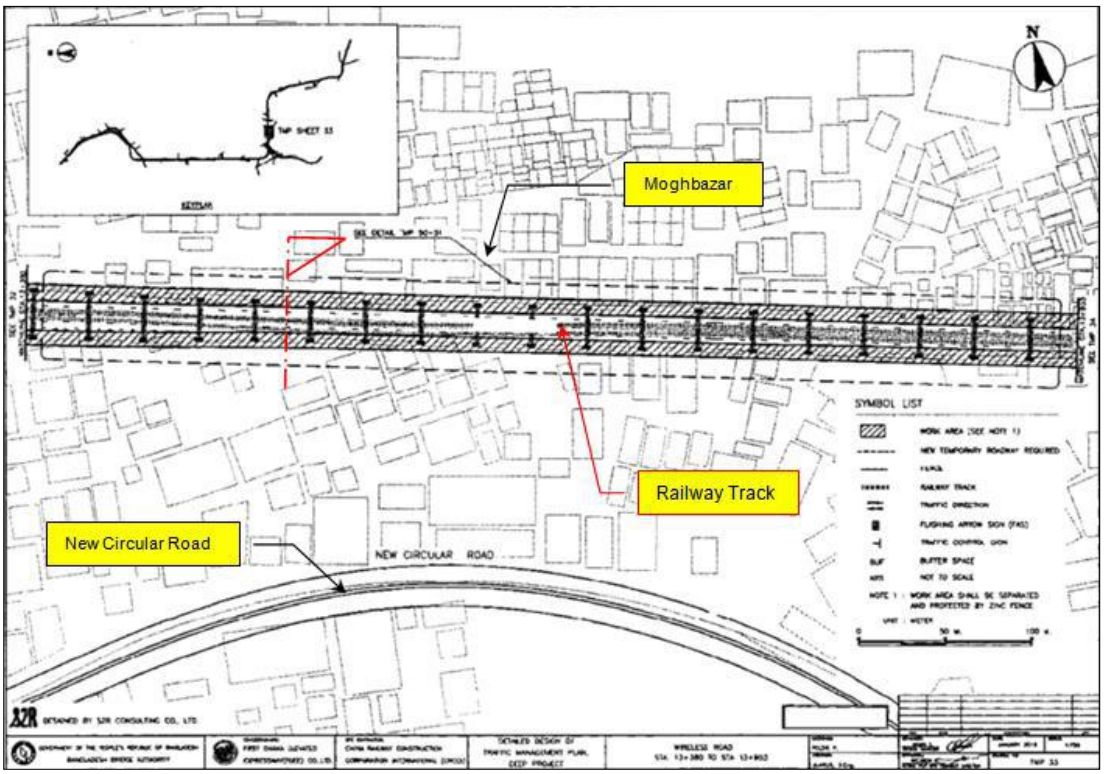


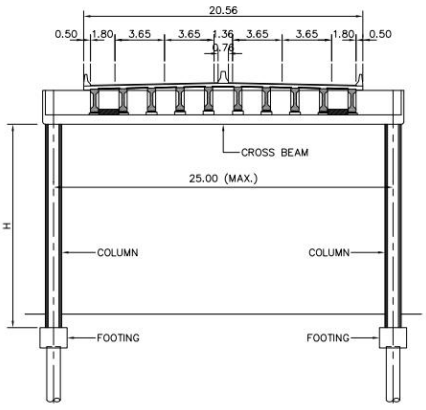


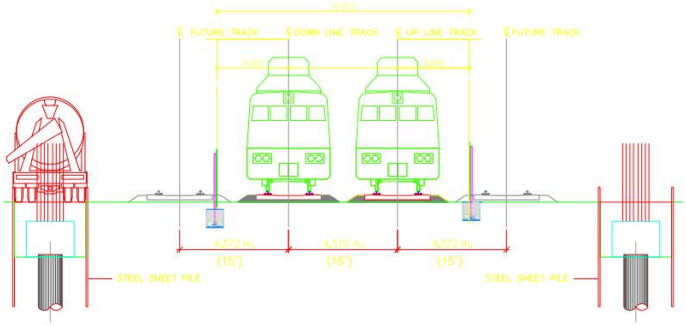


5.34 RD-TMP 33 (STA.13+380m TO STA.13+903m)

This drawing sheet shows the work zone between STA. 13+380 to STA. 13+903 On Main Route. The work zone is set outside the main roads, but the work zone is set within the train track area. However, setting up a proper work zone within the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

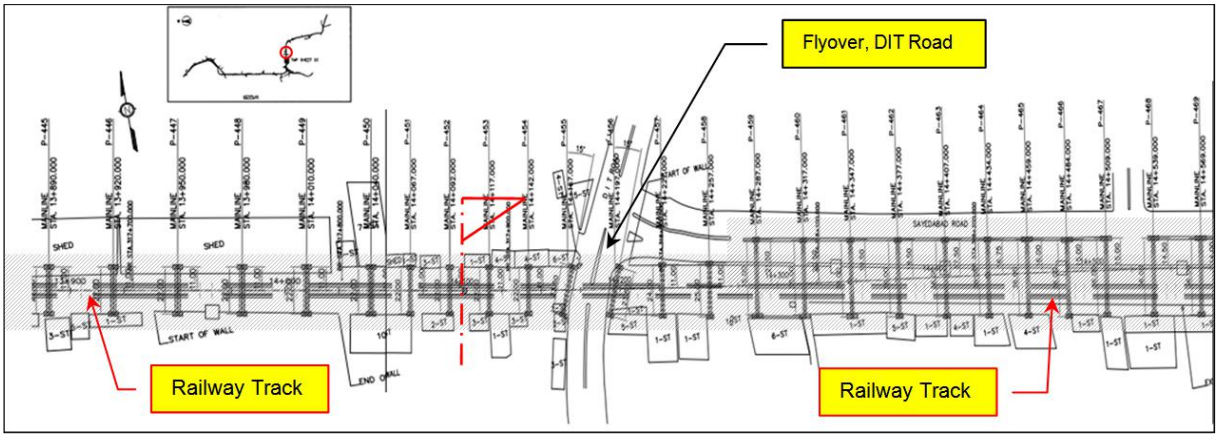


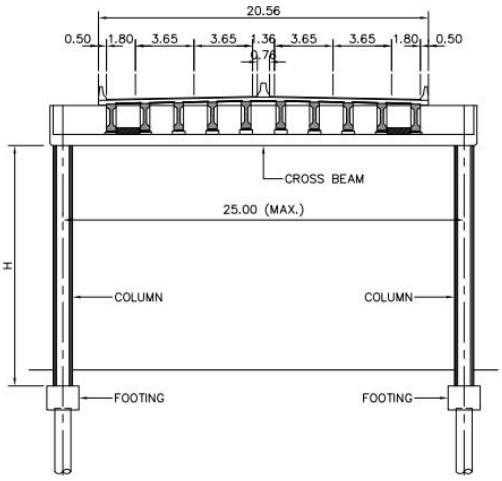


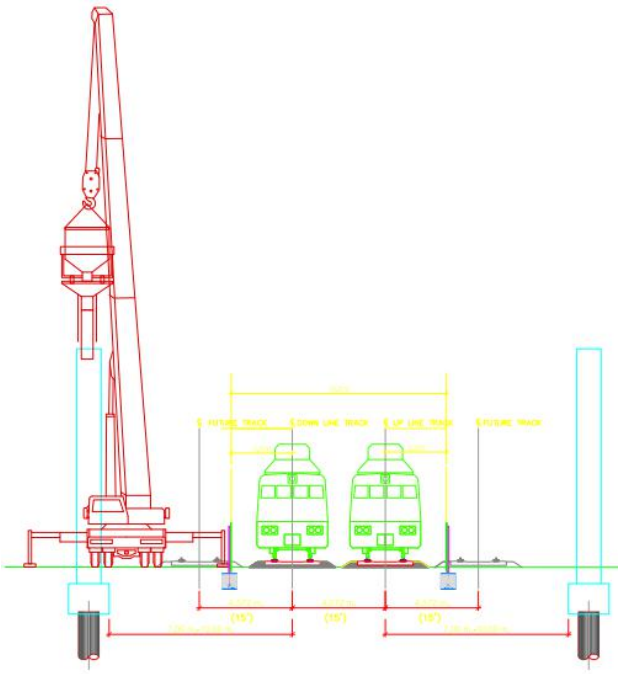


5.35 RD-TMP 34 (STA.13+903m TO STA.14+569m)

This drawing sheet shows the work zone between STA.13+903 to STA.14+569 On Main Route. Most of the work zone is set outside the main road, but within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

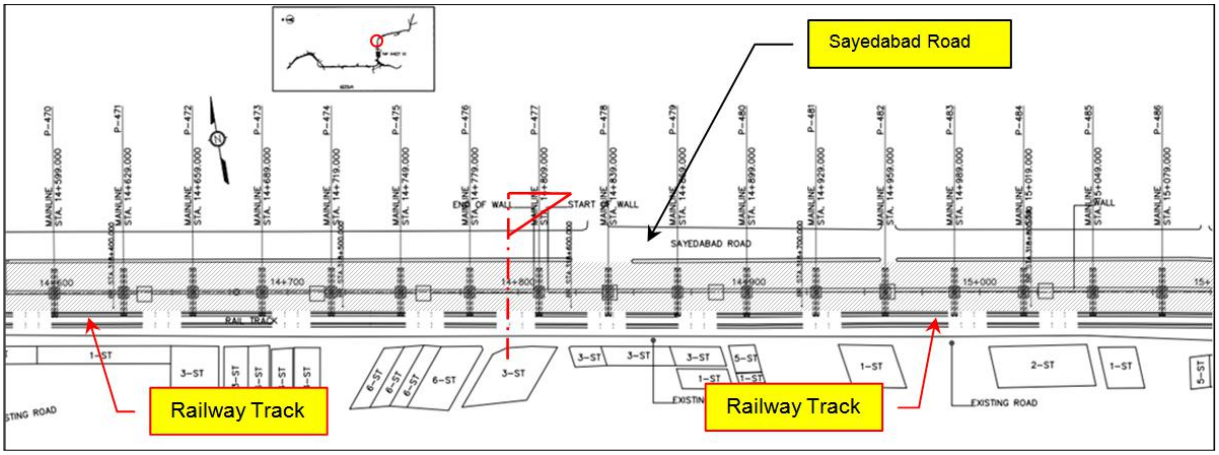


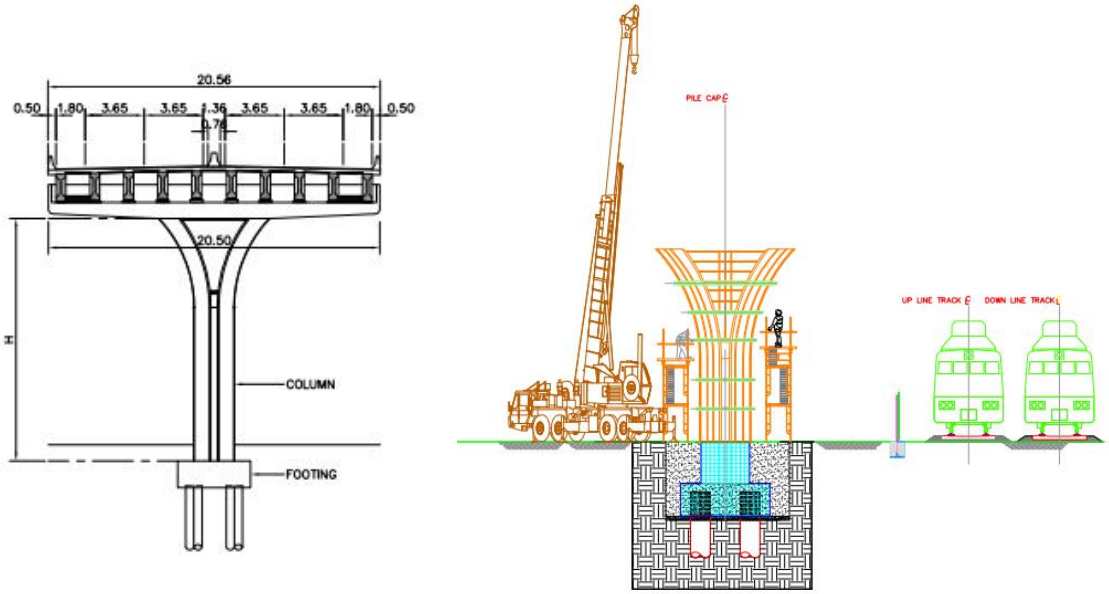




5.36 RD-TMP 35 (STA.14+569m TO STA.15+079m)

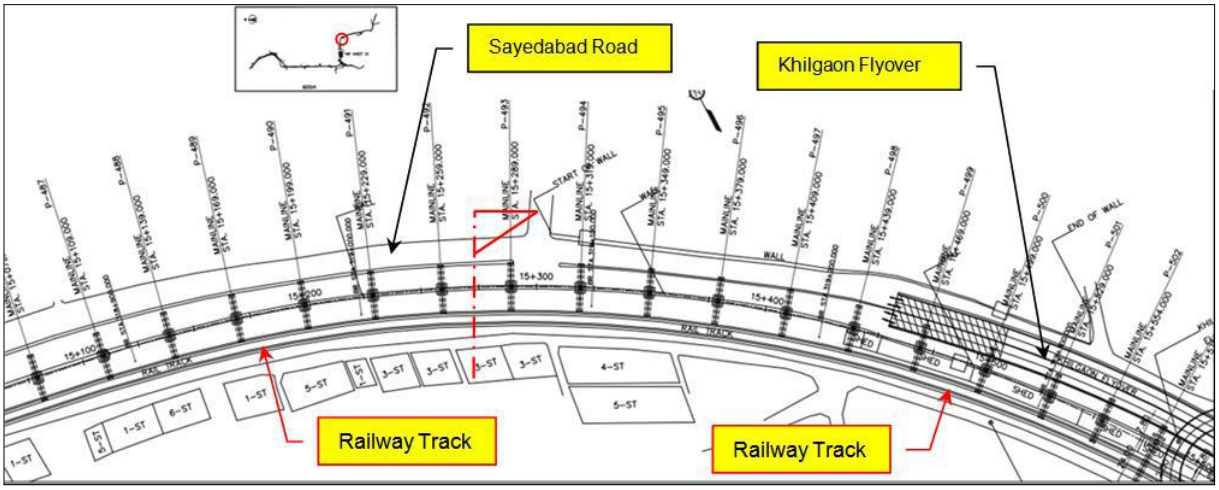
This drawing sheet shows the work zone between STA. 14+569 to STA.15+079 along Sayedabad Road. Therefore Sayedabad Road will be reduced from 6 Lanes (3 Lanes in each direction) to 4 lanes (2 Lanes in each direction) However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.

