NATIONAL TRANSPORT RESEARCH CENTRE

GOVERNMENT OF PAKISTAN

MINISTRY OF COMMUNICATIONS

Lyari Expressway Assessment Report

NTRC-330 April, 2020

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Background

A meeting was held on 24th February, 2020 under the chairmanship of Member (I&RC) of the Planning Commission duly attended by Chief, National Transport Research Centre (NTRC) and General Manager PPP, National Highway Authority (NHA) minutes attached (**Annex – I**).

2. It was informed to the participants that in the Secretaries Committee meeting held on 17-02-2020 it was decided that National Transport Research Centre (NTRC) should provide a report on the option of opening of Lyari Expressway for freight traffic by mid of April, 2020 with the following TORs:

a. The Safety Audit report of the NHA Consultant will be reviewed and comments on the contents of the report will be provided.
b. The inward and outward traffic data of the KPT will be collected with classification of vehicles.
c. The current traffic data of the Lyari Expressway will be collected and impact of opening of the Lyari Expressway for freight traffic on the level of service vis-à-vis passenger traffic will be examined.
d. The design of the existing Lyari Expressway alongwith approved PC-1 will be examined with the aim to assess whether it was initially designed for freight traffic and if so, why NHA has closed the expressway now for freight traffic.
e. The geometry and structural capacity of the Lyari Expressway will be examined to ascertain whether freight traffic can use the facility or not.
f. The impact on the traffic movements at the starting and the termination points of Lyari Expressway by opening it for freight traffic will also be examined.
g. Any other factor that NTRC deems necessary to include in the Safety Audit report to ascertain use of Lyari Expressway by freight traffic.

Methodology

3. Methodology adopted for conducting the study covers the review of the project documents including the original and revised PC-1 of the project. Web surfing and literature review. NTRC team visited the project area for assessment of the facility with respect to its opening for Heavy Goods Vehicles. Other available routes for traffic movement from M-9 to Karachi Port and vice versa were analyzed. Daily traffic data analysis and the survey of Lyari expressway with respect to road safety aspects were carried out. Also, the Road Safety Audit Report prepared by M/s TEARS Consultants in October, 2018 was reviewed.

Lyari Expressway Project

History

4. This section is copied as-is from an article published in the Dawn newspaper[1]:-

"The Lyari Expressway was nowhere in the picture until 1986. The Karachi Master Plan 1975 – 85 had proposed the Northern and Southern Bypasses to enable traffic going upcountry from Karachi Port to bypass the city and thus ease congestion and pollution. The Southern Bypass was designed to go through the Defence Authority area and link Karachi Port with the National Highway (N-5). It had to be dropped because of stiff resistance from the DHA on

[1] Mustafa, Zubeida (8 March 2006). "KARACHI: Lyari Expressway: boon or bane?". *dawn.com*.

environmental grounds. The Northern Bypass that could have been easily constructed then was not built on account of the apathy of the policy makers. Public attention was focused on the Lyari, which wrecked destruction in 1977 when heavy rains caused severe flooding to 200 deaths. WAPDA did come up with a flood protection plan but this was never implemented. In 1986, the Lyari Expressway was proposed as an alternative to the Northern Bypass, but was found unfeasible since 100,000 people would have to be evicted. The floods in 1993 led to the revival of the plan for the expressway as a device for flood protection apart from its function of providing another traffic corridor. Opposition from civil society led the Sindh Government to arrange public hearings on the project in 1996 after which the Lyari Expressway was dropped and attention was focused on the Northern Bypass for port traffic. This was found feasible in view of the fact that most of the land on which it was to be built was uninhabited. Four years later in 2000 the Karachi Port Trust (KPT) decided to begin work on the Bypass on a BOT basis. It was to be a six-lane highway 68 km in length that would connect Mauripur to the Super Highway beyond the toll plaza at Sohrab Goth. In June 2001 there was a change of heart and the government came up with the idea of building both the Northern Bypass and the Lyari Expressway together in the budget for the bypass alone. This two-in-one approach appealed to the highest quarters though it is not known how this feat was to be achieved by those masterminding it. The work was entrusted to the National Highway Authority and the FWO (Frontier Works Organization) was appointed contractor for LEP (Lyari Expressway Project), and the NLC for the bypass. The alignment of the bypass was changed to make it shorter and its lanes were reduced to four to cut the cost."

5. The construction of the Lyari Expressway required the demolition of 15,000 housing units and the displacement of 24,400 families living along the banks of Lyari River. This is thought to be the largest urban demolition project for the purpose of road-making in the world. To resettle the displaced people, the Federal Government launched the Lyari Expressway Resettlement Project. As part of this project, the people were given a compensation package that included an 80 square yard plot of land on the outskirts of Karachi and Rs 50,000 for construction. The lands were allotted in newly developed suburbs in Hawke's Bay, Taiser Town and Baldia Town. The demolished settlements along the Lyari River in most cases did not have all the utilities and were not planned constructions. The new suburbs at Hawke's Bay, Taiser Town and Baldia Town however have been planned with utilities, transport, schools, parks and roads.

6. The Right of Way required for the expressway, almost all along the alignment of project was encroached upon and the task of clearance of RoW was entrusted to City District Government Karachi (CDGK) through Government of Sindh. Parallel to construction of Road a PC-I amounting to Rs 4.7 Billion for resettlement / compensation to the affectees was approved and accordingly funds were released to GOS[2].

7. Another assessment made in a Dawn newspaper article describes the new sites as follows[3].

"The exercise has offered a mixed bag to the people affected. The sites developed in Taiser Town, Hawke's Bay and Baldia are neat, clean and offer the advantage of an open environment. It is said that when the Hawke's Bay site for the Lyari affectees was launched in 2002 the displaced people were virtually dumped in the open with no water, electricity or gas. There were no regular bus services connecting it with the city. But afterwards present a

[2] PC-1 for Re-settlement project of Lyari Expressway Project

[3] Mustafa, Zubeida (10 March 2006). "KARACHI: Lyari Expressway: a new land scam?". *dawn.com*.

different picture. Taiser Town and the Hawke's Bay sites appear well developed. They had electricity connection, sewage lines had been laid and homes had started receiving gas connections. The plantation — of course not enough to make the entire area lush green— was substantial by Karachi standards. Another positive aspect of life in the resettlement sites for those who are fortunate to get it is education. However it has not been easy sailing for everyone. There are not enough schools (and only one at the secondary level) though the Citizens Foundation (TCF) schools and others are being upgraded gradually. This means that the older children have suffered, and many of them have given up their education".

8. Lyari Expressway as a toll facility was designed to relieve traffic congestion in Karachi city. The Project was launched in May 2002 with a schedule period upto November, 2004 however completion was delayed due lack of funding and difficulties in resettling affected residents. In June 2016, it was announced that the final legal hurdles had been cleared and 99% of construction was completed, with the last 1 km to be finished by the end of the year, however the expressway was completed by August 2017, with a formal inauguration ceremony held on 14th August 2017 and inaugurated by the then Prime Minister. The cost of constructing this expressway has been revised several times since it was first proposed in 2002. The final budget estimated Rs 11.5 billion which is 108% up from the original estimated cost of Rs 5.0 billion.

9. Contract for construction of Lyari Expressway was awarded to M/s Frontier Works Organization (FWO) in May 2002. The supervision of this contract was awarded to the consultant M/s Engineering Associates Consultants (Pvt) Ltd. Southbound (Left bank) carriageway was completed (16.5 km) and inaugurated in February 2008. Northbound (Right bank) carriageway from Sir Shah Suleman to Sohrab Goth Interchange (6.5 km) was opened for traffic in July 2009. Balance work was completed in August 2017. Details below provided salient features of the project as per PC-1:-

Objectives.

a. To provide higher service level for local and national transport;
b. To improve transport and commute service to the central business /industrial area and the national port;
c. To moderate traffic congestion on arterials and lesser the resulting pollution;
d. To lesser pedestrian and vehicle accidents across the network;

Another project shall form the part of an integrated programme aimed at mitigating the traffic problems of the Mega polis was "Karachi Northern Bypass Project" which shall provide following benefit upon completion;-

- To remove long range goods transport vehicles to and from Karachi port from and to neighborhood and Commercial area.
- To provide higher service level for upcountry goods transport vehicles.

Salient Features

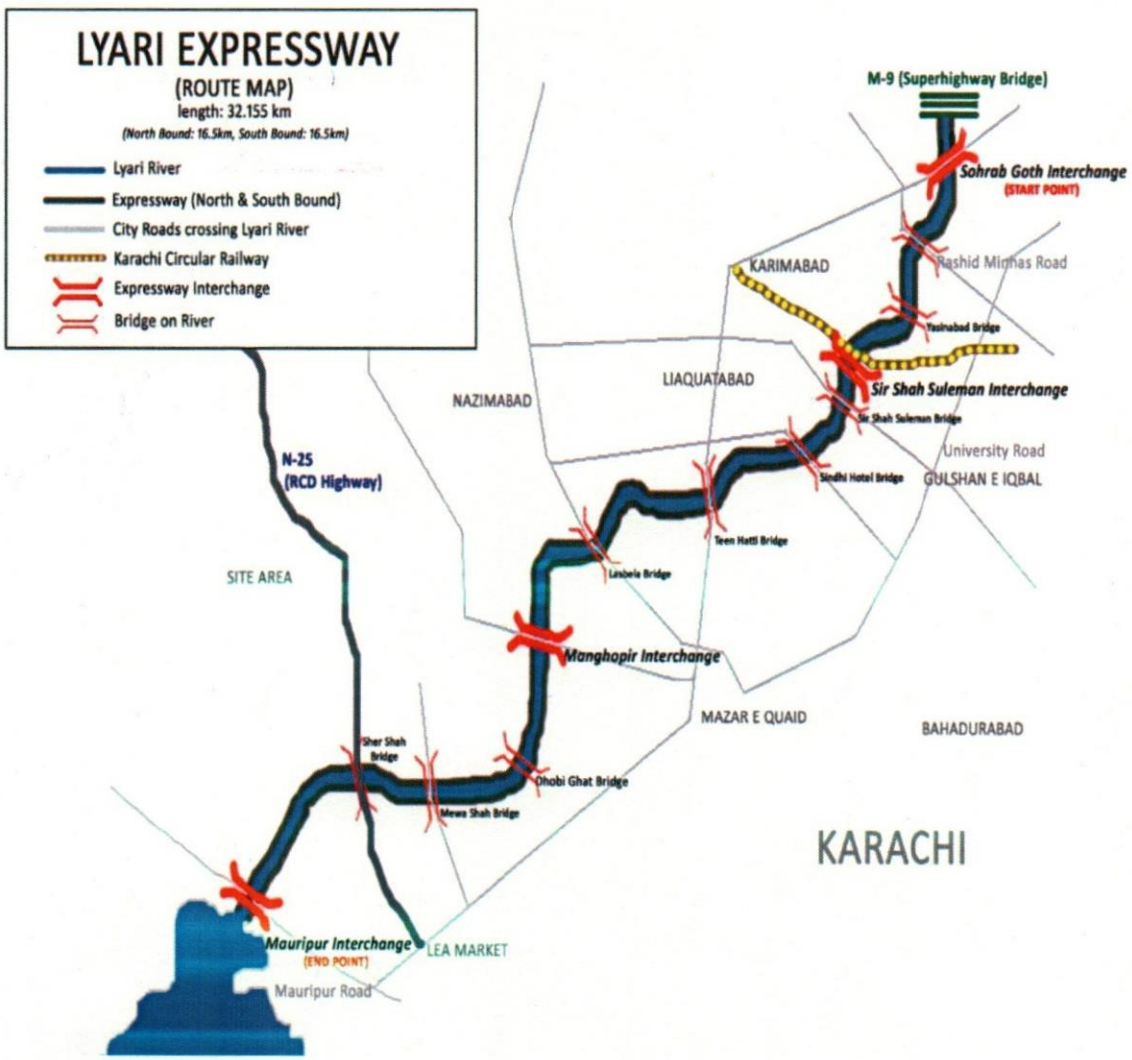
- Consultant : M/s Engineering Associates Consultants (Pvt) Ltd.
- Contractor : Frontier Works Organization (FWO)
- Original Cost : 5.08 Billion
- Final Cost : 11.521 Billion
- Funding By : Government of Pakistan
- Commencement : May-2002
- Original Completion : Nov-2004
- Completion Date : Aug 2017

Design Features.

- Start Point : Sohrab Goth Bridge
- End Point : Maripur Road Bridge
- Total Length of Project :38.417 Km (Main + Ramps)
- Length of Service Road :25 Km
- Design Speed : 80 km / hr
- Interchanges : 4 Locations
- Overpasses : 8 Locations

10. The Lyari Expressway is constructed on the banks of Lyari River started from Shorab Goth Interchange on M-9 and ends at Mauripur Interchange at Karachi Northern Bypass enrouted through different localities of Karachi. The North bound carriageway is constructed on the right bank of Lyari River whereas the South bound carriageway is located on left bank of the River.

Route Map of the Lyari Expressway:



An Aerial View of the Lyari Expressway:

11. The traffic study conducted at the time of project design the project was divided into following three sections[4]:-

i. Superhighway (M-9) To Sir Sulman Muhammad Shah Road
ii. Sulman Muhammad Shah Road To Mangopir Road
iii. Mangopir Road To Mauripur Road

Annual Average Daily Traffic (AADT), estimated in 2000 for above three sections is enlisted in Tables 1 – 3.