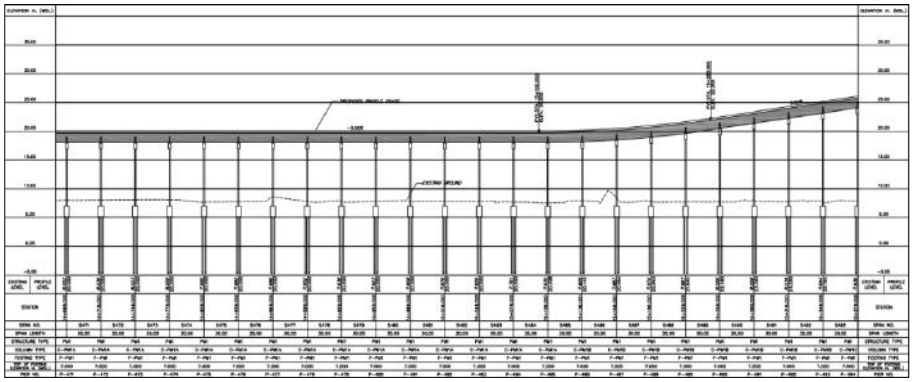


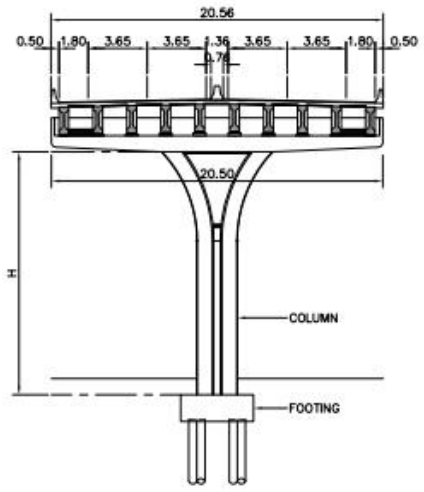


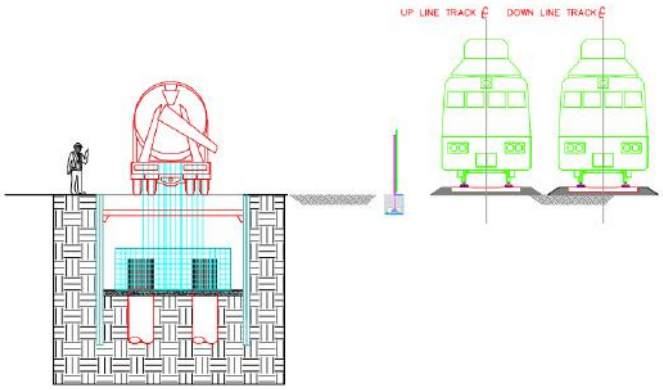
5.37 RD-TMP 36 (STA.15+079m TO STA.15+554m)

This drawing sheet shows the work zone between STA. 14+569 to STA.15+079 along Sayedabad Road. Therefore Sayedabad Road will be reduced from 6 Lanes (3 Lanes in each direction) to 4 lanes (2 Lanes in each direction) However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



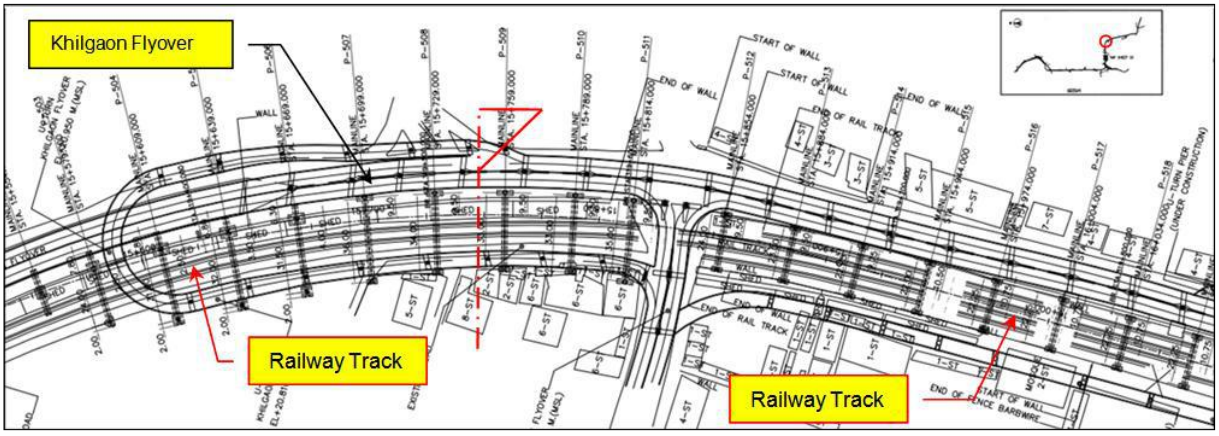


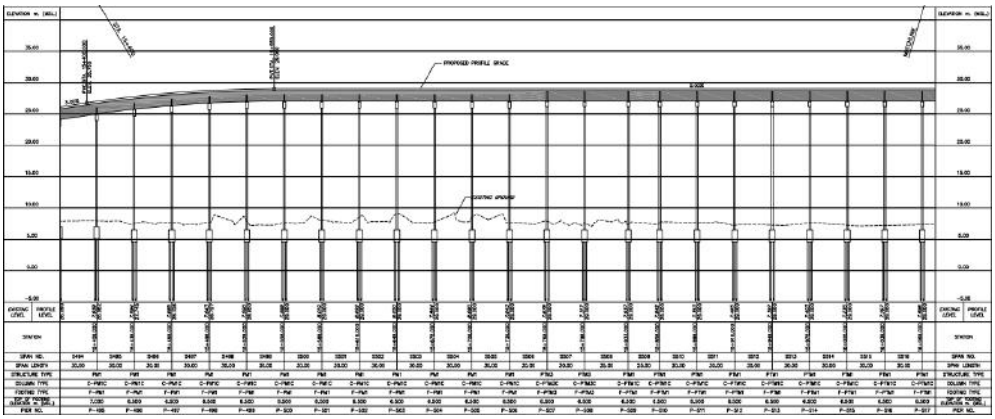


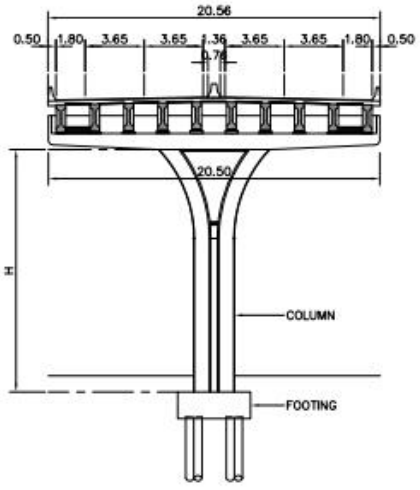


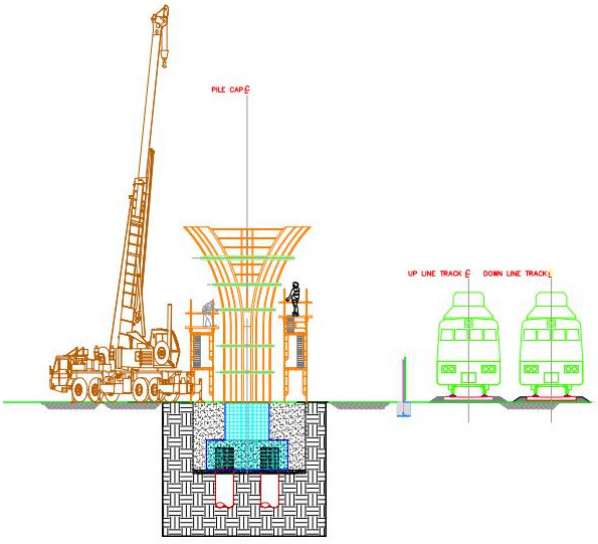
5.38 RD-TMP 37 (STA.15+554m TO STA.16+034m)

This drawing sheet shows the work zone between STA.15+554 to STA.16+034. Most of the work zone is set along Sayedabad Road. Therefore Sayedabad Road will be reduced from 6 Lanes (3 Lanes in each direction) to 4 lanes (2 Lanes in each direction) However, setting up a proper work zone within the Khilgaon Flyover, main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



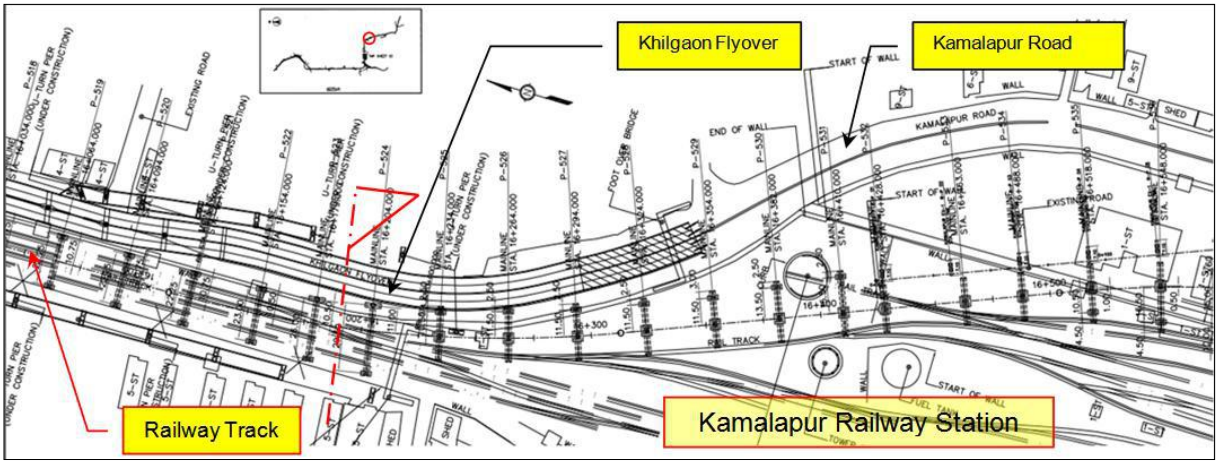


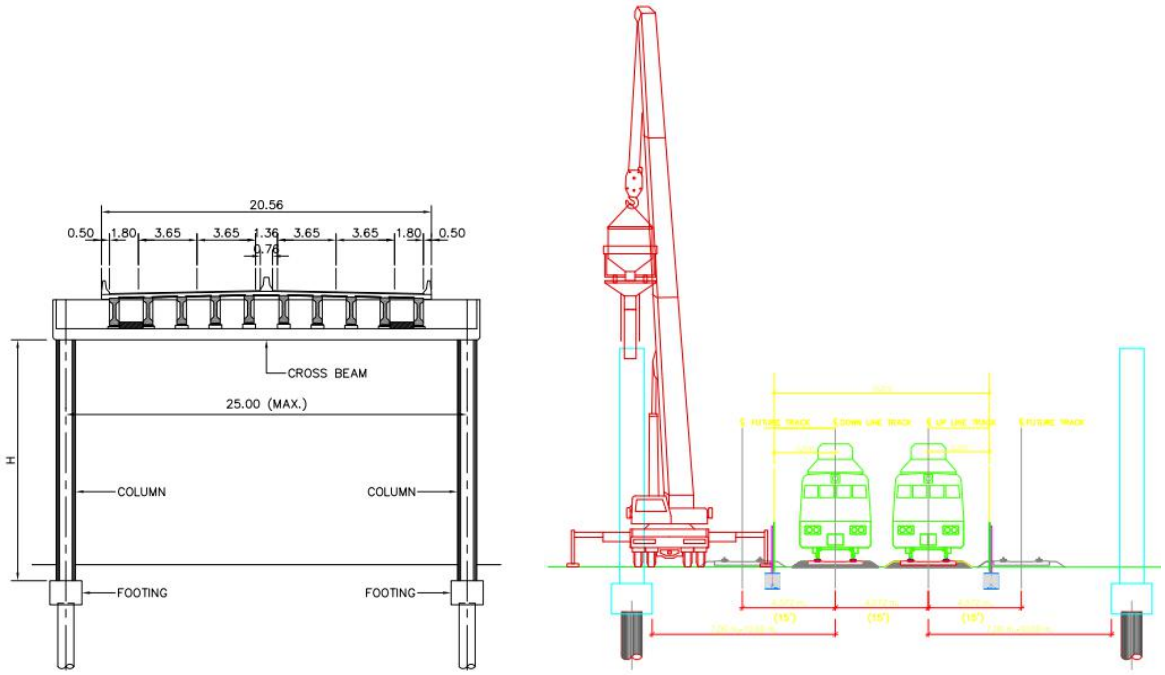




5.39 RD-TMP 38 (STA.16+034m TO STA.16+548m)

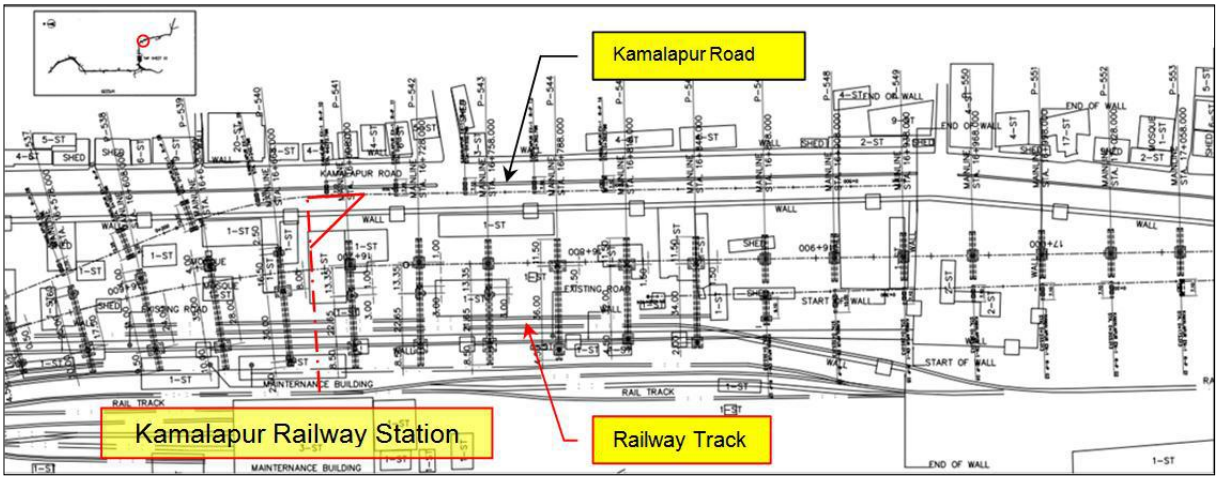
This drawing sheet shows the work zone between STA.16+034 to STA.16+548 On Main Route. Most of the work zone is set outside the main road, but within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