Table – 1 Annual Average Daily Projected Traffic
Superhighway (M-9) To Sir S.M.S. Road

Year	Cars	Wagons	Buses	Single Unit Trucks	Trucks + Trailers	Total
* 2001	22770	503	196	2368	250	26087
2002	24086	515	201	2498	261	27561
2003	25478	526	205	2636	273	29118
2004	26951	539	210	2781	285	30765
** 2005	28509	551	215	2934	298	32506
2006	30156	564	220	3095	312	34346
2007	31900	577	225	3265	326	36291
2008	33743	590	230	3445	340	38348
2009	35694	603	235	3634	356	40522
2010	37757	617	241	3834	372	42820
2011	39939	631	246	4045	388	45250
2012	42248	646	252	4267	406	47818
2013	44690	661	257	4502	424	50534
*** 2014	47273	676	263	4750	443	53405
Total 10 Years	371907	6116	2383	37770	3663	421840

[4] PC-1 Lyari Expressway, Karachi, National Highway Authority (NHA), Ministry of Communications

Table – 2

Annual Average Daily Projected Traffic
Sir S.M.S. Road To Mangopir Road

Year	Cars	Wagons	Buses	Single Unit Trucks	Trucks + Trailers	Total
* 2001	37501	503	196	2368	250	40818
2002	39669	515	201	2498	261	43143
2003	41961	526	205	2636	273	45602
2004	44387	539	210	2781	285	48201
** 2005	46952	551	215	2934	298	50950
2006	49666	564	220	3095	312	53856
2007	52537	577	225	3265	326	56929
2008	55574	590	230	3445	340	60178
2009	58786	603	235	3634	356	63614
2010	62183	617	241	3834	372	67247
2011	65778	631	246	4045	388	71088
2012	69588	646	252	4267	406	75150
2013	73601	661	257	4502	424	79446
*** 2014	77855	676	263	4750	443	83988
Total 10 Years	612512	6116	2383	37770	3663	662444

Table – 3

Annual Average Daily Projected Traffic
Mangopir Road To Mauripur Road

Year	Cars	Wagons	Buses	Single Unit Trucks	Trucks + Trailers	Total
* 2001	13683	503	196	1930	204	16516
2002	14474	515	201	2036	213	17438
2003	15310	526	205	2148	223	18413
2004	16195	539	210	2266	233	19442
** 2005	17132	551	215	2391	243	20531
2006	18122	564	220	2522	254	21681
2007	19169	577	225	2661	265	22897
2008	20277	590	230	2807	277	24181
2009	21449	603	235	2962	290	25539
2010	22689	617	241	3125	303	26974
2011	24000	631	246	3297	316	28491
2012	25388	646	252	3478	331	30094
2013	26855	661	257	3669	346	31788
*** 2014	28407	676	263	3871	361	33579
Total 10 Years	223487	6116	2383	30783	2986	265755

Note : Growth Rates (% p.a.)				
Cars	Wagons	Buses	Trucks	Trucks + Trailers
5.78	2.30	2.30	5.50	4.50

* Base Year
** First Year of Operation
** Tenth Year of Operation

12. As planned in 2001 the estimated traffic for each section of the project on the basis of traffic study is given below for the first year (2005), and the 10th year of project operation (2014):

Year	Annual Average Daily Traffic (Estimated)		
	Superhighway (M-9) To Sir Sulman Muhammad Shah Road	Sulman Muhammad Shah Road To Mangopir Road	Mangopir Road To Mauripur Road
	Vehicle per day (VPD)	Vehicle per day (VPD)	Vehicle per day (VPD)
2005	32,506	50,950	20,531
2014	53,405	83,988	33,579

Whereas, traffic data provided by NHA for the month of June 2019 by combining North and South Bound carriageways traffic of Lyari Expressway is shown below:

Year	Average Daily Traffic (Actual) on North & South Bound Carriageways
	Vehicle per day (VPD)
2019	38,000

Similarly, traffic Volume in terms of Vehicle per Day (VPD) in March, 2020 counted by NTRC on Shara-e-Pakistan is 125,500 VPD with about 90,000 motorcycles only, whereas VPD on Karachi Northern Bypass in May 2017 provided by NHA is about 12,000 VPD (**Annex – II**).

13. There are two separate carriageways one for North and the other for South bound traffic flow. Both carriageways are designed for 2-lanes (2*3.65 m) and with 3 m & 1 m wide paved outer & inner shoulders. The cross slope for carriageway and shoulders adopted is 2%. On super-elevated curves cross fall of outer shoulder has been adjusted such that the maximum rollover condition is not exceeded. The average height of embankment is about 2.5 meter with side slope of 2:1 (H:V) where applicable otherwise reinforced earth technology has been adopted. To minimize sharp bends in the alignment a minimum radius of 300 meter has been adopted. Based on the minimum curve radii the maximum super elevation provided is 4%.

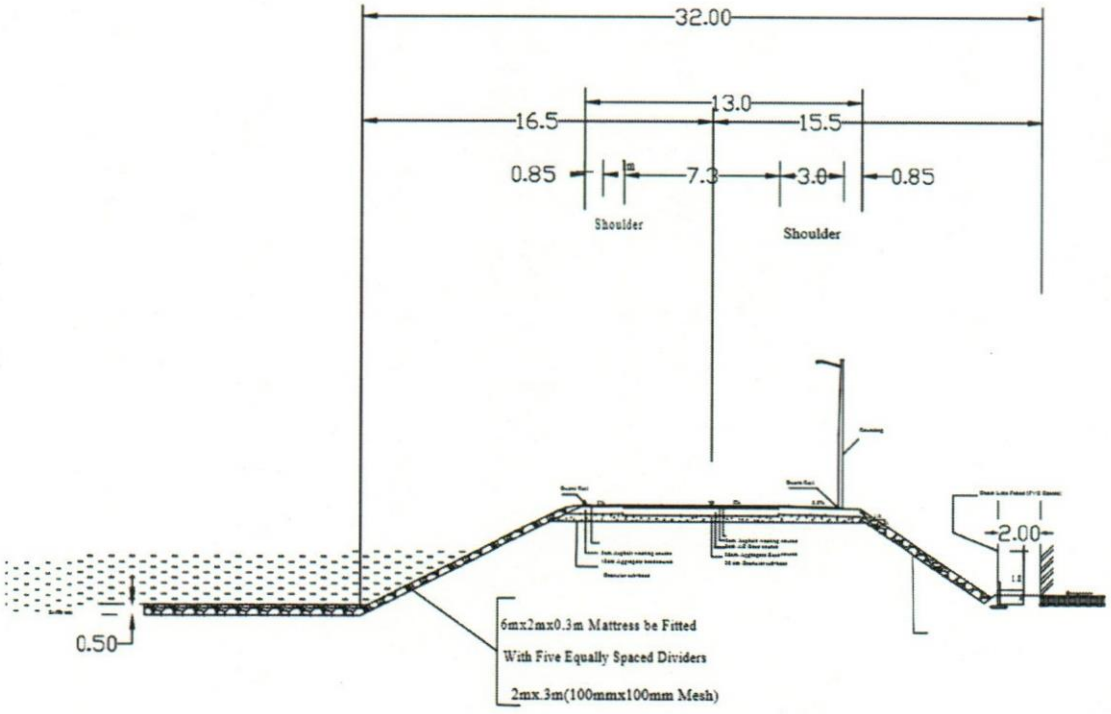
14. The pavement was designed on the basis of "AASHTO Guide for the Design of Pavement Structures, 1993". The Axle load factors indicated in NTRC Axle Load Study published in 1995 were adopted for different axle configuration of trucks to be deployed on the expressway. The Design Cumulative Equivalent Standard Axles (CESAL) adopted for pavement design were 26.845 million ESALs. Following Pavement configuration was adopted for construction of each carriageway:

Pavement Layer	Layer Thickness (cm)
Bituminous Wearing Course	5.0
Bituminous Base Course	8.0
Aggregate Base Course	36.0
Granular Sub-base	30.0
Total	**79.0**

15. As per the revised PC-1 of the project it was planned to construct controlled access dual carriageway four lane (2+2) expressway. Each carriageway is constructed on North and

South banks of River Lyari. Provision of two lane service roads along the banks of Lyari River were proposed through the Metropolitan city of Karachi. Also, as per the design the Right of Way required was 32 meter for each carriageway with sufficient space was earmarked between the property line and the edge of the embankment with fences along both edges of Right of Way. After the fence there was a provision of service road to provide access to the local communities along the route (**Annex – III**). Typical cross section is presented below:

Typical Cross Section of South Bound (Left Bank) Carriageway



16. There were 12 existing crossings where overpasses were proposed and 4 interchanges at Sohrab Goth, Hassan Square, Mangopir and Mauripur Road. In addition bridges were constructed over Gujar nallah, Orangi nallah and Sangal nallah. The bridge super structures were designed in accordance with the AASHTO standard specifications (1996) for Highway Bridges, AASHTO LRFD 1998 and West Pakistan Code of Practice for Highway Bridges (1967).

17. On the direction of NHA, M/s TEARS conducted the Road Safety Audit of Lyari Expressway (**Annex – IV**) in October, 2018 with objective to review the Lyari Expressway for possible opening it for heavy goods vehicles. The report provided by the Ms TEARS observed certain short comings with respect to road safety on the expressway and provided necessary recommendations for rectifying the errors or providing new accessories related to road safety on Lyari Expressway. However, no firm opinion was offered regarding opening of Lyari Expressway for Heavy Goods Vehicles.

Findings of the Study

18. The principal objective of Lyari Expressway Project was to provide better communication facility to the road users of Karachi Metropolis as an urban artery. The facility is providing the required service to the commuters of Karachi city, however the present traffic is not at par what was estimated at the time of appraisal of the project. Traffic in 2019 in terms of Vehicle per Day is found 38,000 (Car+Wagon+Mini Truck) as per NHA record, whereas it was estimated as 53,405 VPD for 2014 in the Revised PC-1 with a Level of Service (LOS) D. Therefore in terms of road capacity/ level of service the facility is underutilized. The executing agency NHA allows only cars, wagons/pickup and mini-truck to use the Lyari Expressway on payment of prescribed toll since its opening in August, 2017. National Highway & Motorway Police (NH&MP) is deployed on this expressway for traffic rules enforcement.

19. The geometric design (horizontal and vertical) adopted by NHA was as per AASHTO Guidelines for 80 Km/hr design speed on the main carriageways of Lyari expressway. The project is executed on the same design thus put no restrictions for plying heavy goods vehicles. On interchanges at Sohrab Got and Mauripur the articulated vehicles can be maneuvered, however on mid-way interchanges required space for maneuvering the movement of articulated vehicles is not available.

20. In this study other available/ permitted routes to the users of Heavy Goods Vehicles from Motorway M-9 to Karachi Port were also examined. Starting from Karachi Port there are three possible routes to reach M-9. The first is the Shara-e-Pakistan second is the Lyari Expressway and third is the Karachi Northern Bypass as marked on the Map below:-

Shahrah-e-Pakistan
Lyari Expressway
M-9
M-10 Single Carriageway

21. The pavement was designed on the basis of "AASHTO Guide for the Design of Pavement Structures, 1993". The Axle load factors indicated in NTRC Axle Load Study published in 1995 were adopted for different axle configuration of trucks to be deployed on the expressway and the Cumulative Equivalent Standard Axles (CESAL) estimated for pavement design were 26.845 million and a thickness of 79 cm for pavement structure adopted in the design for 10 years' pavement service for all type of goods vehicles. Therefore, as per the pavement design executed on project there is no reason for restricting heavy goods vehicle on this facility. The bridge super structures were designed in accordance with the AASHTO standard specifications (1996) for Highway Bridges, AASHTO LRFD 1998 and West Pakistan Code of Practice for Highway Bridges (1967), and also constructed as per the specifications therefore, there is no restriction from the point of structural strength of structures to deploy heavy goods vehicles on Lyari Expressway.

22. At present Heavy Goods Vehicles movement is allowed for 24 hours to reach Karachi Port from M-9 via Northern Bypass, the trip length of this route is about 55 Km, however Karachi Northern Bypass from M-9 to Rais Goth is single carriageway and snatching and robberies from Goods Vehicle users have been reported on this route. The other route followed by Heavy Goods Vehicles is from Sohrab Goth at M-9 through Shahra-e-Pakistan, however due to heavily use by local commuters, Heavy Goods Vehicles are allowed to use this facility from 12:00 p.m to 06:00 p.m daily. Whereas, on Lyari Expressway only Mini Trucks are allowed to ply.

23. The Lyari Expressway carriageways were also inspected with respect to road safety. It was observed that due to non-availibity of required buffer between the edge of embankment and the building line on many locations especially on South Bound Carriageway (Left Bank) many buildings are located on the edge of the carriageway, this lead to a road safety hazard. The road side concrete barrier requires strength testing with respect to restrain or redirect heavy goods vehicles. In Pakistan, 4 pin lock mechanism; to lock the loaded container with the semi-trailer isn't followed, thus there will high probability that container may fall on residential buildings in case if a truck hits the road side barrier which may lead to human fatalities. Pictures below shows the problem:

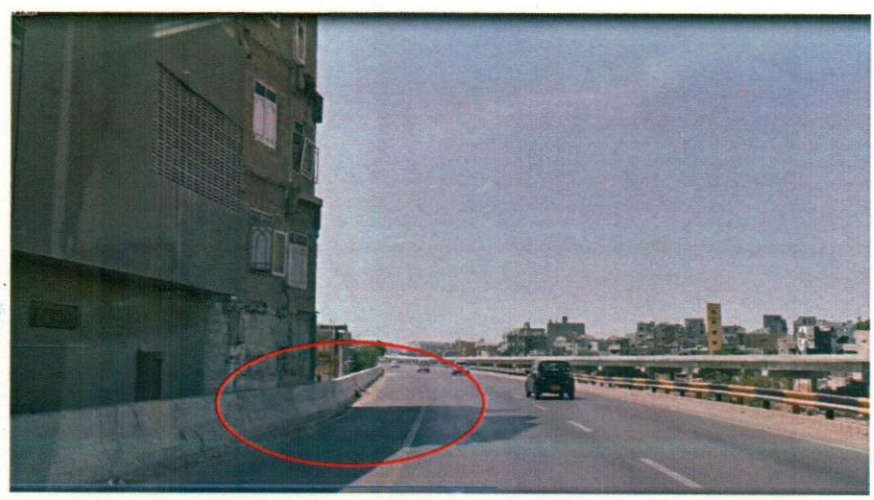


Photo – 1 South bound carriageway residential building located on roads edge

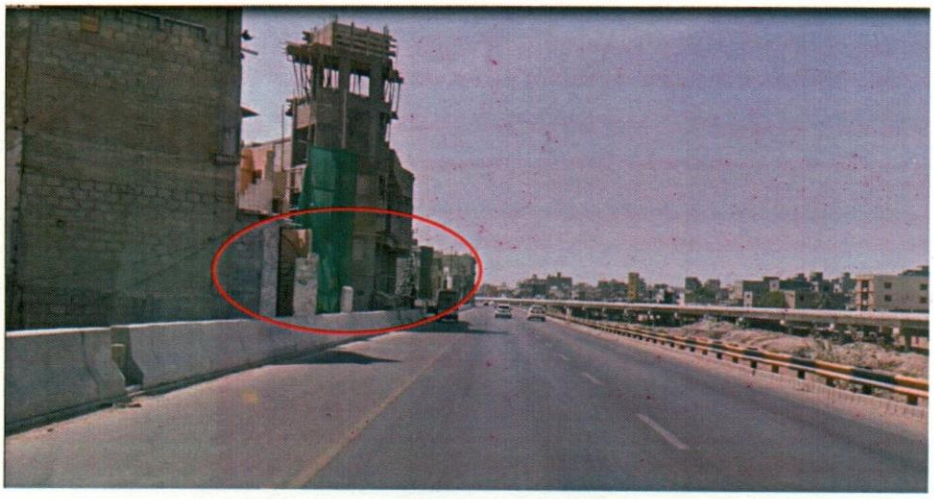


Photo – 2 South bound carriageway residential building located on roads edge

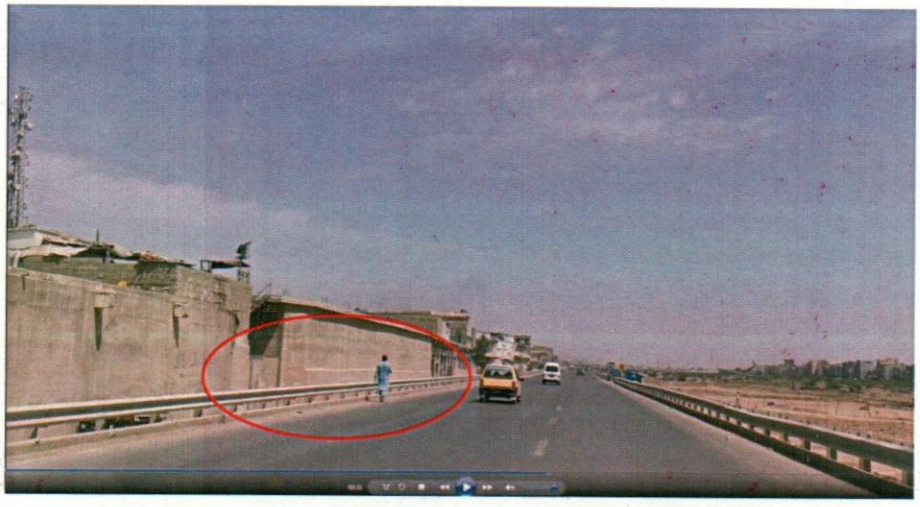


Photo – 3 South bound carriageway residential building located on roads edge

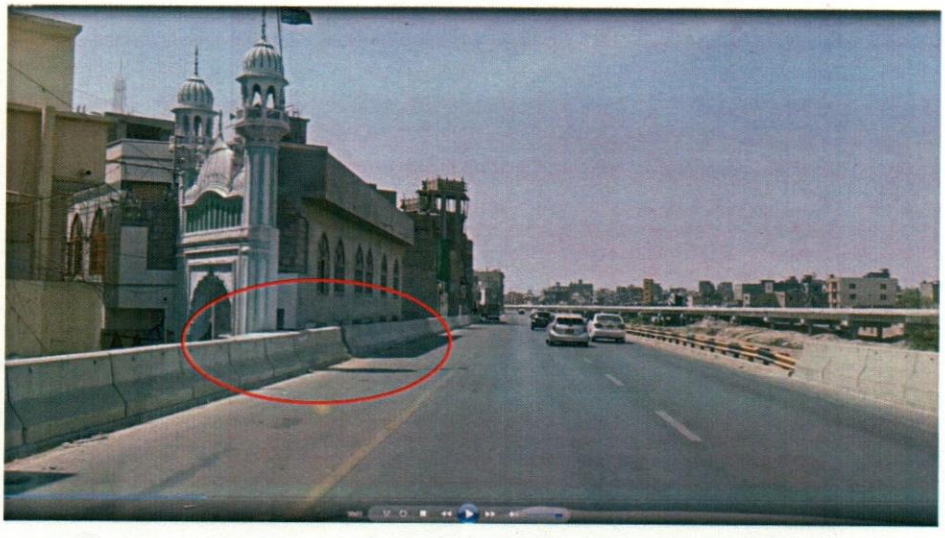


Photo – 4 South bound carriageway Mosque located on roads edge

24. It is worth mentioning here that as per the NHA Act 1991 as amended in 2001 the earmarked Right of Way (RoW) of any national highway must be free from all encumbrances to ensure road safety. As per THE NATIONAL HIGHWAYS AND STRATEGIC ROADS (CONTROL) RULES, 1998 as AMENDED IN 2002; Restriction on Encroachment and Ribbon Development:- (1) Subject to Sub Rule (2) of Rule 3, no person shall without the consent, in writing, of the Authority; (a) erect any, building, boundary wall and structure whether temporary or permanent, moveable or immovable; (b) set up any fence, hedge, post, scaffolding, tower, pylon, transmission line, dispenser, sign board, advertisement, hoarding or banner; (c) deposit or cause to be deposited building material, goods for sale, rubbish, industrial waste, waste water, selvage, industrial effluent or any other such matter or article etc.; (d) carry any cable, wire, pipeline, drain, duct, sewer or channel of any kind through, across, under or over; and (e) make any excavation on road, highway, motorway, bridge or land:- (iv) within **forty meters** from center line of the ROW in case of sections of a national highway or strategic road or bridge which is situated in municipal limits and hilly areas.

25. As per the design of Lyari Expressway a RoW of 32 meter was earmarked for each carriageway and a fence was provided on the edges of RoW to make this facility control access. Also, service roads for local commuters were provided outside the RoW in the revised PC- 1 and funds of the tune of Rs. 3.0 billion were earmarked for this provision.

26. However, even in a time period of 10 years the City District Government could not be able to make available the required RoW to NHA and also due to non-availability of land the provisions of service roads were not executed. Thus, the road safety has been compromised by NHA on this project as at many locations especially on South bound carriageway where still many residential and other buildings are located just adjacent to road edge. Under such circumstances the executing agency NHA had not allowed the heavy goods vehicles on Lyari Expressway since its opening in 2017.

Recommendations

27. Observing the findings of the study following recommendations are proposed:-

i. In the present scenario Lyari Expressway cannot be opened for Heavy Goods Vehicle use due to Road Safety concerns indicated above. Prior opening of this facility for Heavy Goods Vehicles, Service Roads along the Right & Left Bank embankments of Lyari Expressway must be constructed as per the provisions of Revised PC-1 of the project, this will provide a buffer between the building line and carriageway and will remove the probability of fatalities in case if a heavy truck hits the road side barrier.

ii. Concerns of Heavy Goods Vehicle users regarding security/ safety must be addressed by the Government by providing necessary Police/ Rangers check points on Karachi Northern Bypass as this the main reason of the demand of truckers to open Lyari Expressway for Heavy Goods Vehicles. Observing the present traffic additional carriageway of Karachi Northern Bypass between M-9 and Raais Goth must be constructed as soon as possible.

iii. Lyari expressway runs through heavily populated areas of the Karachi city the facility can be further utilize for light traffic including mini trucks with improved connectivity to fully utilize its available capacity. Option of making this facility toll free may be studied to attract diversion of light traffic from Shara-e-Pakistan this will reduced the congestion on Shara-e-Pakistan and will improve the utility of Lyari Expressway.

iv. Necessary traffic management measures must be taken on Northern Bypass/ N-25 (Mauripur Road) so that unnecessary congestion develop due to the parking of vehicles on road and encroachment at available Right of Way must be removed, this will ensure smooth movement of Heavy Goods Vehicles from M-9 to Karachi Port and thus travel time.

v. To propose Traffic Management measures on the Mauripur Road, NTRC may conduct a detailed study if approved by the Government.

ANNEXURE-I

Most Immediate (also by Fax)

GOVERNMENT OF PAKISTAN
PLANNING COMMISSION
Ministry of Planning, Development & Special Initiatives
(Transport & Communication Section)
****

No.4 (57-31)/ PC/ T&C / 2020 Islamabad, the 26th February, 2020

OFFICE MEMORANDUM

Subject: **Minutes of Consultative Meeting held in Ministry of Planning, Development & Special Initiates (PD&SI) in compliance of decisions taken in the Secretaries Committee meeting held on 17.2.2020**

The undersigned is directed to refer to the above captioned subject and to enclose herewith minutes of the subject meeting held under the Chairmanship of Member (I&RC), Planning Commission on 24th February, 2020 in the Ministry of PD&SI for further necessary action.

(Zohair Fazil)
Deputy Chief
Tel: 9211642

i. **DG (Planning), Ministry of Railways**, GoP, Islamabad.
ii. **Divisional Superintendent (DS) Railways**, Pak. Railways, Karachi.
iii. **Chief (NTRC)**, GoP, Islamabad.
iv. **Member (PPP), National Highway Authority (NHA)**, GoP, Islamabad.
v. **GM (Planning), Karachi Port Trust (KPT)**, Karachi.

Copy to:

i. Secretary, Ministry of Communications, GoP, Islamabad.
ii. Secretary, Ministry of Railways, GoP, Islamabad.
iii. Secretary, Ministry of Maritime Affairs, GoP, Islamabad.
iv. Chairman, National Highway Authority (NHA), GoP, Islamabad.
v. Chairman, BOD SIDCL, Karachi.
vi. Joint Secretary / Special Assistant to Minister for P,D&SI, GoP, Islamabad.
vii. Sr. P.S. to Secretary, Ministry of P,D&SI, GoP, Islamabad.
viii. Sr. P.S. to Member (I&RC), Planning Commission, GoP, Islamabad.

28/02/2020
Please open a new file and put up.
D.C (Tech-I)

Government of Pakistan
Ministry of Planning, Development & Special Initiatives
(Transport & Communication Section)
****

Subject: **Minutes of Consultative Meeting held in Ministry of Planning, Development & Special Initiates (PD&SI) in compliance of decisions taken in the Secretaries Committee meeting held on 17.2.2020**

A meeting of the Secretaries Committee was held on 17th February, 2020 in the Ministry of Planning, Development & Special Initiatives (P,D &SI) wherein following decisions were made:

a. **Development of Freight Clearance / Transportation System from KPT to Pipri:**

Decision: "Pakistan Railways shall finalize the TORs / Scope of Work / RFP and any other pre-requisites for the commercial feasibility; and advertisement for procurement of consultant will be published in the newspapers **by 1st March, 2020**. NHA having expertise in the procurement of services of a PPP concessionaire would facilitate Pakistan Railways in finalization the TORs in consultation with M/o PD&SI. ***A consultative meeting in this regard will be held under Member (I&RC) on 24.02.2020.***"

b. **Strengthening of Lyari Expressway:**

Decision: "*A meeting under Member (I&RC) will be held by 24th February 2020* to be attended by MOC, NTRC, and NHA to work out modalities for conducting a Safety Audit study to evaluate the possibility to make the Lyari Expressway accessible/usable for the KPT freight traffic. NTRC would be asked to complete the study by 30-4-2020. NHA would also provide documented reasons for closure of Lyari Expressway for heavy vehicular freight traffic.

As a longer-term solution, NHA will conduct a commercial feasibility for construction of a new dedicated 4-lane elevated expressway to be constructed on PPP mode from east/west wharves of KPT to M-9 interchange. Advertisement for commercial feasibility should published by NHA **by 1st March, 2020**."

2. In compliance with the above decisions, a consultative meeting to finalize the TORs for the above mentioned projects was held under the Chairmanship of Member (I&RC), Planning Commission on 24th February, 2020 in the Ministry of PD&SI. List of participants is at **Annex-I**.

Development of Freight Clearance / Transportation System from KPT to Pipri:

3. DG (Planning), Ministry of Railways (MoR) stated that for undertaking the commercial feasibility study and transaction advisory services for the construction of new railway lines from KPT to Marshaling Yard Pipri (MYP), ToRs have already been shared with the World Bank through Economic Affairs Division. He stated that in this regard, World Bank has already called the Expression of Interest (EOI) with closing date as 9th March, 2020 and MoR is proactively pursuing with the World Bank for timely procurement of the Consultant. He stated that a PC-II for undertaking the proposed feasibility study has also been approved by the MoR DWP.

4. Sr.Chief (T&C) stated that in the Secretaries Committee meeting held on 17.2.2020, these details were not shared by Ministry of Railways. He stated that the feasibility study mentioned by DG (Planning), MoR is for the new lines which was discussed as Option-2 in the earlier meetings held on the subject on 13.1.2020 in Governor House co-chaired by Ministers for Planning and Maritime and further by the Secretaries Committee on 17.2.2020 in MoPD&SI. He stated that in the above referred meetings, Option-I was also discussed that envisaged rehabilitation of existing lines for

operations of a shuttle service between KPT and MYP to ease out congestion on the urban roads of Karachi due to freight traffic in short term.

5. DG (Planning), MoR stated that for rehabilitation of the existing lines to operate shuttle service (Option-I), MoR has planned to rehabilitate the existing lines through a PSDP funded project in FY 2020-21.

6. Member (I&RC) stated that MoR should stick to a single plan and details provided in this meeting by Ministry of Railways should have been mentioned also in the earlier meetings held on the subject.

Decision:

7. Ministry of Railways will make presentation on their plans for Option-I (operations on existing lines) and Option-II (operations on new lines) for movement of freight from KPT to Marshalling Yard Pipri to Minister for PD & SI.

Strengthening of Lyari Expressway:

8. Member (I&RC), Planning Commission stated that as per the decision of the Secretaries Committee meeting held on 17.2.2020, NTRC should provide a safety audit report on the option of opening of Lyari Expressway for freight traffic with the following TORs:

a. The Safety Audit report of the NHA Consultants will be reviewed and comments on the contents of the report will be provided.
b. The inward and outward traffic data of the KPT will be collected with classification of types of vehicles.
c. The current traffic data of the Lyari Expressway will be collected and impact of opening of the Lyari Expressway for freight traffic on the level of service vis-à-vis passenger traffic will be examined.
d. The design of the existing Liyari Expressway alongwith approved PC-I will be examined with the aim to assess whether it was initially designed for freight traffic and if so, why NHA has closed the Lyari Expressway now for freight traffic.
e. The geometry and structural capacity of the Lyari Expressway will be examined to ascertain whether freight traffic can use the facility or not.
f. The impact on the traffic movements at the origination and termination point of Lyari Expressway by opening it for freight traffic will also be examined.
g. Any other factor that NTRC deems necessary to include in the safety audit report to ascertain use of Lyari Expressway by freight traffic.