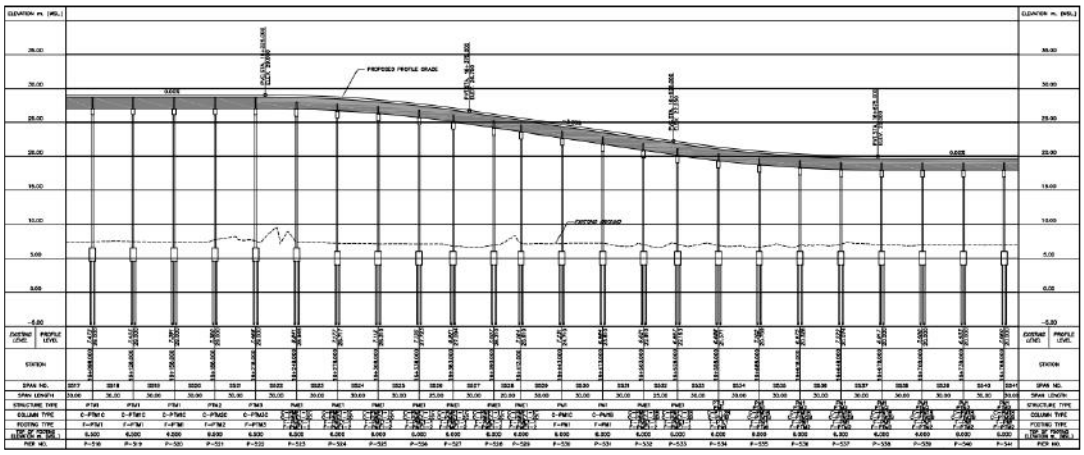


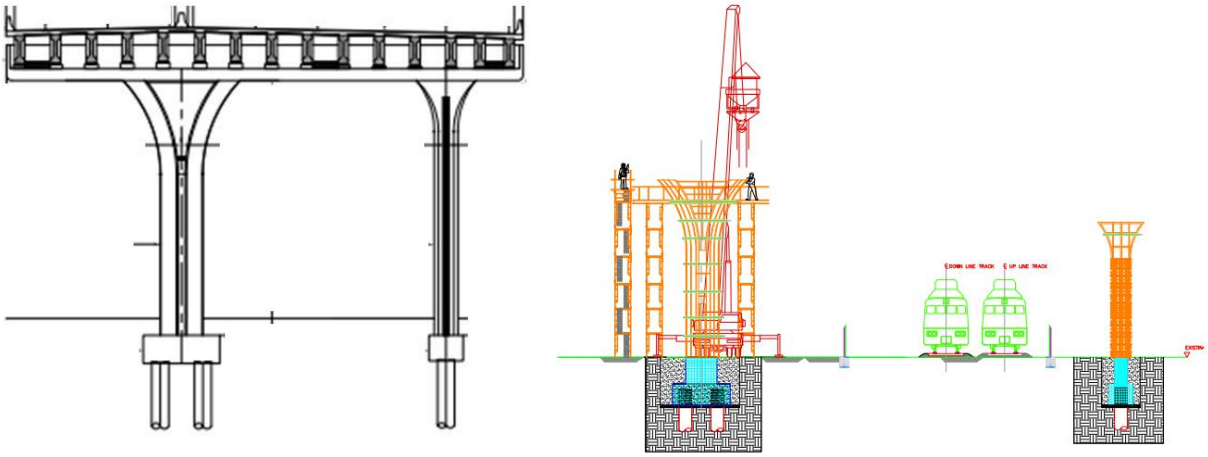


5.40 RD-TMP 39 (STA.16+548m TO STA.17+058m)

This drawing sheet shows the work zone between STA.16+548 to STA.17+058 On Main Route. Most of the work zone is set outside the main road, but within the train track area. However, setting up a proper work zone within the side streets and the train traffic track area will need to be done in order to ensure the traffic/train safety during the construction of this project. See details in Chapter 6 for setting up the work zone for proper and safe train traffic operation.

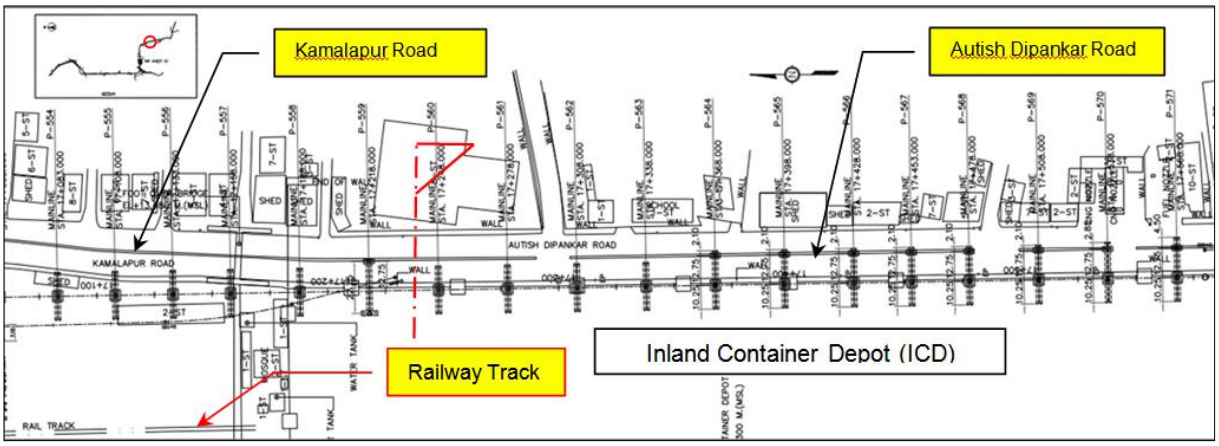


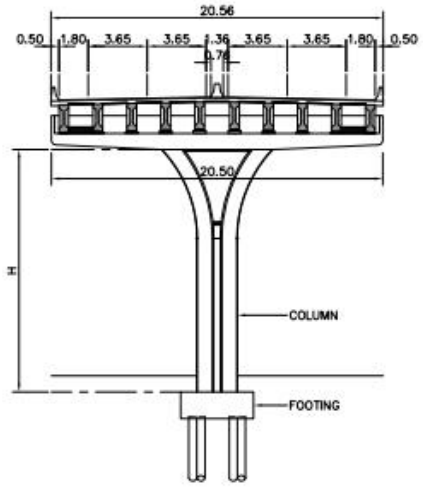


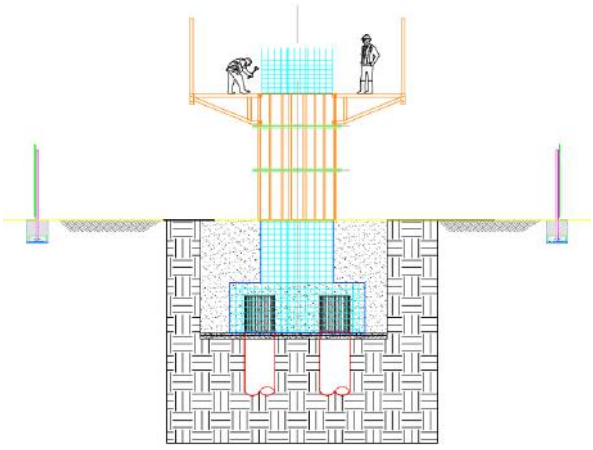


5.41 RD-TMP 40 (STA.17+058m TO STA.17+568m)

This drawing sheet shows the work zone between STA.17+058 to STA.17+568. Most of the work zone is set along Autish Dipankar Road. Therefore Autish Dipankar Road will be reduced from 6 Lanes (3 Lanes in each direction) to 4 lanes (2 Lanes in each direction) However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project.



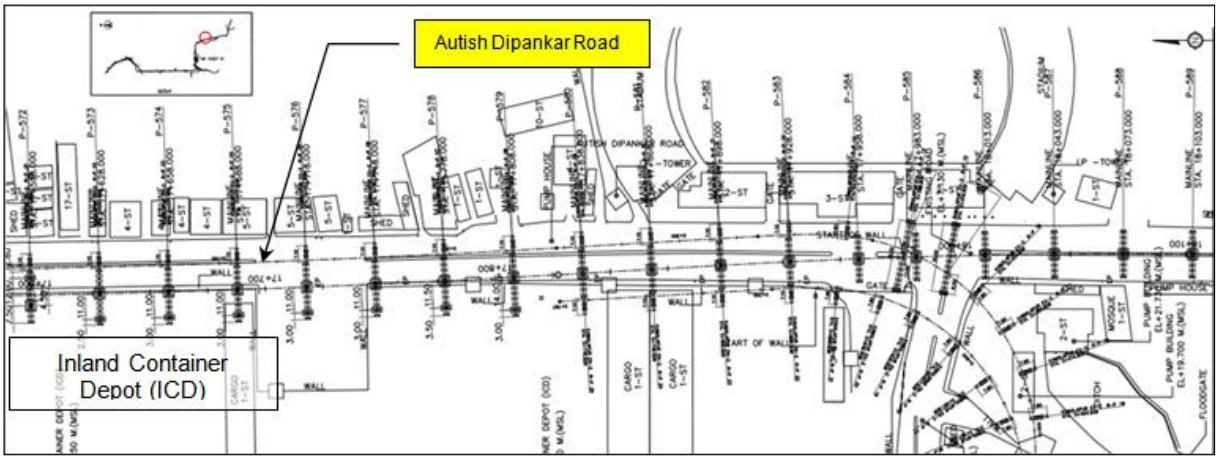




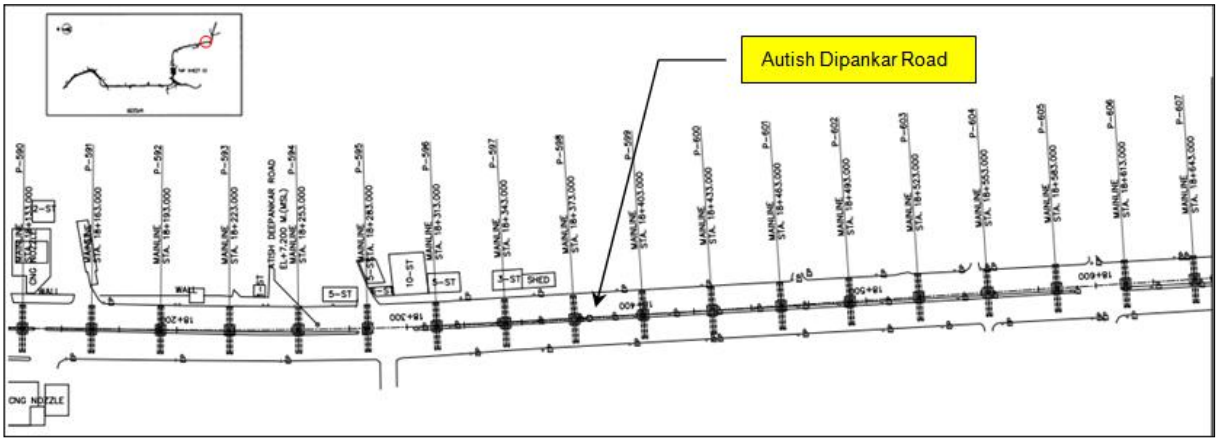
5.42 STA.17+568m TO STA.19+155m

These drawing sheets show the work zone between STA.17+568 to STA.19+155. Most of the work zone are set along Autish Dipankar Road. Therefore Autish Dipankar Road will be reduced from 6 Lanes (3 Lanes in each direction) to 4 lanes (2 Lanes in each direction). However, setting up a proper work zone within the main and side streets will need to be done in order to ensure the traffic safety during the construction of this project. The work zone is set outside the Railway Track. Therefore the BR's train traffic operation will not be affected according to this work zone.