9. Chief (NTRC) stated that the above task assigned to NTRC will be completed by 15th April, 2020.

Decision:

10. NTRC will submit safety audit report based on the above mentioned ToRs by 15th April, 2020.

Annex-I

List of Participants

Subject: **Consultative Meeting held in Ministry of Planning, Development & Special Initiates (PD&SI) in compliance of decisions taken in the Secretaries Committee meeting held on 17.2.2020**

Ministry of Planning, Development & Special Initiatives / Planning Commission

i. Mr. Malik Ahmed Khan, Member (I&RC), Planning Commission ---------- in Chair
ii. Syed Tanwir Husain Bukhari, Sr.Chief (T&C)
iii. Mr. Zohair Fazil, Deputy Chief (T&C)

Ministry of Railways

iv. Syed Mazhar Ali Shah, DG (Planning)
v. Mr. Nisar Ahmed Memon, DS Karachi

Ministry of Maritime Affairs / KPT

vi. Mr. Ali, Section Officer (KPT), M/o Maritime Affairs
vii. Engineer Hussain Soomro, AXEN (P&D), KPT

National Transport Research Centre (NTRC)

viii. Mr. Hammed Akhtar, Chief
ix. Mr. Khizer Javaid, Deputy Chief

National Highway Authority (NHA)

x. Mr. Azeem Tahir , GM PPP, NHA
xi. Dr. Iftikhar Mehboob, Director (PPP)

Government of Pakistan
Ministry of Communication
*****

National Transport Research Centre
Dy No 647
Date 15-4-2020

F. No 8(1). 2018/PMDU

Islamabad, the 14th April, 2020

To,

The Chief,
National Transport Research Centre,
Islamabad.

Subject: **MEETING – KARACHI PACKAGE HELD ON 13TH MARCH, 2020**

I am directed to refer to enclose herewith a Prime Minister Office letter no. F.5(11)/DS(EA-II) 2020 dated -04-2020, on the subject noted above and to say that a compliance report on the matter may be sent to this office for its uploading to Pakistan Citizen's Portal (PMDU), please.

(Muhammad Tanveer)
Director General (PM&E)

Copy to:-

PSO to Minister for, Communications.
SPS to Secretary Communications.

15/4/2020
D.C (Tech-II)

Annex-I

Communication Division

National Transport Research Centre (NTRC), Ministry of Communications will conduct review of the NHA Consultant's safety audit report by 15th April, 2020.

Dated: 14-Apr-2020

Assign Date: *09-Apr-2020*

Due Date: *15-Apr-2020*

Created at: *13-Apr-2020*

Created by: *DS (EA-II) (9208186)*

Type: *Non-Periodic / Timeline Specific*

This task is assigned by Prime Minister of Pakistan

Task e-Letters

Ref.NO: T11831C

Task: National Transport Research Centre (NTRC), Ministry of Communications will conduct review of the NHA Consultant's safety audit report by 15th April, 2020.

Description:

Assigned To

Secretary Communication Division Pending

No Work Started No work started, or not enough information

All Responses

IMMEDIATE

PRIME MINISTER'S OFFICE
ISLAMABAD
****

Subject: **MEETING – KARACHI PACKAGE HELD ON 13TH MARCH, 2020**

During a meeting on Karachi Package held on 13th March, 2020, the following direction was given by the Prime Minister:

Sr. No.	Decisions / Directions by PM	Time Line	Action by
1.	Sindh (Karachi) Infrastructure Development Company (SIDCL) Board to decide on procurement of buses through operator or any other option.	30 days	SIDCL.
2.	Construction of Flyover on Jinnah Avenue M-9. Scheme will be undertaken by NHA as deposit work from SIDCL / Cabinet Division		– SIDCL **(Lead)** – NHA – Cabinet Division
3.	For increasing railway's freight share in short term from KPT through management and capacity enhancement using & improving the existing railway system, a Joint study will be conducted by M/o Railways / Pakistan Railways, Ministry of Maritime Affairs / KPT and NLC.		– M/o Railways **(Lead)** – M/o Maritime Affairs
4.	Additional dual track from KPT to Pipri and Freight Terminal at Pipri will be constructed in PPP mode. M/o Railways / Pakistan Railways will expedite its efforts to conduct a bankable / commercial feasibility.		M/o Railways
5.	National Transport Research Centre (NTRC), Ministry of Communications will conduct review of the NHA Consultant's safety audit report by 15th April, 2020.	15-04-2020	M/o Communications
6.	NHA will simultaneously hire 3rd Party Consultants with the aim to examine use of facility for freight traffic and suggest workable remedial measures for making Existing Lyari Expressway usable by freight traffic.		– NHA **(Lead)** – M/o Communications
7.	NHA will conduct commercial feasibility for construction of elevated Expressway on Lyari for exit and entry of entire port traffic.		– NHA **(Lead)** – M/o Communications

8.	KPT will construct water recycling plant at Mai Kullachi bypass Nullah on PPP basis.		– M/o Maritime Affairs – KPT
9.	Secretary, M/o Maritime Affairs will take up the matter regarding handing over of land with Chief Secretary Sindh for resolution.	02 weeks	– M/o Maritime Affairs – Sindh Govt.
10.	To improve the capacity of SIDCL, Cabinet Division will hire services of a professional CEO through advertisement on priority basis.	30 days	Cabinet Division

2. Action may be taken for compliance of the directions of the Prime Minister as per given timeline and progress report may be submitted to this office.

(Usman Akhtar Bajwa)
Additional Secretary-II
Ph. 9217300

- Secretary, Cabinet Division, Islamabad
- Secretary, Planning & Development Division, Islamabad
- Secretary, Ministry of Railways, Islamabad
- Secretary, Ministry of Communications, Islamabad
- Secretary, Ministry of Maritime Affairs, Islamabad
- Chief Secretary, Government of Sindh, Karachi
- Chief Executive Officer, Sindh Infrastructure Development Co. Ltd., Karachi
- Chairman, National Highway Authority, Islamabad
- Chairman, Karachi Port Trust, Karachi

No. F. 5(11)/DS(EA-II)/2020 Dated: -04-2019

CC: 1. JS(EA)
2. DS to SPM

ANNEXURE-II

Annex-II

National Transport Research Centre
Traffic Count Survey

Road Section: **Both Directions**

Location: **Liaqat Abad near Police Station** (Layari By Pass , Karachi)

Hour	Date	Time	Motorcycle	Rickshaw	Car, Jeep, Pajero/Taxi	Large Buses	Tractor Trolly	Hiace/ Mini Bus	Light Truck	2 Axle Truck	3 Axle Truck	4 Axle Truck	5 Axle Truck	6 Axle Truck	Others	Others Total
1	18-03-2020	00:00 - 1:00	2630	206	742	11	2	59	12	26	20	6	0	0	0	3714
2	18-03-2020	01:00 - 2:00	1200	180	650	12	2	35	25	35	30	8	4	0	0	2181
3	18-03-2020	02:00 - 3:00	1050	150	550	10	0	32	18	40	35	10	5	0	0	1900
4	18-03-2020	03:00 - 4:00	800	165	450	10	0	50	20	48	36	10	8	0	0	1597
5	18-03-2020	04:00 - 5:00	765	100	340	11	0	55	30	55	32	15	9	0	0	1412
6	18-03-2020	05:00 - 6:00	1569	115	292	14	2	119	35	60	39	13	3	0	0	2261
7	18-03-2020	06:00 - 7:00	1750	250	350	25	2	120	18	30	0	0	0	0	0	2545
8	18-03-2020	07:00 - 8:00	3500	450	550	35	2	125	20	10	0	0	0	0	0	4692
9	18-03-2020	08:00 - 9:00	4800	650	750	50	2	150	30	8	0	0	0	0	0	6440
10	18-03-2020	09:00 - 10:00	4000	850	880	55	2	165	35	5	0	0	0	0	0	5992
11	18-03-2020	10:00 - 11:00	4600	899	989	65	2	180	25	4	0	0	0	0	0	6764
12	18-03-2020	11:00 - 12:00	4800	1050	990	68	2	175	22	3	0	0	0	0	0	7110
13	18-03-2020	12:00 - 13:00	5000	1100	1050	78	2	215	28	6	0	0	0	0	0	7479
14	18-03-2020	13:00 - 14:00	5100	1045	1005	88	2	190	20	3	0	0	0	0	0	7453
15	18-03-2020	14:00 - 15:00	5967	1097	1008	97	2	228	24	4	0	0	0	0	0	8427
16	18-03-2020	15:00 - 16:00	6500	1100	1100	89	0	220	27	5	0	0	0	0	0	9041
17	18-03-2020	16:00 - 17:00	6545	980	1050	86	0	215	22	4	0	0	0	0	0	8902
18	18-03-2020	17:00 - 18:00	7000	880	950	75	0	185	18	3	0	0	0	0	0	9111
19	18-03-2020	18:00 - 19:00	6500	875	900	30	0	75	22	6	0	0	0	0	0	8408
20	18-03-2020	19:00 - 20:00	5500	650	840	25	0	65	25	3	0	0	0	0	0	7108
21	18-03-2020	20:00 - 21:00	3500	550	450	15	0	40	24	4	0	0	0	0	0	4583
22	18-03-2020	21:00 - 22:00	2500	400	480	10	0	35	23	5	0	0	0	0	0	3453
23	18-03-2020	22:00 - 23:00	1250	440	650	8	0	25	27	4	0	0	0	0	0	2404
24	18-03-2020	23:00 - 00:00	1000	500	680	8	0	25	25	3	0	0	0	0	0	2241
			87826	14682	17696	975	24	2783	575	374	192	62	29	0	0	125218

NATIONAL HIGHWAY AUTHORITY
REVENUE SECTION, SINDH SOUTH

SUMMARY TRAFFIC COUNT SURVEY BY NHA AT LYARI EXPRESSWAY TOLL PLAZ A RAMP I, II & III

24 HOURS FOR 03 DAYS

S.No.	Date & Day	Time 8 AM TO 8 AM	SOHRAB GOATH RAMP-I			HASSAN SQUARE RAMP-II			GAREEBABAD RAMP-III			Total Vehicle
			Car	Wagon	Mazda	Car	Wagon	Mazda	Car	Wagon	Mazda	
1	11/6/2019	24 hours	12599	989	287	1690	290	245	1390	190	115	17795
2	12/6/2019	24 hours	8390	721	198	2755	210	210	1250	115	90	13939
3	13/6/2019	24 hours	13665	1121	345	4402	320	401	1620	189	145	22208
Total Traffic Count for 03 Days			34,654.00	2,831.00	830.00	8,847.00	820.00	856.00	4,260.00	494.00	350.00	53942
			11551	943	276	2949	273	285	1420	164	350	
			30	50	100	30	50	100	30	50	100	
Total Amount			1,039,620.00	141,550.00	83,000.00	265,410.00	41,000.00	85,600.00	127,800.00	24,700.00	35,000.00	1,843,680.00
										Monthly		18,436,800.00

12770

3507

19221

1420 164 350

NATIONAL HIGHWAY AUTHORITY

REVENUE SECTION, SINDH SOUTH

SUMMARY TRAFFIC COUNT SURVEY BY NHA AT LYARI EXPRESSWAY TOLL PLAZ A RAMP IV

24 HOURS FOR 03 DAYS

S.No.	Date & Day	Time 8 AM TO 8 AM	GARDEN			Total Vehicle
			Car	Wagon	Mazda	
1	11/6/2019	24 hours	4899	210	210	5319
2	12/6/2019	24 hours	2980	398	178	3556
3	13/6/2019	24 hours	5240	456	195	5891
Total Traffic Count for 04 Days			13,119.00	1,064.00	583.00	14766
			30	50	100	
		Total Amount	393,570.00	53,200.00	58,300.00	505,070.00
					Monthly	5,050,700.00

4373 354 194

4921

24

NATIONAL HIGHWAY AUTHORITY

REVENUE SECTION, SINDH SOUTH

SUMMARY TRAFFIC COUNT SURVEY BY NHA AT LYARI EXPRESSWAY TOLL PLAZA RAMP V & VI

24 HOURS FOR 03 DAYS

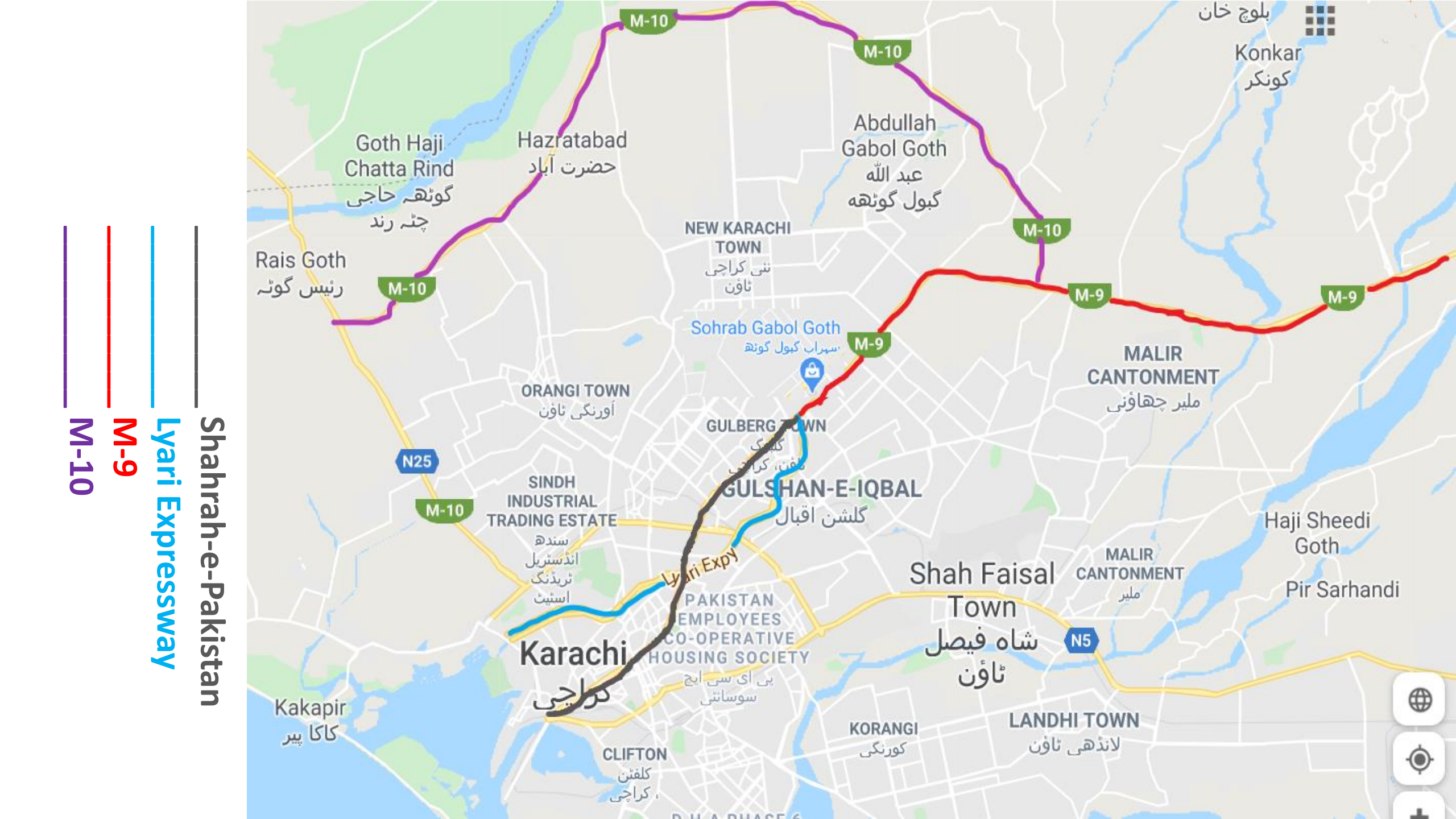
S.No.	Date & Day	Time 8 AM TO 8 AM	MAURIPUR RAMP VI			MANGHOPIR RAMP-V			Total Vehicle
			Car	Wagon	Mazda	Car	Wagon	Mazda	
1	11 6/2019	24 hours	10987	1015	495	1035	110	90	13752
2	12 6/2019	24 hours	6890	815	340	745	70	110	8970
3	13 6/2019	24 hours	18890	1140	489	1140	119	88	16866
Total Traffic Count									39588

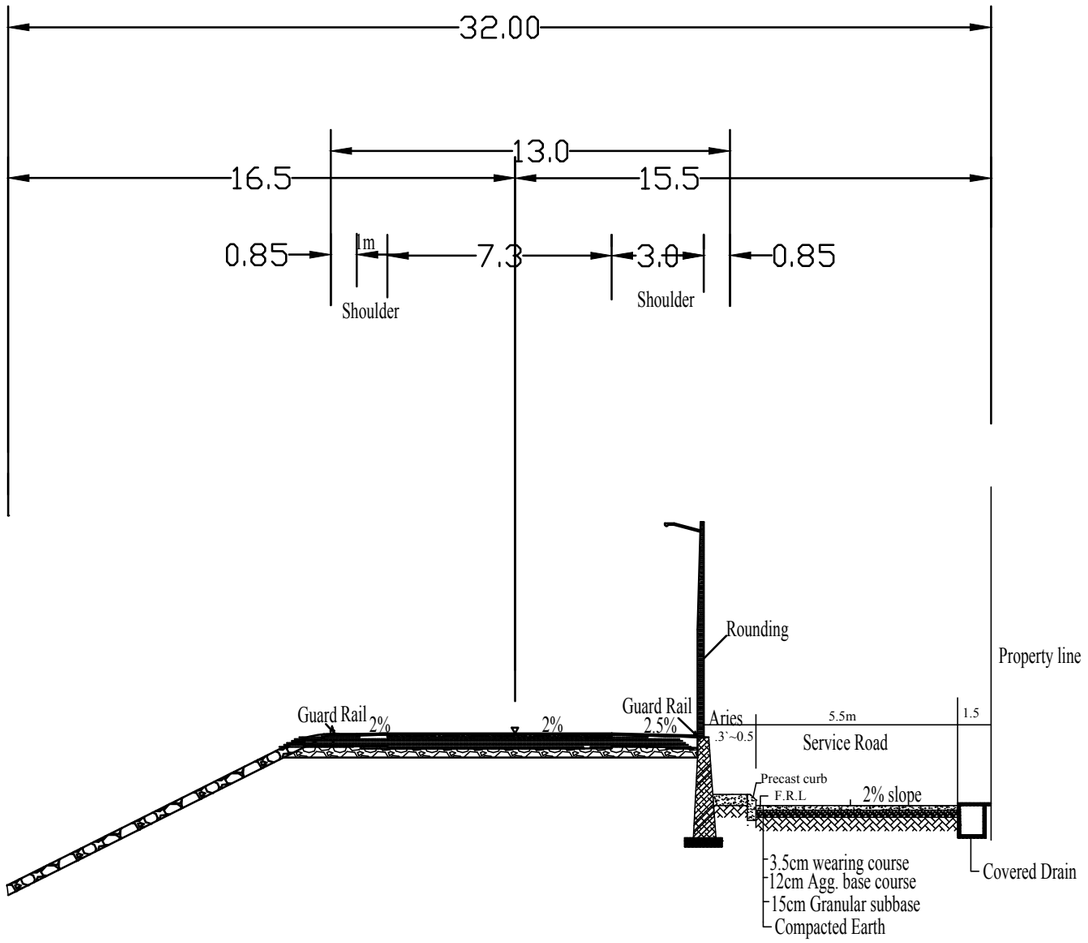
12,235 ~~7970~~ ~~1324~~ 980 100 96

990 441/446

(14,826)

25


M-10
Lyari Expressway
M-9
Shahrah-e-Pakistan
M-10
M-10
M-10
M-10
M-9
M-9
M-9
N25
M-10
N5
Goth Haji Chatta Rind
گوٹھ حاجی چٹہ رند
Hazratabad
حضرت آباد
Abdullah Gabol Goth
عبد اللہ گبول گوٹھ
Konkar
کونکر
Rais Goth
رئیس گوٹہ
NEW KARACHI TOWN
نئی کراچی ٹاؤن
Sohrab Gabol Goth
سہراب گبول گوٹھ
ORANGI TOWN
اورنگی ٹاؤن
MALIR CANTONMENT
ملیر چھاؤنی
GULBERG TOWN
گلبرگ
GULSHAN-E-IQBAL
گلشن اقبال
SINDH INDUSTRIAL TRADING ESTATE
سندھ انڈسٹریل ٹریڈنگ اسٹیٹ
Lyari Expy
PAKISTAN EMPLOYEES CO-OPERATIVE HOUSING SOCIETY
پی ای سی ایچ سوسائٹی
Karachi
کراچی
Shah Faisal Town
شاہ فیصل ٹاؤن
MALIR CANTONMENT
ملیر
Haji Sheedi Goth
Pir Sarhandi
Kakapir
کاکا پیر
CLIFTON
کلفٹن
KORANGI
کورنگی
LANDHI TOWN
لانڈھی ٹاؤن



Typical Cross Section Of SERVICE ROAD

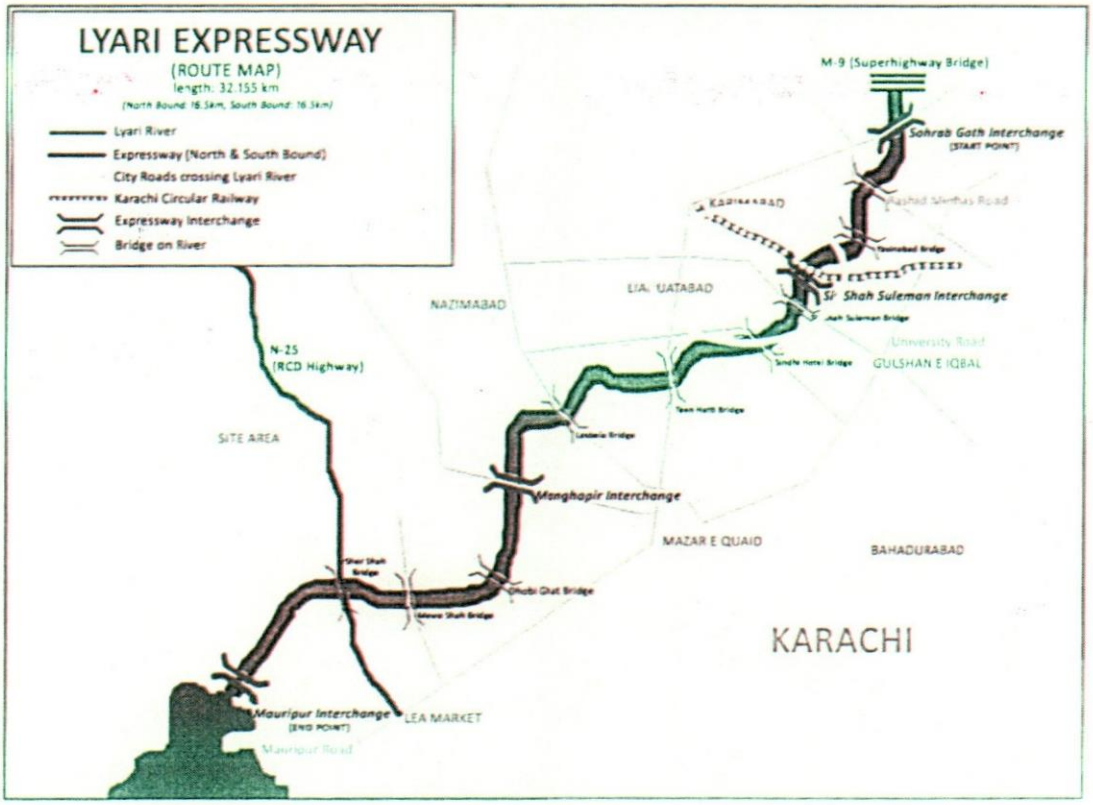
In normal Embankment Area

ANNEXURE-III

ANNEXURE-IV

LYARI EXPRESSWAY, KARACHI, PAKISTAN.

Road Safety Audit Report



OCTOBER, 2018

Prepared by:

TEARS Consultants

Traffic Engineering & Road Safety Consultants
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Disclaimer

This Road Safety Audit (RSA) has been carried out with the sole purpose of identifying safety issues with Lyari Expressway, Karachi, Pakistan. Any recommendation made in this report for safety improvement, should be studied further before implementation.

The information contained in this document is exclusively for the use of our Client (NHA) for the purpose for which it has been prepared and RSA Consultant undertakes no duty to or accepts any responsibility to any third party who may rely upon this RSA report.

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Acronyms & Abbreviations used in RSA report

Acronyms & Abbreviations	Description
AADT	Average Annual Daily Traffic
KM	Kilo Meter
NHA	National Highway Authority
NH&MP	National Highway and Motorway Police
ROW	Right of way
RSA	Road Safety Audit
TEARS	Traffic Engineering and Road Safety Consultants
EA	Engineering Associates
NBC	Northbound Carriageway
SBC	Southbound carriageway
LE	Lyari Expressway

1. Background

Lyari Expressway is a 32 km (NBC:16 KM, SBC 16 KM) city district expressway constructed along the Lyari River in Karachi, Sindh, Pakistan. The Expressway is separated by Lyari river into two carriageways (SBC & NBC), each having two lanes capacity. It was constructed with the aim of serving as a commuting artery connecting Mauripur Road and M9 Motorway.

In a response to a request from Sindh government, NHA is reviewing the Lyari Expressway for possible opening it for freight traffic. Chairman, NHA directed Road Safety Audit team of NHA to review Lyari Expressway from safety perspective and submit a road safety audit report.

In response to the direction of Chairman NHA, Road Safety Audit team, visited and reviewed Lyari Expressway, Karachi for safety audit. Site visit was made on October 25th, 2018. During field visits weather was sunny and traffic condition were normal for the time of the day. The team has examined the section from road safety perspective only. Resident Engineer and Senior Design Engineer from Engineering Associates' (EA), who is a design and supervision consultant on this project, also joined the RSA Expert in the field visit.

This report documents findings and recommendations of the Road Safety Audit (RSA) of Lyari Expressway, Karachi. The objective of the RSA was to identify safety issues with Lyari Expressway and recommend improvements to enhance traffic safety.

EXHIBIT 1:- MEETING WITH NH&MP AND EA CONSULTANTS TEAM

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2. What is RSA

An RSA is a formal safety performance examination of an existing or future road or intersection by an independent qualified audit team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users.

The objectives of road safety audit are to identify potential safety risks for road users and to ensure that measures to eliminate or reduce the risks are fully considered. Road safety audit works in two ways to ensure that safety is improved, namely by removing preventable crash producing elements and by mitigating the effects of any remaining risks by the inclusion of suitable crash-reducing elements.

3. RSA Team

RSA Team comprised of following members:

Name	Title	Affiliation
Aizaz Ahmed	Road Safety Audit Expert	Traffic Engineering & Road Safety Consultants/NHA RSA Consultant
Muhammad Adam Khan	Transportation Engineer	Traffic Engineering & Road Safety Consultants/NHA RSA Consultant
Muneeb Muzammil	GIS Expert	Traffic Engineering & Road Safety Consultants/NHA RSA Consultant

4. Information Sources

Specific resources used in this audit include:

- Field reviews
- Still Photographs of the study area
- Aerial map of the area
- YouTube videos of Lyari Expressway
- Interviews of NH & MP
- Interviews of EA consultant's team

5. Audit Findings
General

5.1 Pedestrian Jaywalking

Location

North and South Bound Carriageway of Lyari Expressway

Problem Statement

Frequent illegal pedestrian crossing (Jaywalking) was observed on both NBC/SBC of Lyari Expressway which is a safety hazard.

Recommendations

Fencing should be done on both sides of Lyari Expressway to prohibit the pedestrians' crossings.

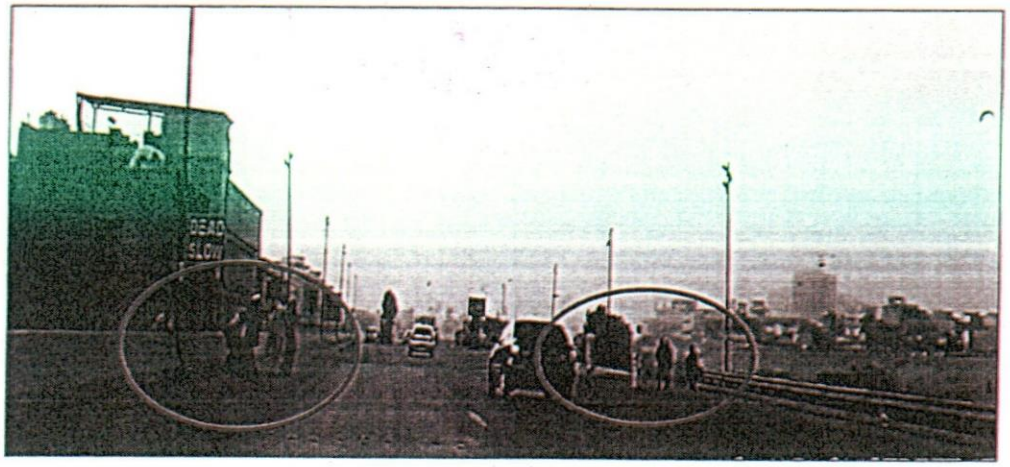


EXHIBIT 2:- PEDESTRIANS JAYWALKING ON SOUTH BOUND CARRIAGEWAY OF LYARI EXPRESSWAY (SOURCE: YOUTUBE[1])

[1] https://www.youtube.com/watch?v=9Qj8c7FIs_g

5.2 Unprotected Toll Booths

Location

Toll plazas located on NBC/SBC of Lyari Expressway.