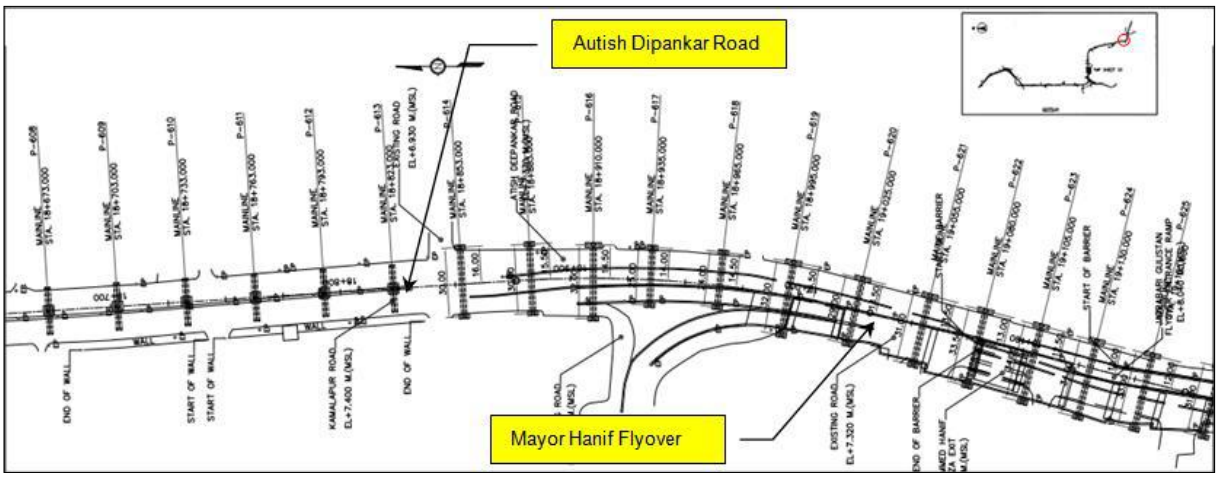
STA.17+568m TO STA.18+103m



STA.18+103m TO STA.18+643m



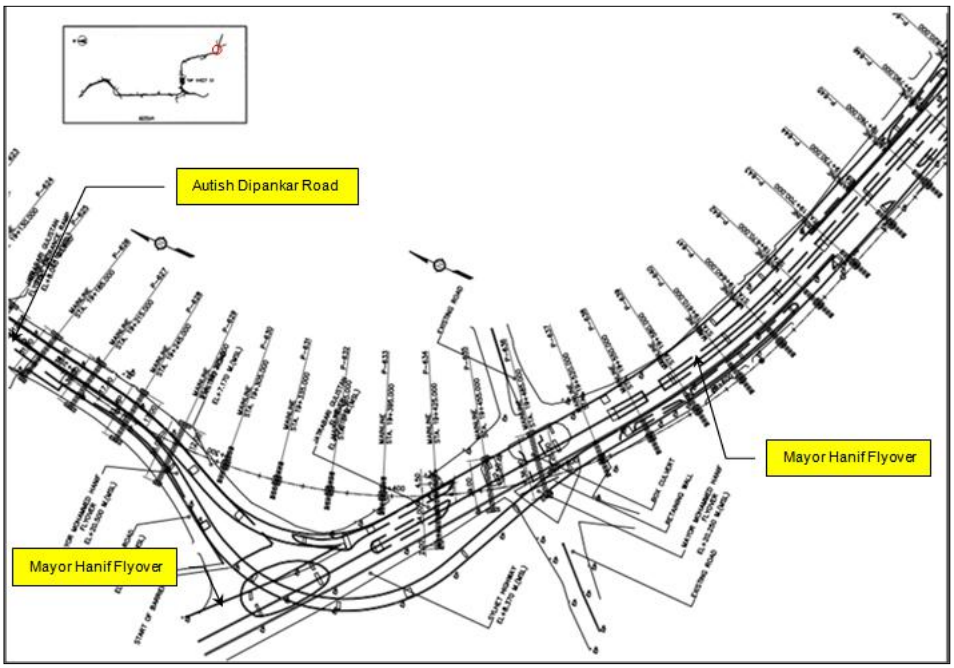
STA.18+643m TO STA.19+155m



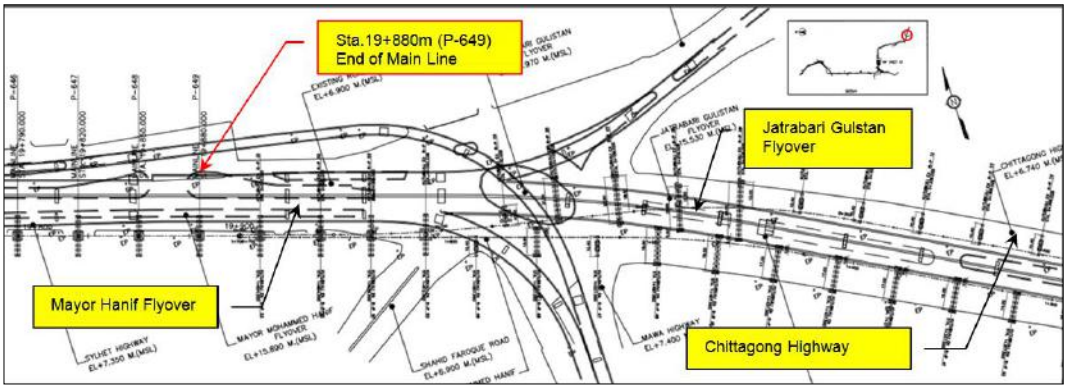
5.43 STA.19+155m TO STA.19+725m (End of Main Line)

This drawing sheet shows the work zone between STA.19+155 to STA.19+725. Most of the work zone is set along Autish Dipankar Road and Mayor Hanif Flyover. Therefore Autish Dipankar will be reduced from 6 Lanes (3 Lanes in each direction) to 4 lanes (2 Lanes in each direction) However, setting up a proper work zone within the Mayor Hanif Flyover, main and side streets upto end of main line to Kutubkhali Ramp – Chittagong Highway (End of Project) will need to be done in order to ensure the traffic safety during the construction of this project.

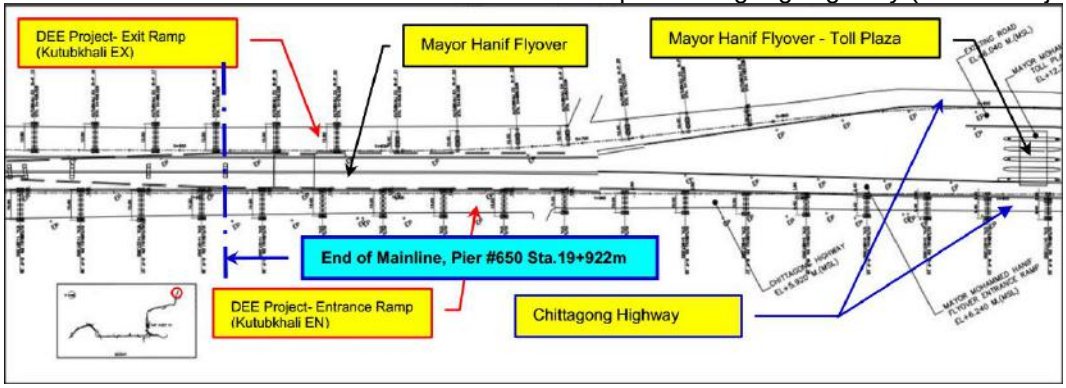
STA.19+155m TO STA.19+790m



STA.19+155m TO STA.19+880m End of Main Line

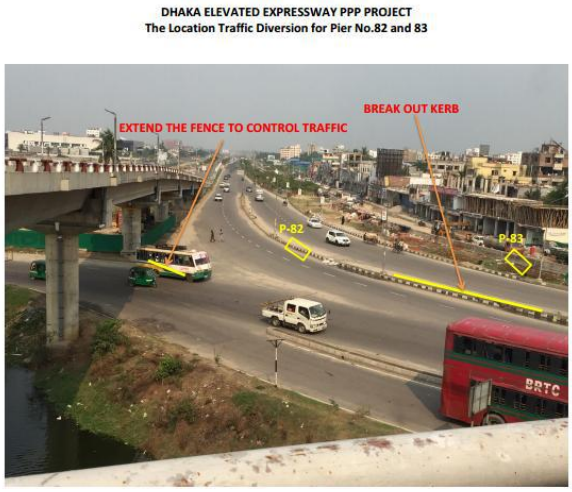


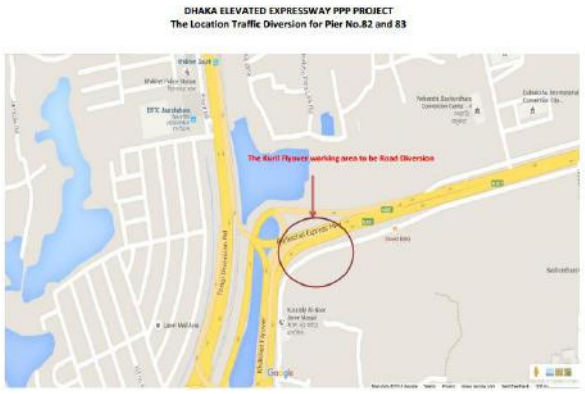
STA.19+880m End of Main Line TO Kutubkhali Ramp – Chittagong Highway (End of Project)

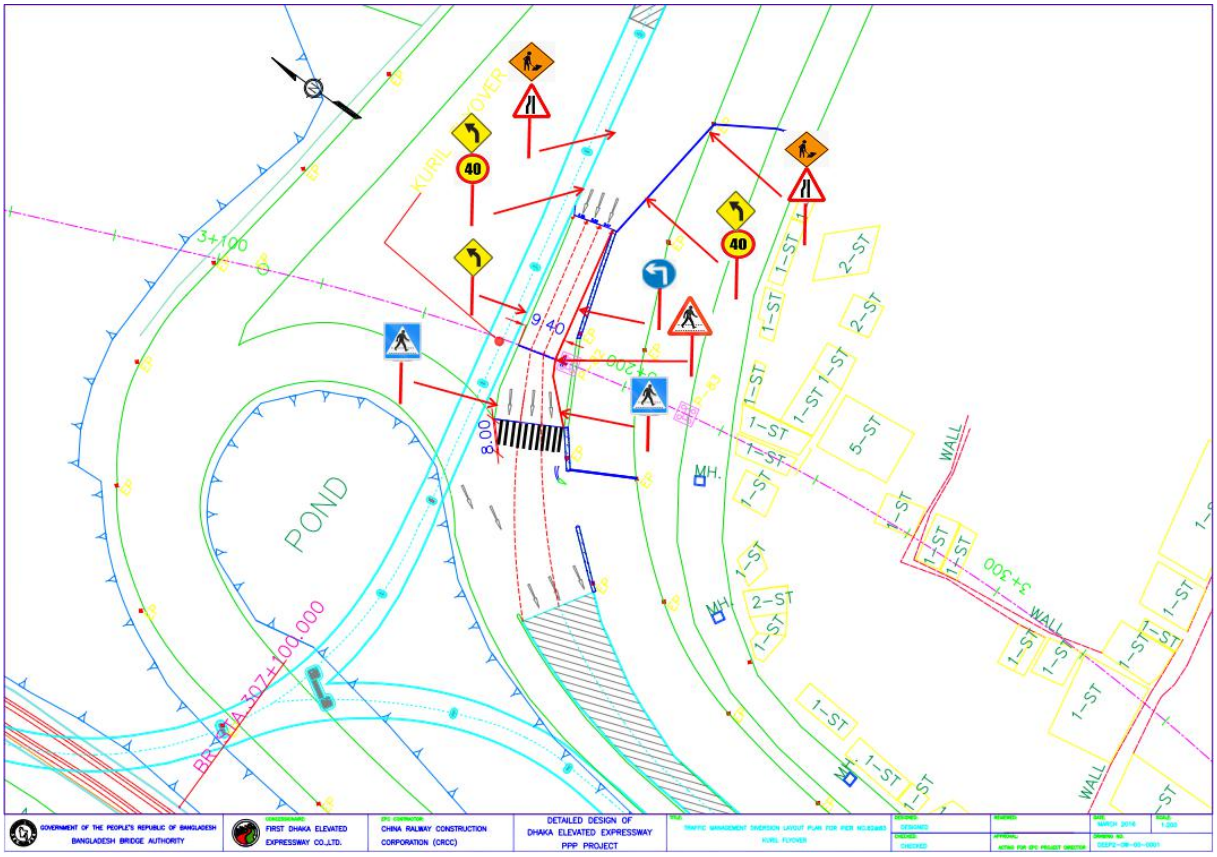


Summary:

FDEE and EPC Contractor agreed with IE and BBA's Safety Consultant on previous comments and confirmed that the drawings included in this document are subject to review and the updated drawings (Sub-Plans) based on the final design of Structure and Alignment will be issued in advance of the commencement of the construction activities to all concerned parties.