Problem Statement

No toll booth protection is provided at the Toll plazas. Errant vehicles may hit the toll Booth facility. Absence of toll booth protection compromises the safety of Toll Booth occupants. Also, the Emergency number or help Number Sign boards installed in front of toll booth is fixed object, thus a safety hazard for errant vehicles.

EXHIBIT 3:- TOLL BOOTH WITH NO IMPACT ATTENUATOR SYSTEM AND RIGID SIGN POST ON SBC OF LYARI EXPRESSWAY

(SOURCE: YOUTUBE[2])

[2] https://www.youtube.com/watch?v=9Qj8c7FIs_g

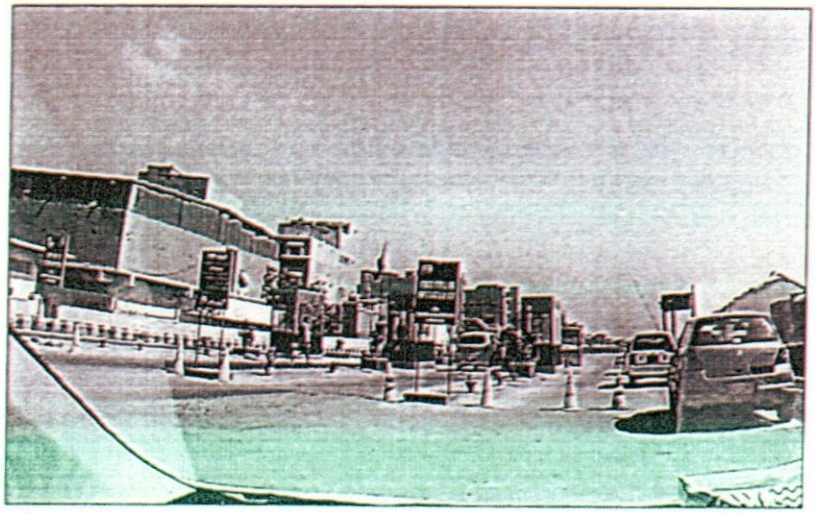


EXHIBIT 4:- UNPROTECTED TOLL BOOTHS AND RIGID SIGN POST AT TOLL PLAZA ON NBC OF LYARI EXPRESSWAY

Recommendations

- Raised rumble strips should be installed in advance of the toll booth facility for the approaching vehicles as a traffic calming measure.
- Remove the rigid sign post and relocate it to the left side of the road.
- Crash cushions or Impact Attenuators should be installed at the toll Booth facility towards the approaching traffic to absorb the impact of colliding errant vehicles.

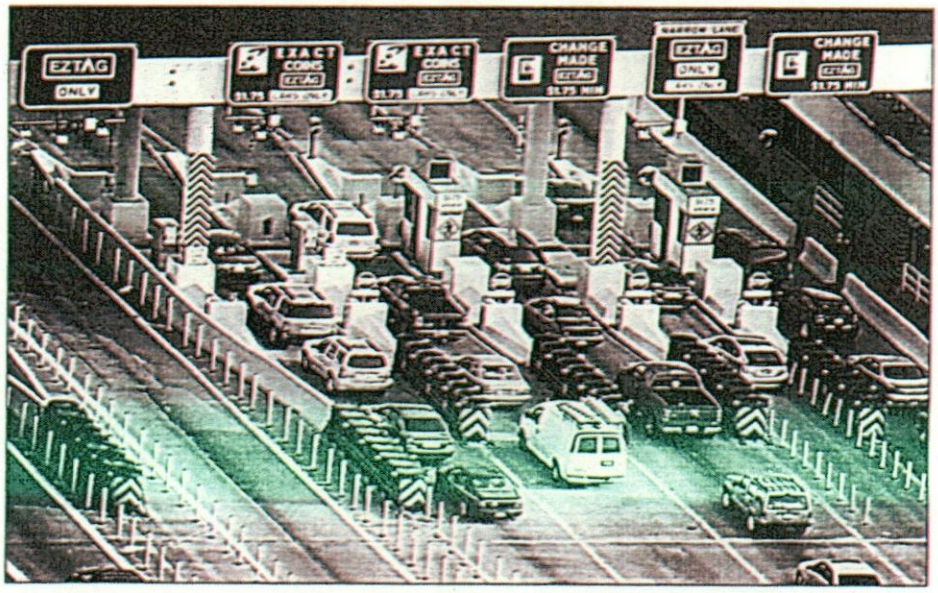


EXHIBIT 5:- PHOTO SHOWING IMPACT ATTENUATORS SYSTEM INSTALLED AT THE TOLL PLAZA IN UNITED STATES

5.3 Improper Connection between Road Side Barrier and Guard Rail

Location

Whole segment of NBC/SBC of Lyari Expressway

Problem Statement

Improper connection is provided between the road side barrier and Guard rail which if hit by an errant vehicle at that specific location will face a fatal crash.

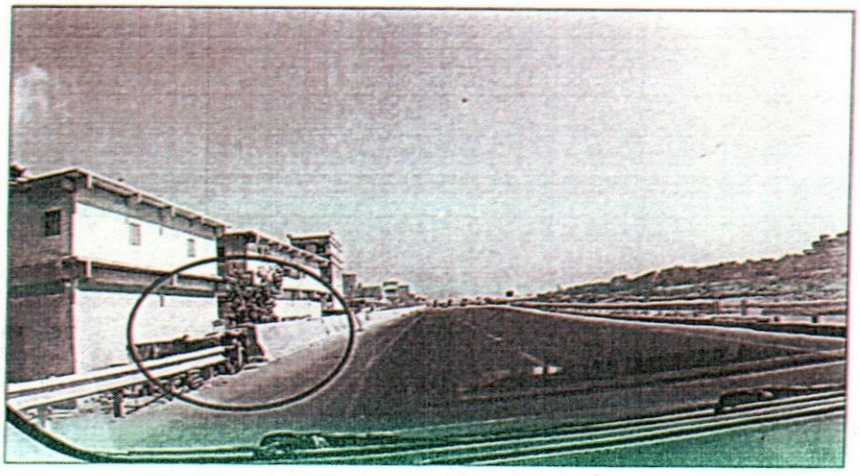


EXHIBIT 6:- PHOTO SHOWING IMPROPER CONNECTION BETWEEN THE GUARD RAIL AND ROAD SIDE BARRIER

Recommendations

It is recommended to provide proper connection between Guard rail and the road side barrier.

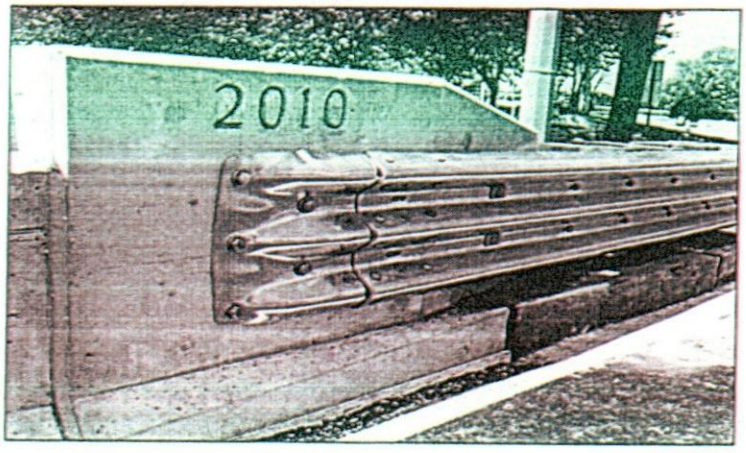


EXHIBIT 7:- PHOTO SHOWING SAMPLE CONNECTION BETWEEN ROAD SIDE BARRIER AND GUARD RAIL

5.4 Guard rail along Lyari Expressway

Location

Complete length of Lyari Expressway

Problem Statement

Guard Rail is installed along Lyari Expressway at various sections on both NBC and SBC. Considering the freight traffic which will traverse Lyari Expressway, the installed guard rail will

not redirect/restrain the errant heavy vehicles after collision and may fall in the developed areas or from the high fill location resulting in fatalities.

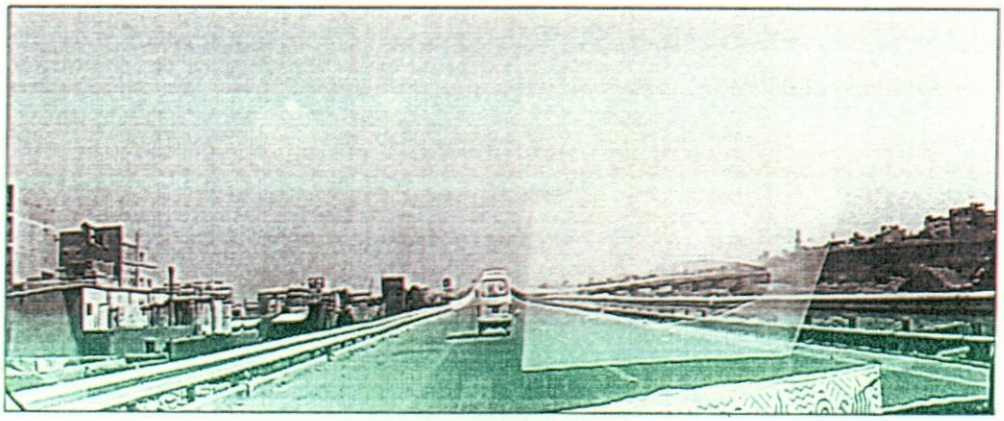


EXHIBIT 8:- GUARD INSTALLED ALONG EXPRESSWAY NEAR THE DEVELOPED AREAS

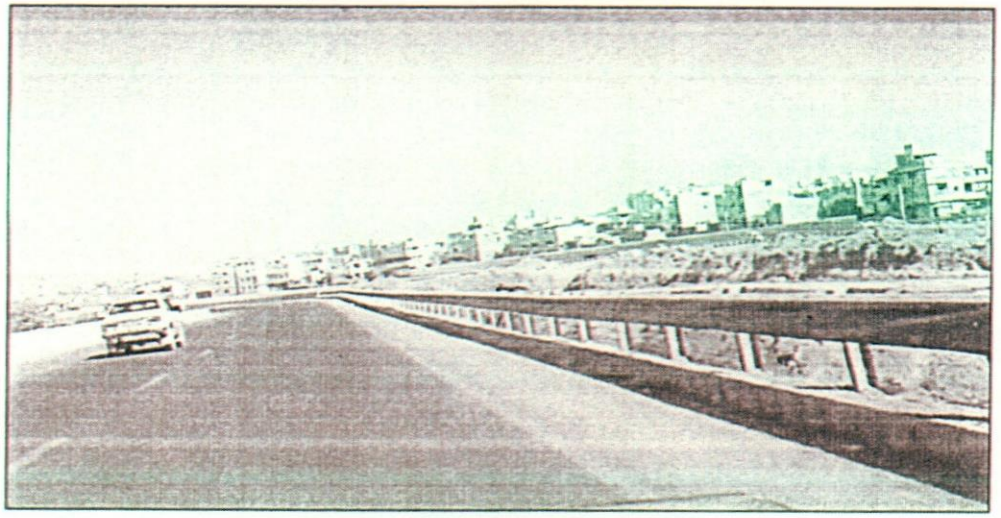


EXHIBIT 9:- GUARD RAIL INSTALLED ALONG LYARI EXPRESSWAY

Recommendations

- Review the barrier system installed suitability for restraining the potential freight traffic particularly the Tractor-Trailor/Container traffic plying on Lyari Expressway.

5.5 No Weigh stations

Location

Start Point of NBC/SBC of Lyari Expressway

Problem Statement

No weigh station is provided at the entrances of NBC/SBC of Lyari Expressway to check the axle loads of freight vehicles.

Recommendations

It is recommended to provide weigh station at the entrances of NBC/SBC of Lyari Expressway to check axle loads of freight traffic.

5.6 Road Side Barrier along SBC/NBC of Lyari Expressway

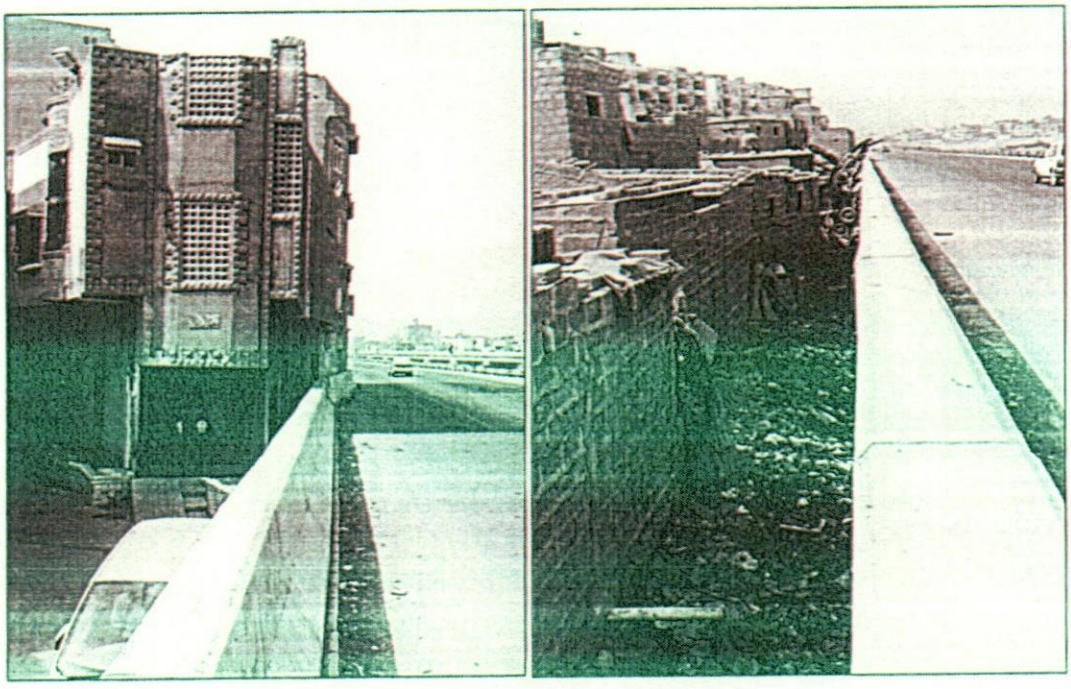
Location

SBC/NBC of Lyari Expressway

Problem Statement

It was observed the road alignment is very close to building line. The road side concrete barrier provided doesn't seem to have sufficient strength to restrain or redirect heavy vehicles. Also, the road side barrier's height seems to be less for heavy vehicles. In Pakistan, 4 pin lock mechanism; a mechanism to lock the loaded container on Truck Trailor, isn't followed. It is possible that container may fall on the curbed developments if a truck Trailor hits the road side barrier which may lead to fatalities.