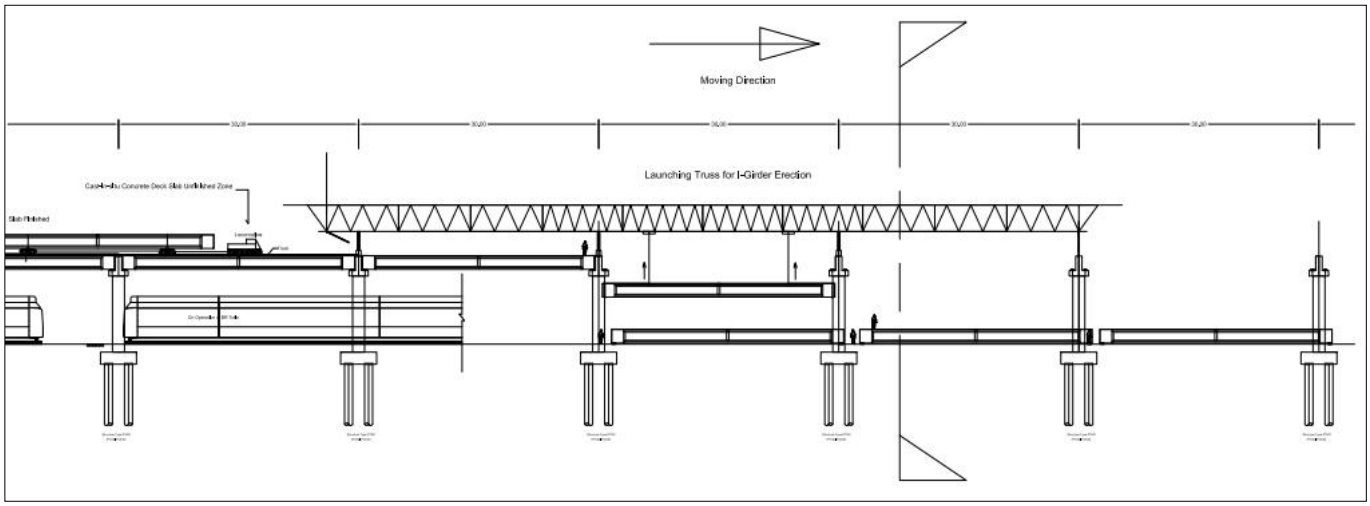




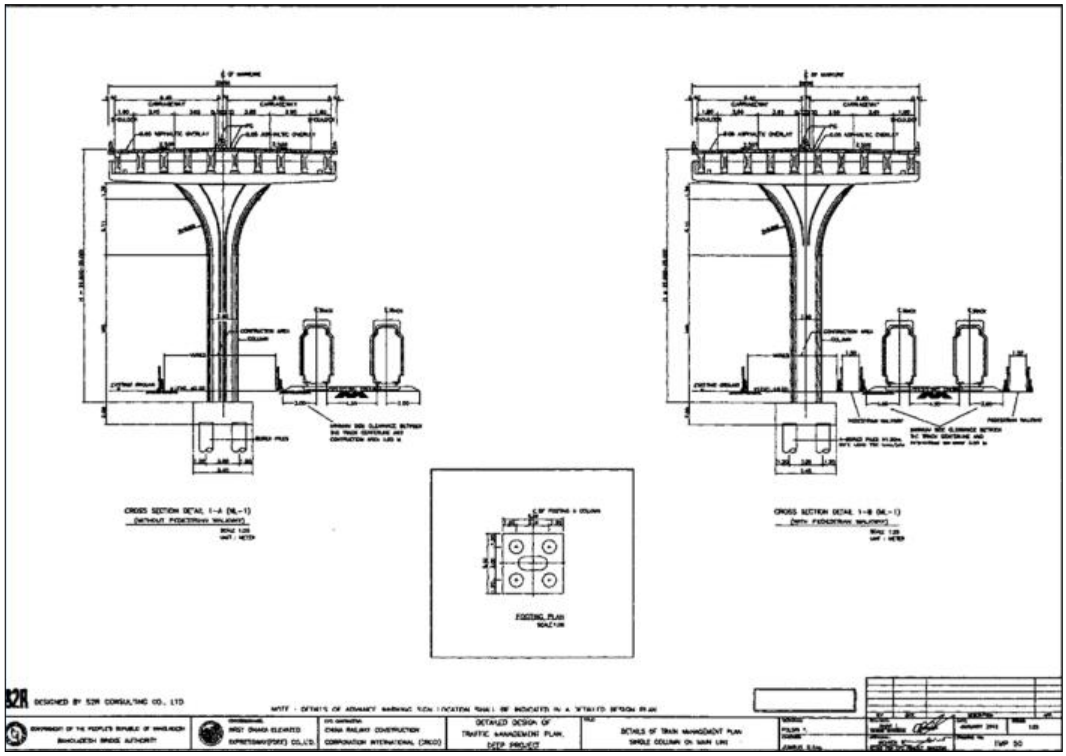
Sub-Plan of Traffic Management Plan in specific construction area at Kuril Flyover
(Construction Bored Pile at Pier No.82 and Pier No.83)

6 Across the Railway Construction Plan:

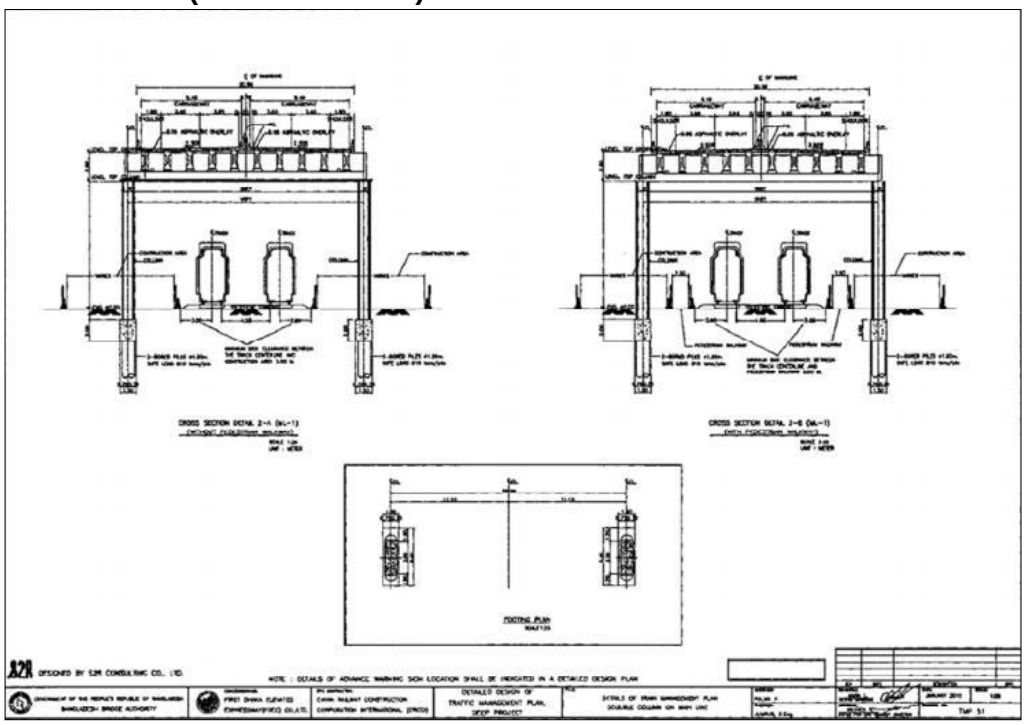
- Horizontal clearance 3.00m as per BR's approval will be obtained for this temporary condition. (details please refer to: FDEE/DEE/TMP-002 "Railway Traffic Management Plan")



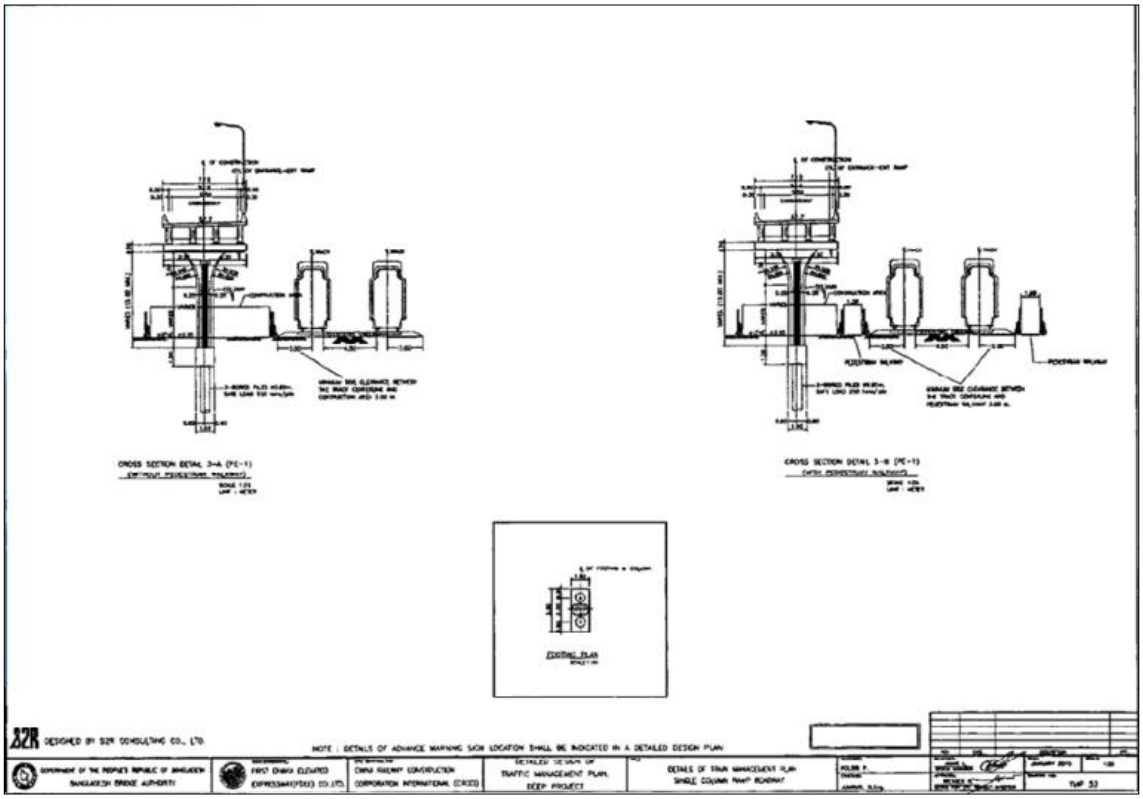
6.1 Single Column On Main Line

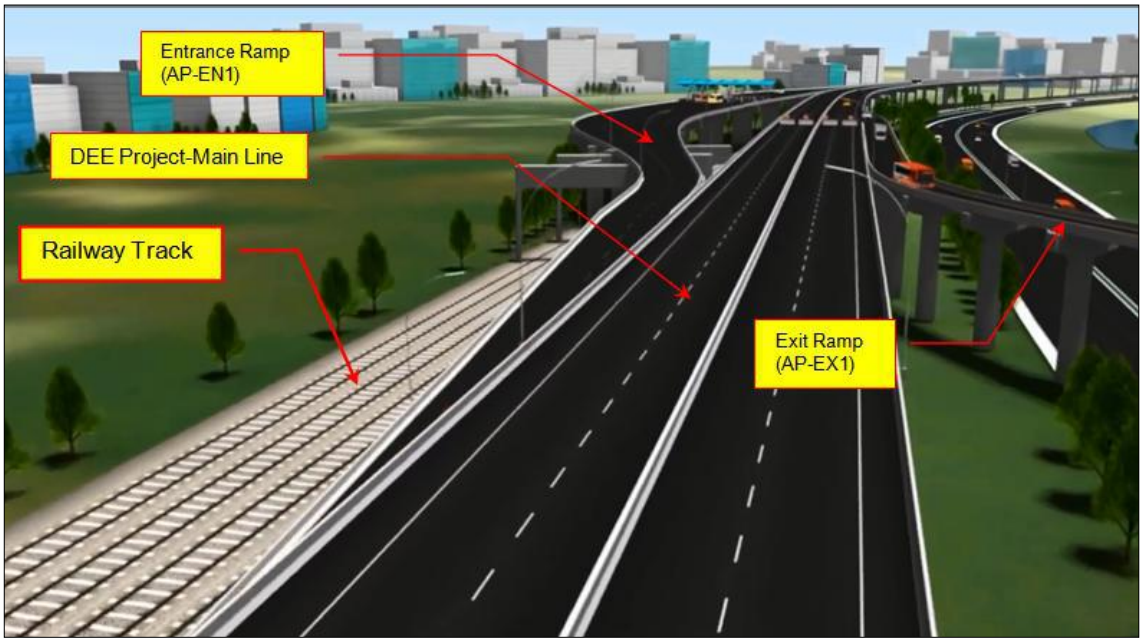


6.2 Portal Frame (Double Column) On Main Line



6.3 Single Column On Ramp





Conceptual Model: Sta.0+830m to Sta.1+574m

Conceptual I-Girder Installation by Launching Truss

7 Safety Overview, Detour and Steps during Construction Plan:

7.1 Safety Overview

It is well aware that the safety of the workmen and the public must be prevented from any accident as far as possible. Therefore, during the period of construction, the Temporary Traffic Management measures are relevant to ensure the safety of all the workmen, the public including the Third Parties involved in the construction works.

The prime responsibility is to establish the Temporary Traffic Control (TC) Zones in the vicinity to the Construction Areas where safe and efficient movement of road users through or around the zones can be ensured. In addition, the TC Zones will also provide reasonably safety or protection the workmen and equipment working within Zones from any traffic incidents. As such, the efficiency of Train's Traffic Operation Flow is an integral element of every TC zone, from planning through completion.

The Road Traffic Management Plan should be comprehensive and should take into account of the following criteria and procedures:

- Basic safety principles, the goal shall be to road users through Temporary Traffic Control Zones which have safety devices as comparable as possible, to those for normal railway traffic conditions.

- Trained Staffs and Managers should be assigned responsibility for safety in Temporary Traffic Control Zones. All the Traffic Safety Devices shall be provided and maintained efficiently to ensure reasonably of safety conditions for road users and workmen etc.

- As the work progresses, temporary traffic controls and/or working conditions should be modified in order to provide reasonably safe and efficient train traffic operation movement at all time.

- Traffic Control Zones, once established, should be carefully monitored under varying conditions of train traffic, road users – volumes, light and weather conditions. The traffic control devices shall be efficient, clearly visible, clean etc.

- If necessary, an engineering study might be made (in cooperation with concerned BBA's officials) of any reported accidents occurring within the Traffic Control Zone. Any accident within the TC zones should be monitored to evaluate for adequacy of the plan.

- Adequate warning signs, guide signs, directional signs should be provided to assist in guiding of road users, people, workmen in advance of and through the TC zone.