EXHIBIT 10:- DEVELOPMENTS LOCATED VERY CLOSE TO THE ROAD ALIGNMENT



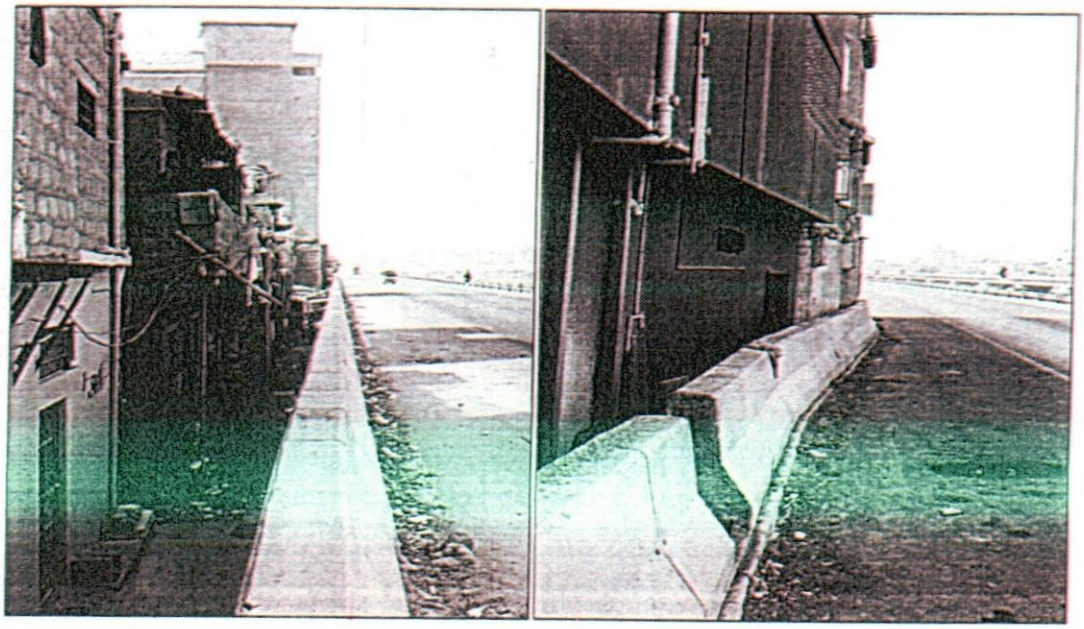


EXHIBIT 11:- DEVELOPMENTS VERY CLOSE TO THE ALIGNMENT

Recommendation

Evaluate the road side barrier's structural strength and structural integrity to check if it can restrain heavy vehicles/loaded trucks. Also, the road side barrier's height should be reviewed considering the restrainment of Heavy vehicles.

5.7 No lighting and delineators

Location

North and South Bound Carriageway of Lyari Expressway

Problem Statement

No lighting and retroreflective delineators are installed along the NBC/SBC of Lyari Expressway.

Recommendation

Lighting should be installed along Lyari Expressway as per the original design. Also, retroreflective delineators should be installed along Lyari Expressway to guide the drivers of the alignment at Night time as an interim measure.

5.8 Inconsistent shoulder width

Location

NBC/SBC of Lyari Expressway

Problem Statement

Inconsistent width of outer (left) shoulder ranging from 1 m to 3 m along Lyari Expressway is provided which is not sufficient from incident management standpoint. Less 3 m width shoulder would force a broken-down vehicle to stop on the travel lane which will create rear-end crash scenario.

EXHIBIT 12:- PHOTO SHOWING LESS SHOULDER WIDTH ON LYARI EXPRESSWAY

Recommendations

Considering the truck width of 2.5 m and shy away distance of through traffic, minimum shoulder of 3 m is needed throughout Lyari Expressway. However, if shoulder width cannot be increased than tow service should be contracted for LE to immediately remove broken down vehicle from the travel lane.

5.9 Pavement Markings

Location

NBC/SBC of Lyari Expressway

Problem Statement

Pavement markings for lane delineation have faded.

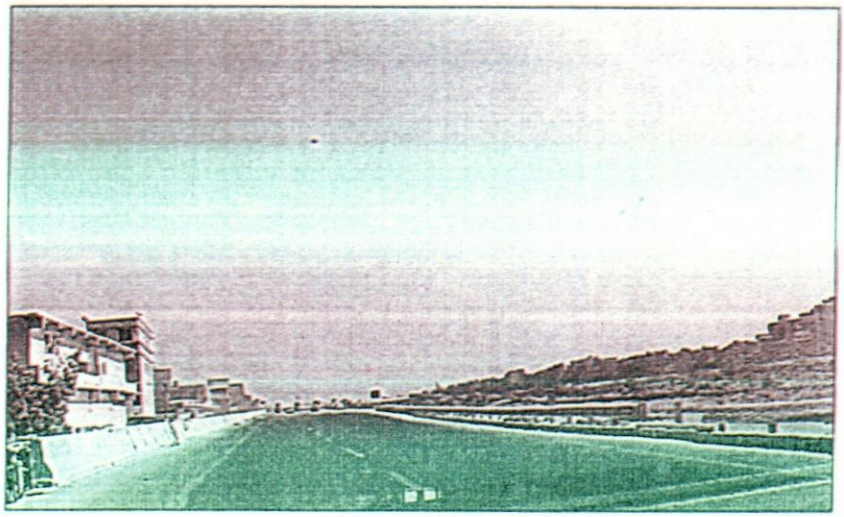


EXHIBIT 13:- FADED PAVEMENT MARKINGS

Recommendations

Consider durable materials for pavement marking such as epoxies, tapes and preformed thermoplastics.

5.10 Broken Road Side Concrete barriers

Location

NBC/SBC of Lyari Expressway

Problem Statement

Road Side concrete barrier are broken at various location on NBC/SBC of Lyari Expressway. Errant vehicles may hit the barrier at that specific location and face a fatal crash.

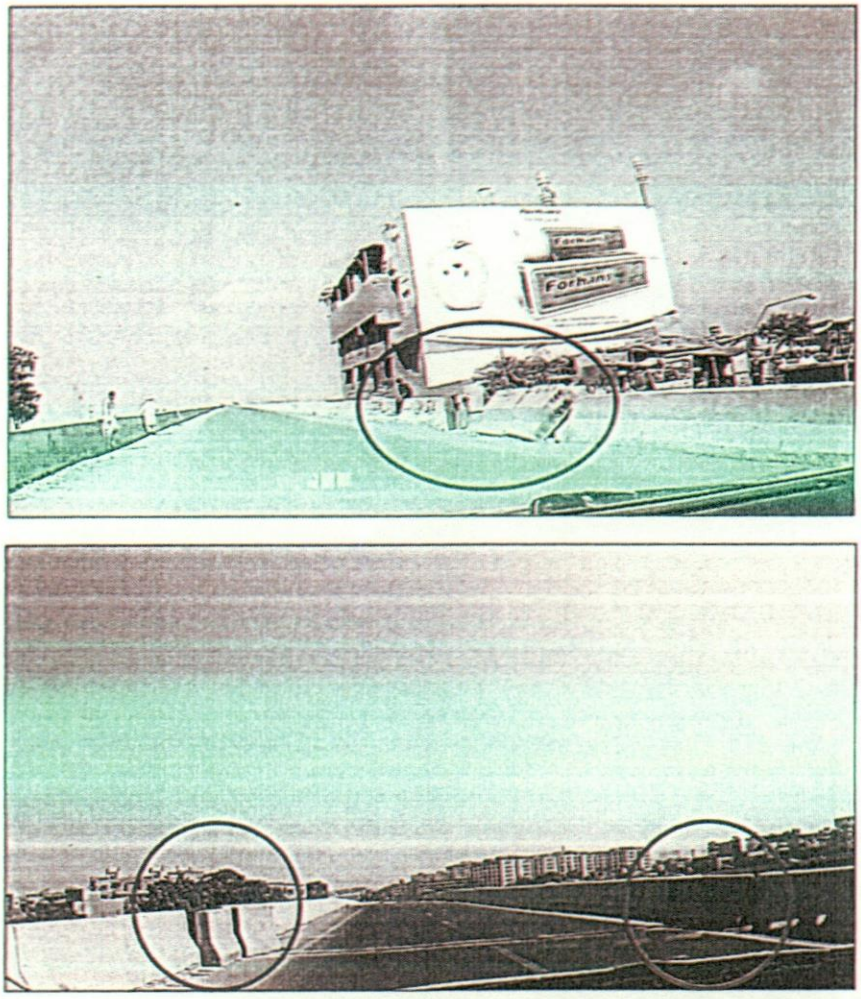


EXHIBIT 14:- BROKEN/MISSING ROAD SIDE BARRIERS ON LYARI EXPRESSWAY

Recommendation

Maintenance should be done of road side concrete barriers.

Old Lyari Segment (South Bound Carriageway)

5.11 Right Turn Exit at Sir Shah Suleman Interchange

Location:

Sir Shah Suleman Interchange

Problem Statement:

On South Bound Carriageway, Right Hand Exit/U-Turn is provided at Sir Suleman interchange. In Pakistan, due to left-hand driving, Exits are provided to the left of alignments. In this case, Exit is to the right of Expressway which is against the driver's expectations. Also, no proper guide signs are installed in advance of the Right turn exit. Without proper guidance, right turn exits are potential point for crashes for through traffic and for the right turning traffic. In addition to these, no advisory speed signs are installed in advance of the Exit/U-Turning Ramp. Vehicles operating with high speed will not be able to safely negotiate those exit ramp curve and may hit the road side barrier.

EXHIBIT 15:- PHOTO SHOWING RIGHT TURN EXIT/U-TURNING RAMP AT SIR SHAH SULEMAN INTERCHANGE

Recommendations

Proper overhead Guide signs should be installed in advance of the right turn exits to completely guide through traffic and Right Turn Exiting traffic. Also, Advisory speed signs should be installed

at the Exit location to inform the drivers of safe traversing speed at the Exit. Auxiliary lane marking should be provided at the exit lane to distinguish it from through lanes.

5.12 Sharp Diversion angle of Exit

Location

Manghopir Interchange

Problem Statement

The divergence angle of taper type exit ramp does not seem safe enough for exiting vehicles. Exiting vehicles will have to reduce speed in the through lanes, producing rear end collision scenario with through traffic. Also, the blunt end of concrete barriers at the Exit gore areas are left unprotected. Errant vehicles may hit the blunt ends and face a fatal crash. Also, no proper ground mounted exit sign is installed at the Exit location.