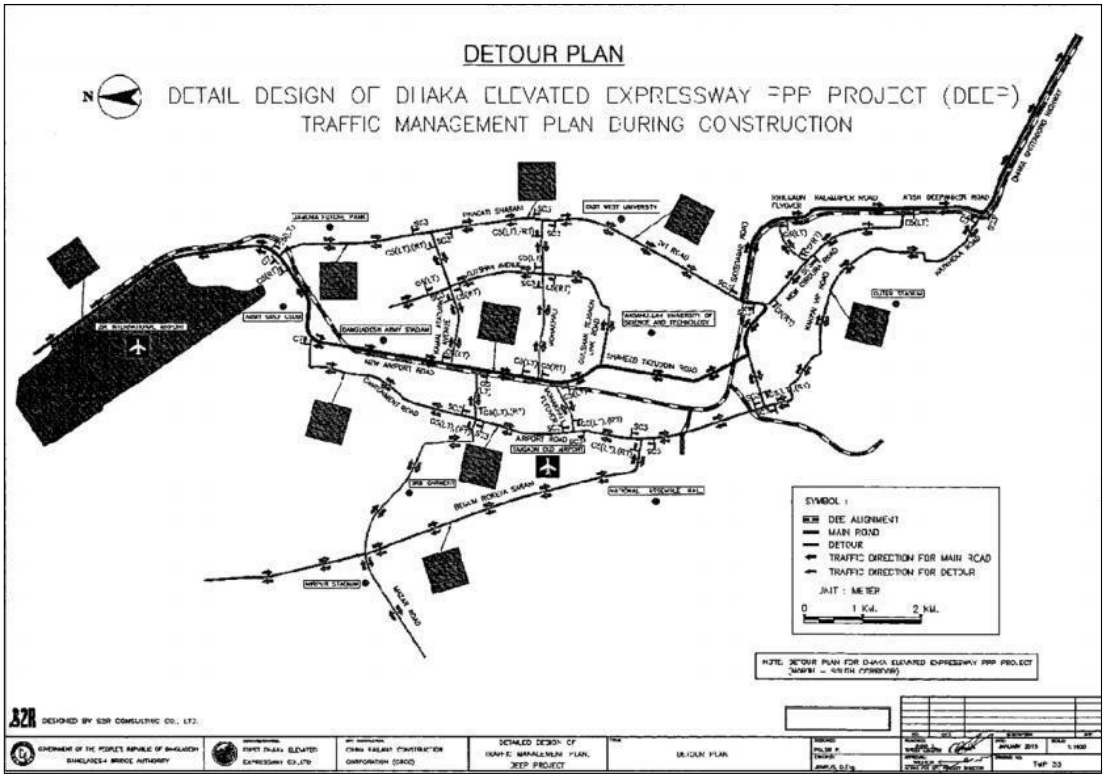
- Flagging procedures, when used, should provide positive guidance to train operator, road users, workmen etc.

- Access roads to construction area should be accomplished and keep under control by safety regulation, warning, signing and detectable guiding devices.

- Working equipment, workmen private vehicles, materials and debris should be stored in such a manner to reduce the probability of being impacted by run-off the road vehicles and railway / train operation.

- Traffic management manager, BBA's co-ordination officer and EPC's staffs will be available for train traffic coordination and control, 24 hours a day, for the entire construction period of the project during construction will be affected according to Railway & Road Traffic Control Zone.

7.2 Detour Plan



7.2.1 Surveys

- Conduct site survey to obtain the following information:
  - Bus stop location
  - Locations of conflicting traffic streams; and
  - Bottleneck stops.

- Conduct traffic volume survey of relevant routes and intersections to determine the following:
  - Number of turning movement
  - Daily average and peak-hour traffic counts at road mid-block; and
  - Composition of vehicles on the roads within the project influence zone.

7.2.2 Construction Impact Evaluation:

An impact evaluation, especially construction on Mainline Tranche 3, Ramps and Sonargaon Link due to most of the construction is on Public Road. The establishing a mitigation solution for the traffic management plan for part of the traffic area will be occupied by the construction activities that cause congestion and lost time. A detailed impact study will be carried out as follows;

- Investigation survey of the project surrounding areas

  The physical survey affected by the project as the followings;

  - The possible detour route and its capacity
  - Details of roadways within the network; mid-block survey, number of lanes of each direction, shoulder width, median type and width, and sidewalk width
  - Layout geometry of intersections and current traffic operation
  - Bus stop locations especially ones that have significant impact
  - Flyover bridges, pedestrian bridges, cross-walk and traffic signal system
  - Road Network bottle necks and narrow bridges
  - Business or office building and side streets that have significant numbers of vehicles

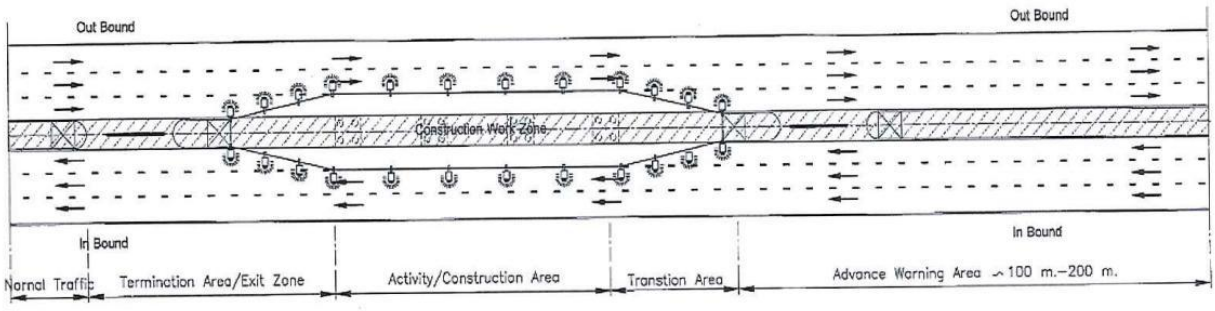
- When the traffic volume is over the capacity for a particular roadway, congestion will occur. To minimize the impact during the construction where one lane one each side will be occupied by the construction areas, a reversible lane may be arranged since the morning rush hour inbound traffic is usually higher than the daytime or evening.

- Night or Weekend Working Period:

  There are times that traffic lane(s) have to be closed during the construction and will severely impact the traffic flow capacity. In such case, in order to minimize the congestion of lane closure, Night work or Weekend work will be considered and be scheduled from 22.00 to 06.00 hour. Motorists will be notified and warned in advance regarding the construction schedule.

  Mobilizing of heavy equipment, I-Girder delivery to work site etc will be scheduled at night or during low traffic periods. The construction program, staging or sequencing will be planned and considered to insure the impact on the traffic is minimized.

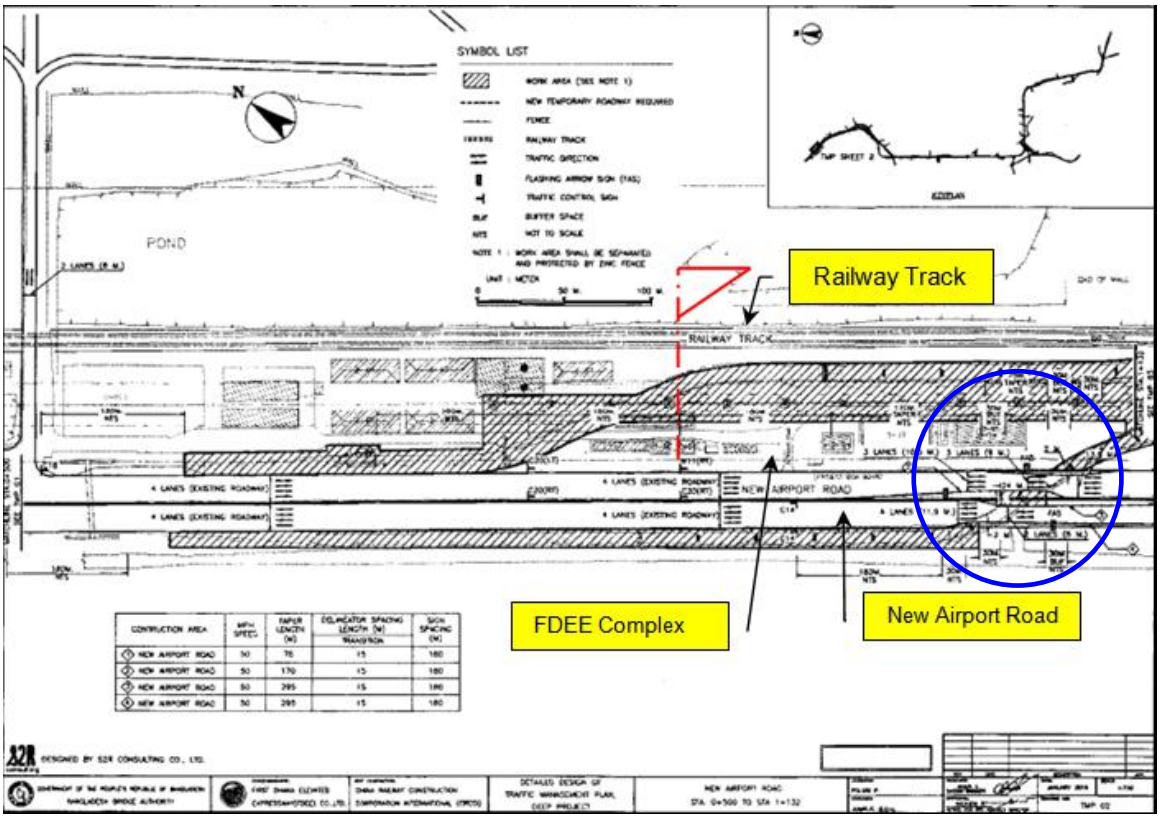
  Temporary lane closures permitted by relevant agencies will be done only at night and motorists will be informed prior to the actual works start.

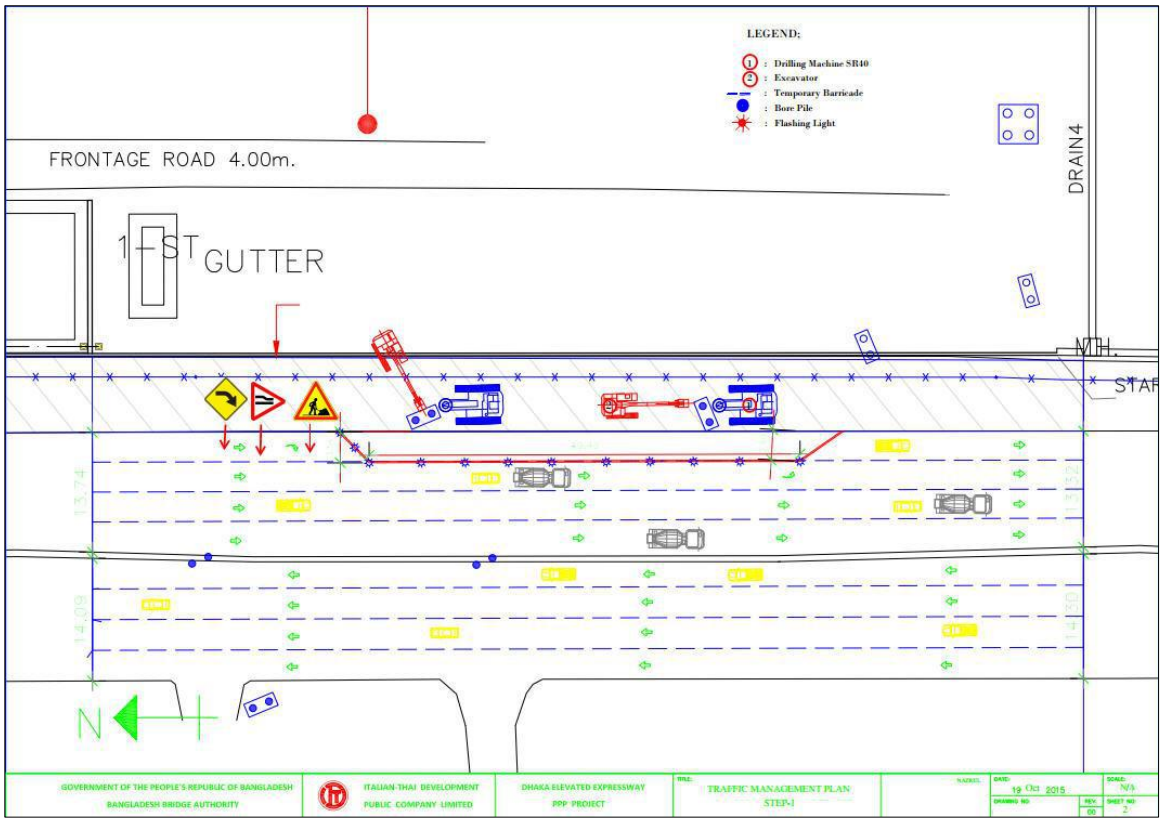


Typical Traffic Management in Construction Area

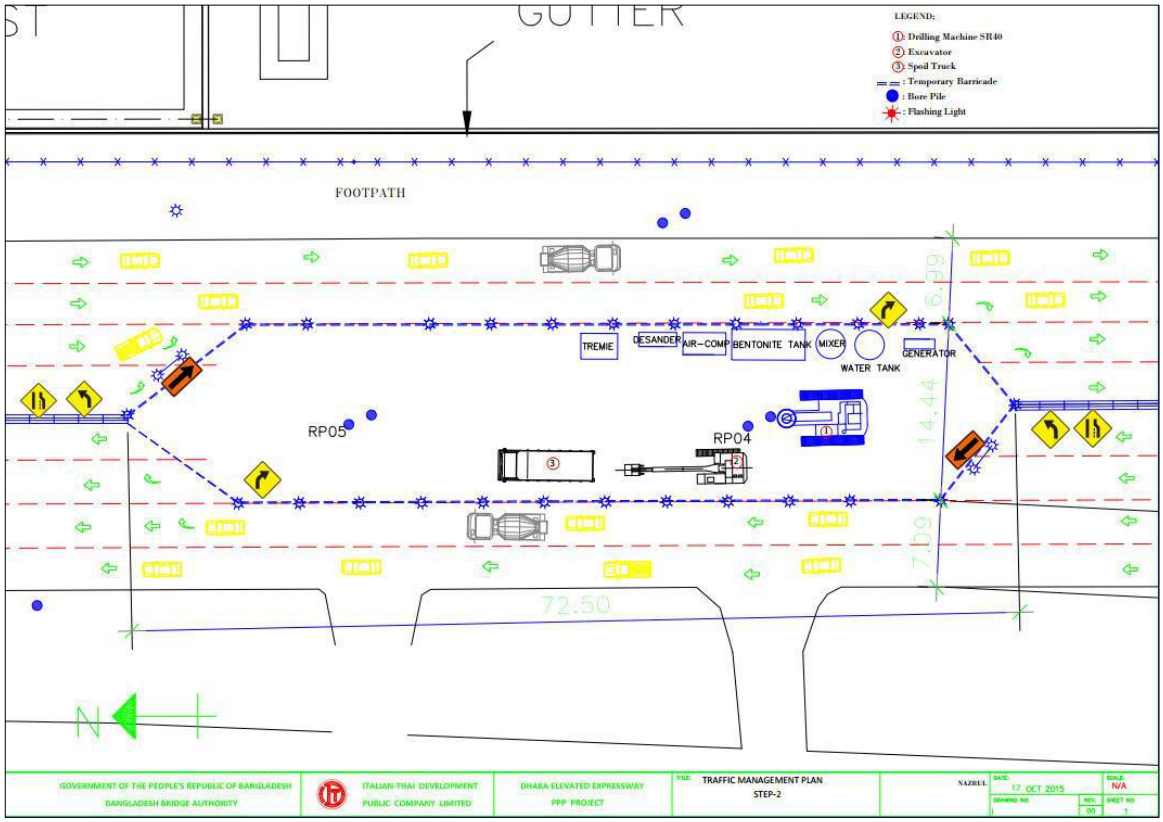
Sample of Detour Plan during Construction
ITD's Project in Bangkok (MRT Green Line Extension)

TMP's Sub-Plan of DEE Project Tranche 1:
Detour Plan during Construction: STA.0+500m TO STA.1+132m – Airport EX Ramp:

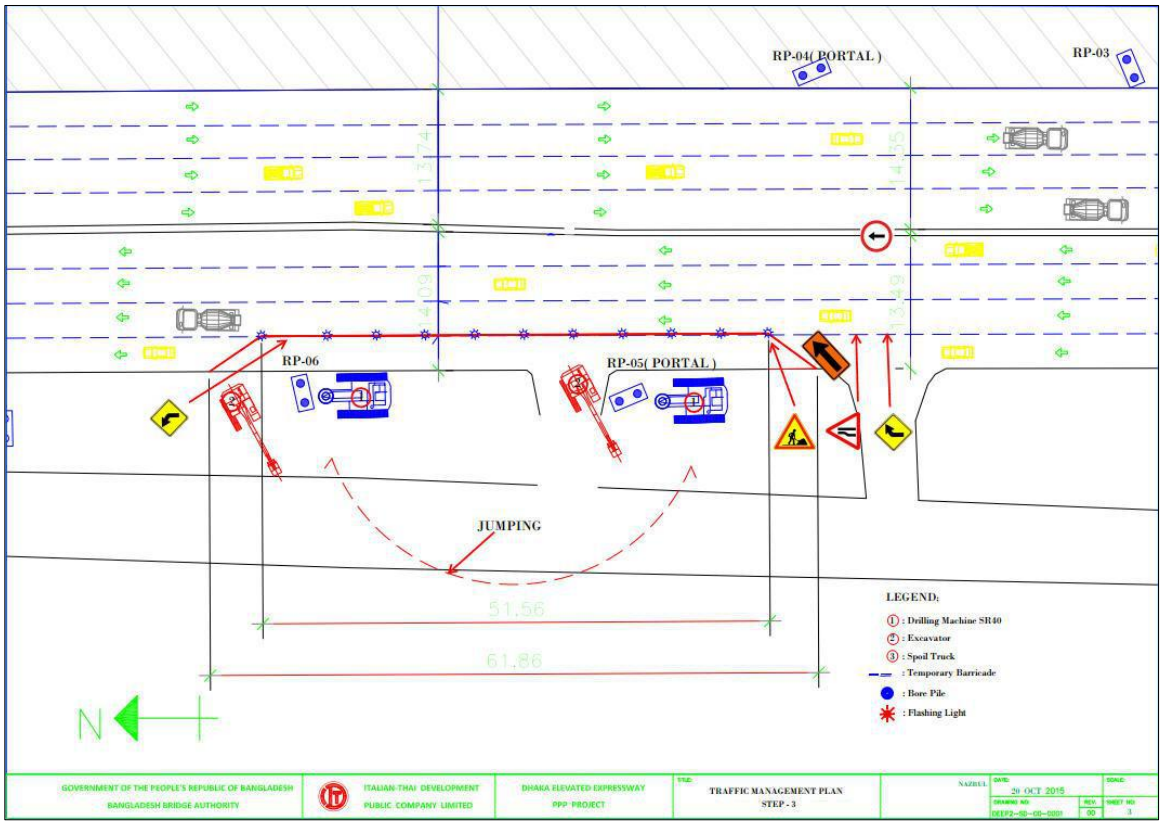




Detour Plan during Construction: Step 1



Detour Plan during Construction: Step 2



Detour Plan during Construction: Step 3

ATTACHMENTS

Exhibit-A : Outline Organization Structure

Exhibit-B : List of Abbreviations

Exhibit-C : Figure Summary and Tentative Schedule of DEE Project

Exhibit-A : OUTLINE ORGANIZATION STRUCTURE

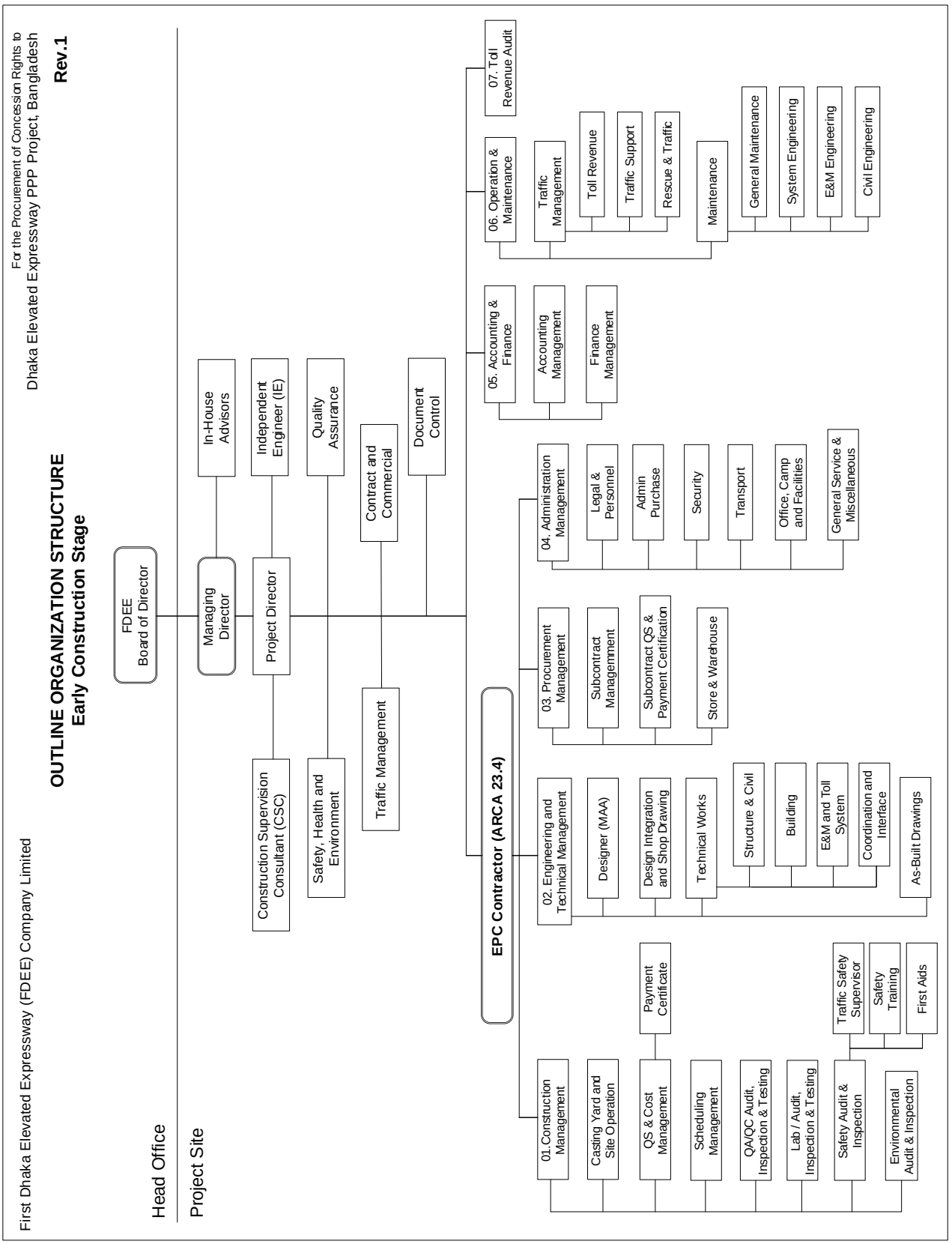


Exhibit-B : List of Abbreviations

Exhibit-B1: Abbreviations for Staff Identified in Railway Traffic Management Plan	
MD	Managing Director
IA	In-house Advisors
PD	Project Director
PM	Project Manager
SHE Manager	Safety, Health and Environment Manager
EPC Contractor	EPC Contractor's Responsible Manager/Engineer

Exhibit-B2: Abbreviations of the Relevant Authorities for Approval (ARCA Schedule 7)			
BB	Bangladesh Bank	DPDC	Dhaka Power Distribution Company
BBA	Bangladesh Bridge Authority	DPHE	Department of Public Health Engineering
BOI	Board of Investment	DTCA	Dhaka Transport Coordination Authority
		DTCB	Dhaka Transport Coordination Board
BPDB	Bangladesh Power Development Board	DWASA	Dhaka Water Supply and Sewerage Authority
BR	Bangladesh Railway	GOB	Government of Bangladesh
BRTA	Bangladesh Road Transport Authority	IRD	Internal Resources Division (M/O Finance)
BTCL	Bangladesh Telecommunication Company Ltd.	MOC	Ministry of Communications (is now Ministry of Road Transport & Bridges)
BTRC	Bangladesh Telecommunication Regulatory Commission	MOEF	Ministry of Environment and Forestry
CCIE	Chief Controller of Imports & Exports	MOF	Ministry of Finance
CI	Controller of Insurance	MOHA	Ministry of Home Affairs
DCC	Dhaka City Corporation	MOI	Ministry of Industries
DESCO	Dhaka Electricity Supply Company	MOPT	Ministry of Post & Telecommunications
DFSCD	Department of Fire Service & Civil Defence	NBR	National Board of Revenue
DMP	Dhaka Metropolitan Police	RAJUK	Rajdhani Unnayan Katripaksha
DOE	Department of Environment	RHD	Roads and Highways Department
DOEXP	Department of Explosives		

Exhibit-C : Figure Summary and Tentative Schedule of DEE Project

J.1851: FDEE Co.,Ltd. (ITD Group)

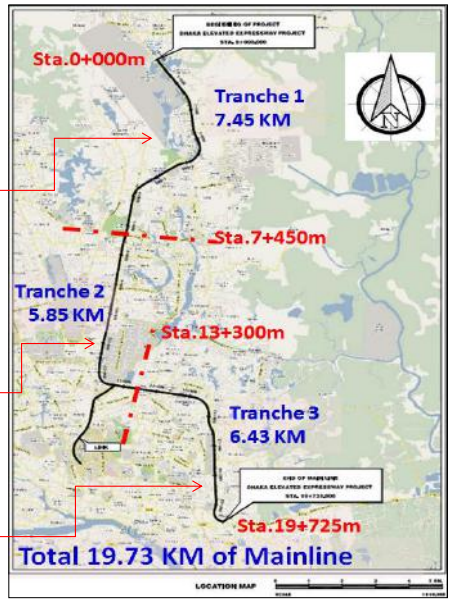
Dhaka Elevated Expressway PPP Project, Bangladesh

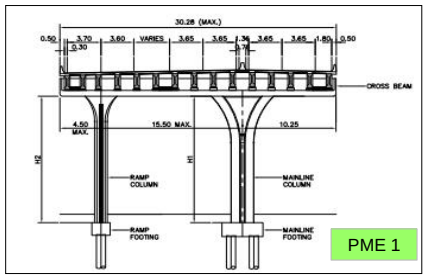
Figure Summary

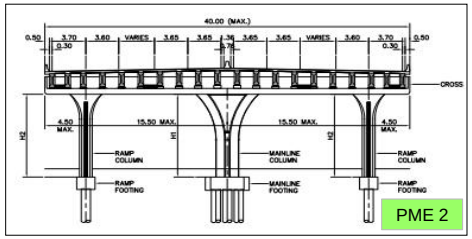
Tranche 1: Sta.0+000m - Sta.7+450m	Mainline:		Km	7.45	
Structure Type			**Pier**	**225**	
1	PM1, PM2, PM3	Single Pier	Pier	105	105
2	PTM1	Portal Pier	Pier	2	
3	PTM2, PTM2U	Portal Pier	Pier	23	37
4	PTM3, PTM3S	Portal Pier	Pier	12	
5	PME1	Single Pier + Supporting Ramp Pier	Pier	60	
6	PME3, PME4, PME5, PME6	Single Pier + Supporting Ramp Pier	Pier	16	83
7	PPM1, PPM2, PPM3	Single Pier + Supporting Ramp Pier	Pier	7	

Tranche 2: Sta.7+450m - Sta.13+300m	Mainline:		Km	5.85	
Structure Type			**Pier**	**200**	
1	PM1, PM2, PM3	Single Pier	Pier	19	19
2	PTM1, PTM1S, PTM1T	Portal Pier	Pier	111	
3	PTM2, PTM2S, PTM2U	Portal Pier	Pier	30	157
4	PTM3, PTM3S, PTM3T	Portal Pier	Pier	16	
5	PME1	Single Pier + Supporting Ramp Pier	Pier	19	
6	PME3, PME4, PME6	Single Pier + Supporting Ramp Pier	Pier	5	24

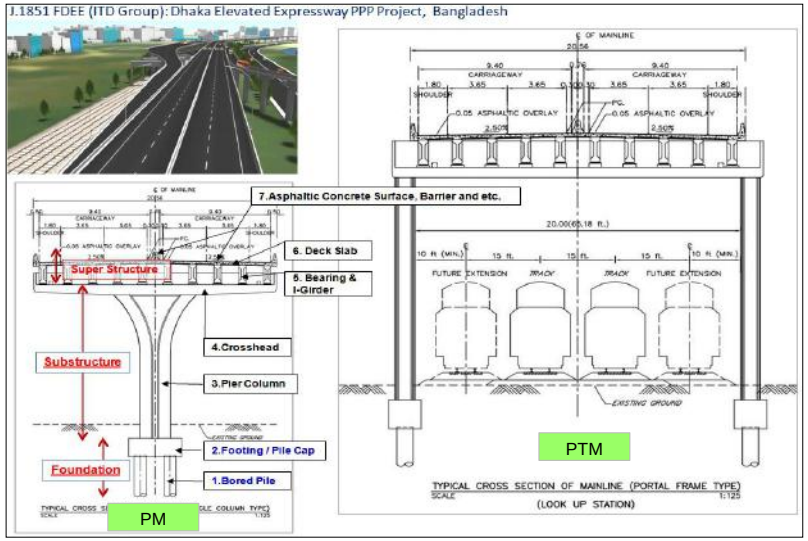
Tranche 3: Sta.13+300m - Sta.19+725m	Mainline:		Km	6.43	
Structure Type			**Pier**	**227**	
1	PM1, PM2, PM3	Single Pier	Pier	106	106
2	PTM1, PTM1S, PTM1U	Portal Pier	Pier	43	
3	PTM2	Portal Pier	Pier	11	81
4	PTM3, PTM3U	Portal Pier	Pier	27	
5	PME1	Single Pier + Supporting Ramp Pier	Pier	25	
6	PME3, PME4	Single Pier + Supporting Ramp Pier	Pier	14	40
7	PPM1	Single Pier + Supporting Ramp Pier	Pier	1	

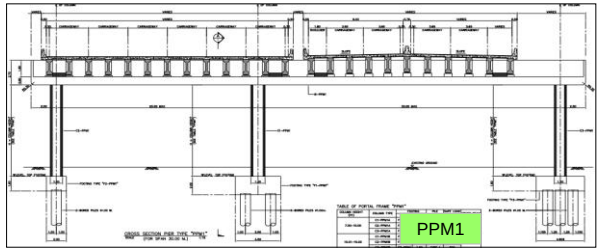






Mainline



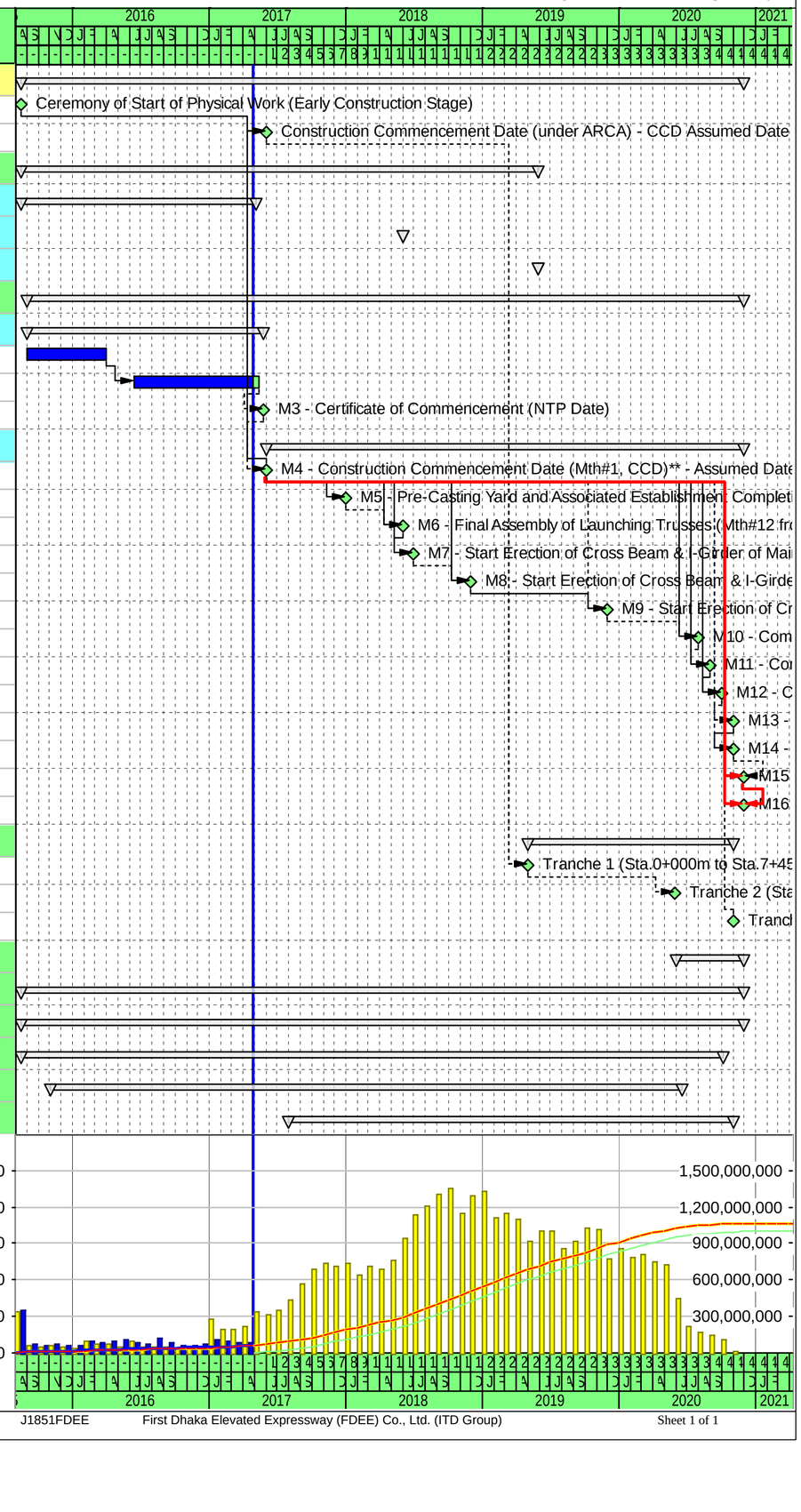


Summary: Structure Type						
Mainline	**Unit**	**T-1**	**T-2**	**T-3**	**Sum**	Weight
Single Column Y Shape	Pier	105	19	106	**230**	35%
Portal Frame	Pier	120	181	121	**422**	65%
Sum Mainline	**Pier**	**225**	**200**	**227**	**652**	**100%**
		TRUE	TRUE	TRUE	TRUE	
Ramp	**Unit**	**T-1**	**T-2**	**T-3**	**Sum**	Weight
Abutment	Pier	8	9	6	**23**	3%
Single Column	Pier	85	357	100	**542**	77%
Portal Frame	Pier	32	57	54	**143**	20%
Sum Ramp	**Pier**	**125**	**423**	**160**	**708**	**100%**
Mainline + Ramp		**T-1**	**T-2**	**T-3**	**Sum**	Weight
Single Column (ML+Ramp)	Pier	190	376	206	**772**	58%
Portal Frame (ML+Ramp)	Pier	152	238	175	**565**	42%
Sum Mainline + Ramp	**Pier**	**342**	**614**	**381**	**1,337**	**100%**

Mainline:		
Tranche 1: Sta.0+000m - Sta.7+450m	7.45	Km
Tranche 2: Sta.7+450m - Sta.13+300m	5.85	Km
Tranche 3: Sta.13+300m - Sta.19+725m	6.43	Km
Sum Mainline Length	**19.73**	**Km**
Ramp (31 Ramps, EN 15, EX 16 Ramps)		
Ramp On (EN Ramp)	13.96	Km
Ramp Off (EX Ramp)	12.63	Km
Sum Ramp Length	**26.58**	**Km**
Sum Length (Mainline+Ramp)	**46.31**	**Km**

Cost Center - E		T-1	T-2	T-3	Sum
Toll Collection Booths	**Nos**	**17**	**18**	**8**	**43**
MTC - Manual Toll Collection	Nos	11	10	6	27
ETC - Electronic Toll Collection	Nos	6	8	2	16
Weigh Station	**Nos**	**3**	**4**	**3**	**10**
Central Control Building	**Nos**	**-**	**1**	**-**	**1**

Activity ID	Activity Name	DEE Phase	Start	Finish
Dhaka Elevated Expressway PPP Project_B1			16-Aug-15 A	30-Nov-20
G.010	Ceremony of Start of Physical Work (Early Construction Stage)	T1	16-Aug-15 A	
G.020	Construction Commencement Date (under ARCA) - CCD Assumed Date (Revised**)	All	01-Jun-17*	
Site Delivery from BBA to FDEE (ARCA)			16-Aug-15 A	31-May-19
Site Delivery - Tranche 1: Sta.0+000m - Sta.7+450m			16-Aug-15 A	05-May-17
Site Delivery - Tranche 2: Sta.7+450m - Sta.13+300m			01-Jun-18	01-Jun-18
Site Delivery - Tranche 3: Sta.13+300m - Sta.19+725m			31-May-19	31-May-19
Milestone Dates (ARCA Schedule 10: Construction Schedule)			01-Sep-15 A	30-Nov-20
Precedent (Prelim) Milestones			01-Sep-15 A	24-May-17
MS.010	M1 - Submission of Detailed Design to the Grantor (BBA) for Approval	All	01-Sep-15 A	31-Mar-16 A
MS.020	M2 - Final Design Approval	All	15-Jun-16 A	15-May-17
MS.030	M3 - Certificate of Commencement (NTP Date)	All		24-May-17*
Construction Schedule Milestones			01-Jun-17	30-Nov-20
MS.040	M4 - Construction Commencement Date (Mth#1, CCD)** - Assumed Date, Revised	T1	01-Jun-17*	
MS.050	M5 - Pre-Casting Yard and Associated Establishment Completion (Mth#7 from CCD)	T1		31-Dec-17
MS.060	M6 - Final Assembly of Launching Trusses (Mth#12 from CCD)	T1		31-May-18*
MS.070	M7 - Start Erection of Cross Beam & I-Girder of Mainline Section 1 (Mth#13 from CCD)	T1		30-Jun-18*
MS.080	M8 - Start Erection of Cross Beam & I-Girder of Mainline Section 2 (Mth#18 from CCD)	T2		30-Nov-18*
MS.090	M9 - Start Erection of Cross Beam & I-Girder of Mainline Section 3 (Mth#30 from CCD)	T3		30-Nov-19*
MS.100	M10 - Completion of Central Control Building and All Toll Surveillance Building (Mth#38 from CCD)	All		31-Jul-20*
MS.110	M11 - Completion of All Decks of Mainline & Ramp (Mth#39 from CCD)	All		31-Aug-20*
MS.120	M12 - Completion of Barrier and Built-in Ducts (Mth#40 from CCD)	All		30-Sep-20*
MS.130	M13 - Completion of Electrical and Mechanical Works Installation (Mth#41 from CCD)	All		31-Oct-20*
MS.140	M14 - Start of Testing for Testing Construction Completion (Start Mth#42 from CCD)	All	31-Oct-20*	
MS.150	M15 - Target Construction Completion Date (Mth#42 from CCD)	All		30-Nov-20*
MS.160	M16 - Completion Certificate (Mth#42 from CCD) - Final Construction Completion	All		30-Nov-20*
Completion by Tranche (T1, T2 and T3)			30-Apr-19	31-Oct-20
SCP.010	Tranche 1 (Sta.0+000m to Sta.7+450m) - Mainline, Ramp, Toll Plaza	T1		30-Apr-19
SCP.020	Tranche 2 (Sta.7+450m to Sta.13+300m) - Mainline, Ramp, Toll Plaza and Central Control Building	T2		30-May-20*
SCP.030	Tranche 3 (Sta.13+300m to Sta.19+725m) - Mainline & Ramp, Overall E&M & Misc.	T3		31-Oct-20*
Partial Operation (ARCA Page15)			01-Jun-20	30-Nov-20
Cost Centre A: Preliminaries and General Requirement			16-Aug-15 A	30-Nov-20
Cost Centre B: Diversion Works / Protection Works			16-Aug-15 A	27-Nov-20
Cost Centre C: Construction for Main Line			16-Aug-15 A	06-Oct-20
Cost Centre D: Bridge and At-Grade Structure for Ramps			02-Nov-15 A	18-Jun-20
Cost Centre E: Toll Plaza, Toll Canopy, Toll Collection System, and Control Building			31-Jul-17	31-Oct-20



Cost

- Budgeted Total
- Actual Total
- Remaining Total
- Planned Value

End of Documents

Road Traffic Management Plan

FDEE/DEE/TMP-001 Rev.C

(As per ARCA Article 11.2(k) and Article 14.1)

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