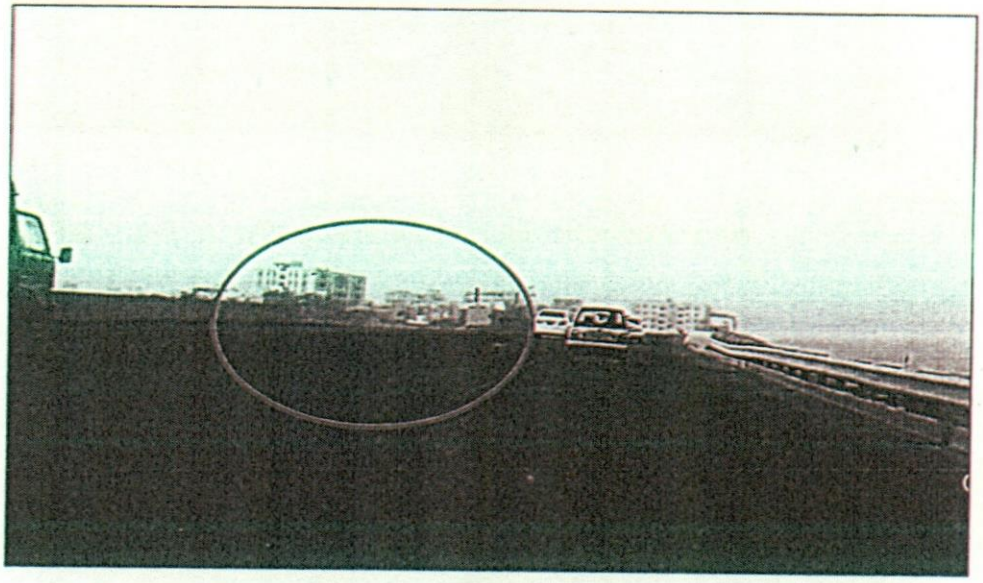


EXHIBIT 16:- SHARP DIVERGANCE ANGLE OF EXIT RAMP

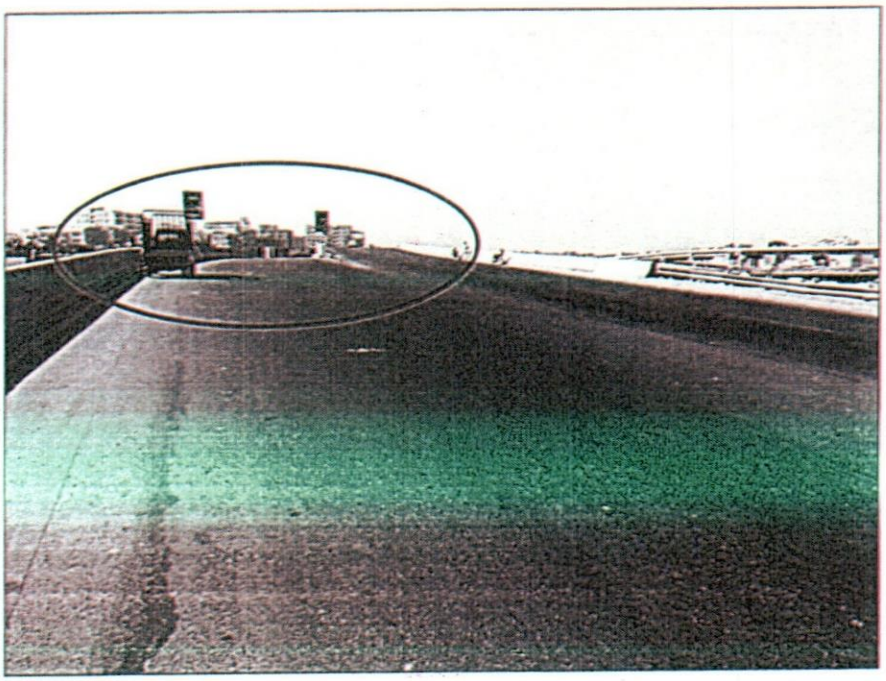


EXHIBIT 17:- SHARP EXIT AT MANGHOPIR INTERCHANGE

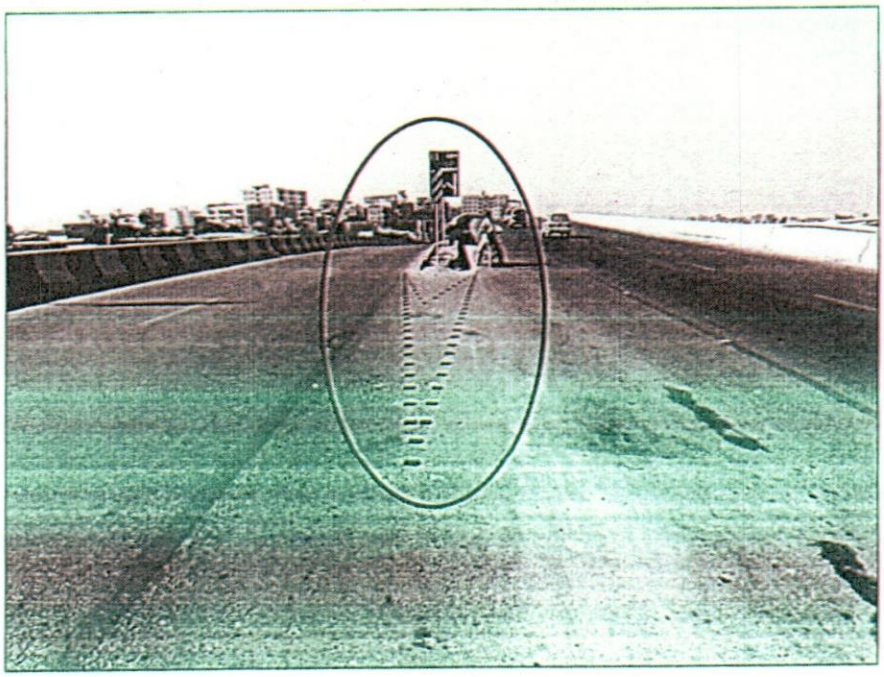


EXHIBIT 18:- UNPROTECTED GORE AREA AND NO PROPER EXIT SIGNS

Recommendation

- To reduce the diverge angle of the exit, the shoulder may be used as a deceleration lane.
- The blunt end of the rigid concrete barriers in the gore areas of exits ramps should be protected with impact attenuator system/crash cushion.
- Gore marking should be installed and if needed through lanes width may be reduced to 3.35 m add this specific location to accommodate gore marking.
- Install proper exit guide signs at the exit gore to supplement the advance overhead guide sign.

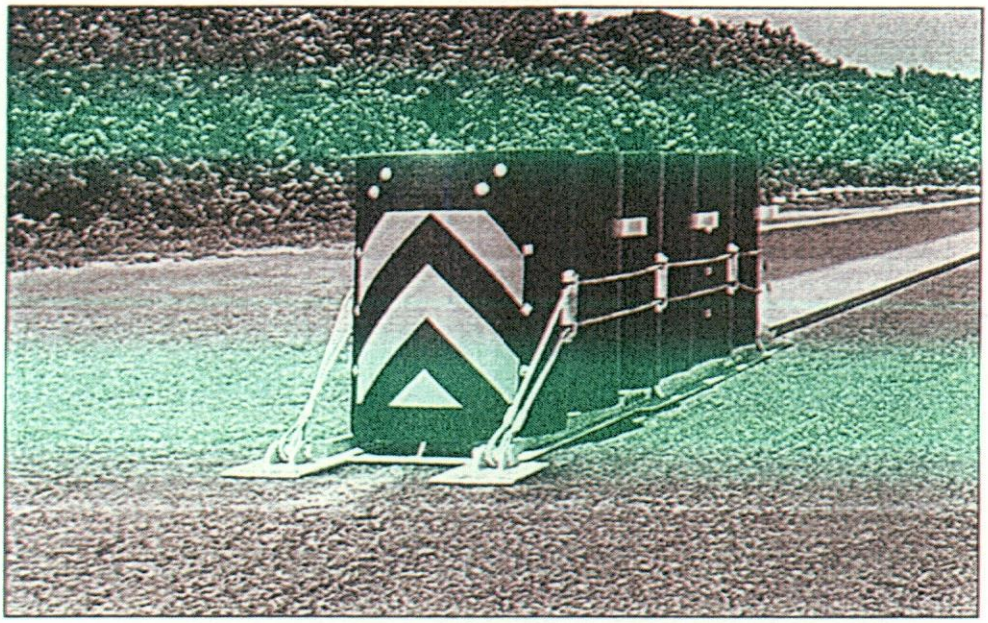


EXHIBIT 19:- IMPACT ATTENUATOR SYSTEM INSTALLED AT BLUNT FACE OF CONCRETE BARRIER

5.13 Right Turn Exit at Manghopir Interchange

Location

Manghopir Interchange

Problem Statement

Right Turn Exit is provided at Manghopir Interchange for Traffic bound for NBC of Manghopir Road and for U-Turning traffic bound for Sohrab Goth. Only one overhead guide sign is installed in advance of the interchange location to guide the drivers of the exit. No ground mounted guide signs are provided in advance of Exit location. It should be noted that lack of proper guidance of drivers will lead to crashes. No advisory speed signs are installed at the exit to inform the drivers of safe speed of traversing the exit/U-turn ramp. Furthermore, the blunt end of the rigid concrete barriers at the Exit gore areas are left unprotected.

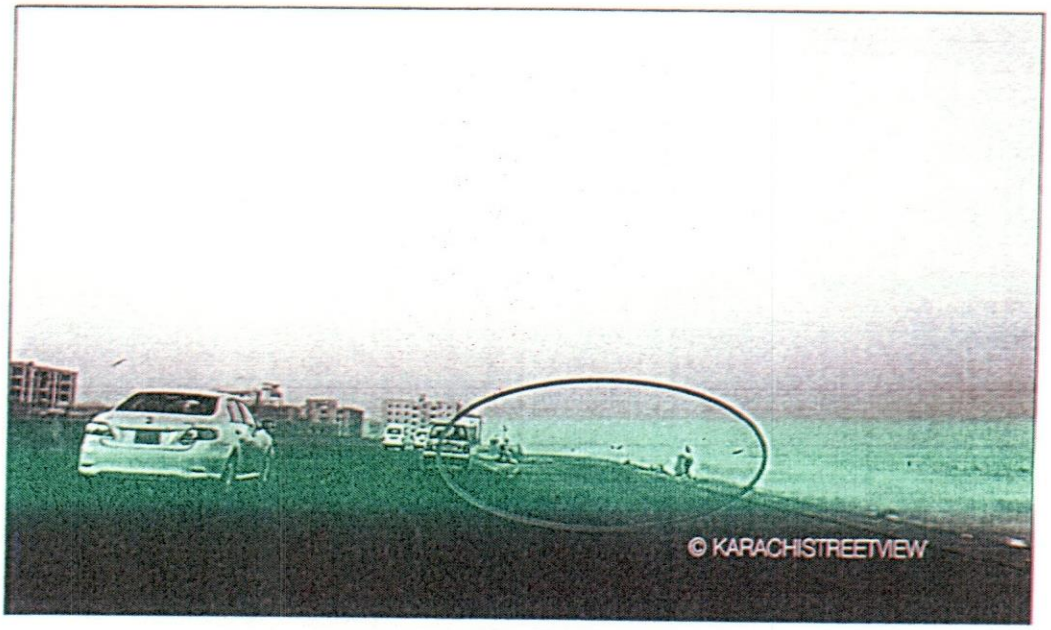


EXHIBIT 20:- PHOTO SHOWING EXIT RAMP WITH NO GROUND MOUNTED GUIDE SIGNS INSTALLED

Recommendations

It is recommended to install ground mounted guide signs at the exit gore to supplement advance overhead sign. Also, advisory speed signs should be installed at the exit/U-turn facility. Install impact attenuator system at the gore area to protect the blunt end of concrete barrier *(Refer to Exhibit 19 for Impact attenuator system installed at the blunt face of concrete barrier).*

5.14 No channelization between Mauripur road entrance ramp and U-turn Exit ramp

Location

Mauripur interchange

Problem statement

No channelization is provided at Mauripur Road Entrance ramp and U-Turn/Exit Ramp. No lane balancing is done at this location.

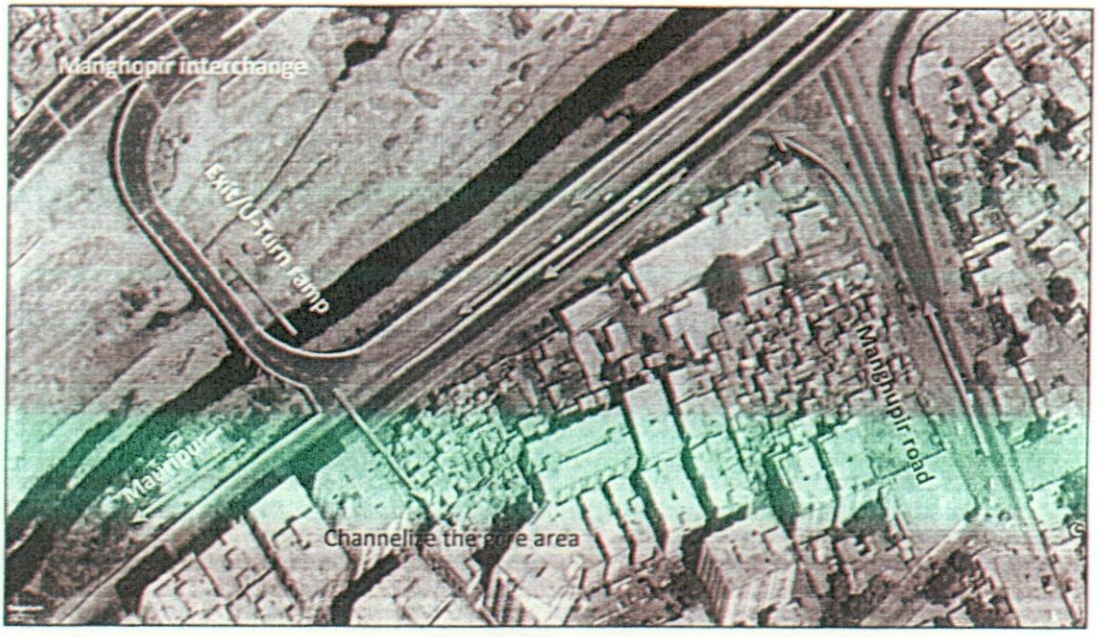


EXHIBIT 21:- NO CHANNELIZATION BETWEEN U-TURNING/EXITING RAMP AND ENTRANCE RAMP

Recommendation

Channelize the gore area between U-Turn/Exit Ramp and Mauripur Road Entrance Ramp. And ensure lane balancing at this location.

5.15 Uncontrolled intersection of SBC of Lyari Expressway with Mirza Adam Khan Road

Location

End point of SBC of Lyari Expressway

Problem Statement

Uncontrolled intersection is provided at the end point of South Bound Carriageway of Lyari Expressway. Intersection if not controlled become potential point for crashes. It was observed the Lyari Express traffic intersect Head-on with the left turning traffic from Mauripur Road, bound for Mirza Adam Khan road creating a potential point for Head on collisions.

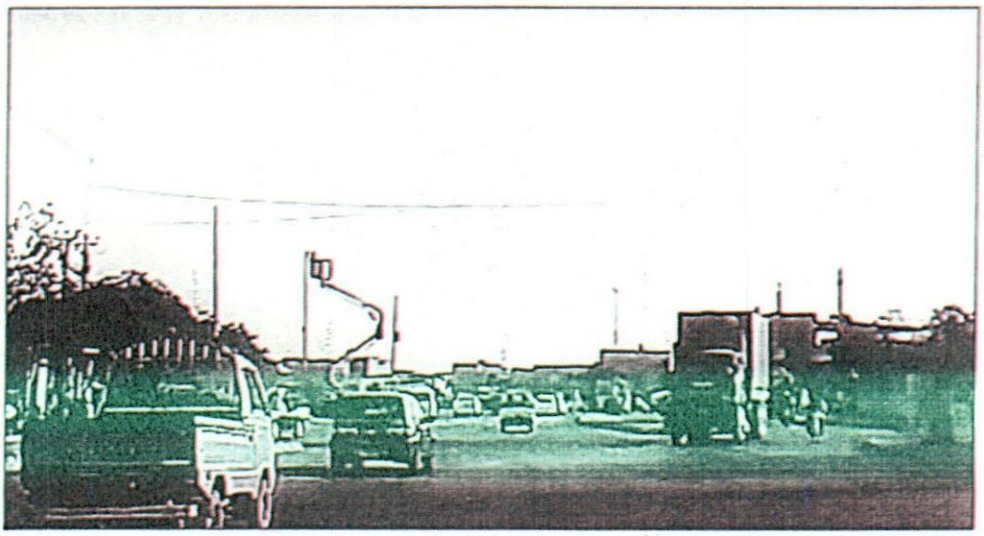


EXHIBIT 22:- PHOTO SHOWING LEFT TURNING TRAFFIC OF MAURIPUR ROAD, BOUND FOR MIRZA ADAM KHAN ROAD

Recommendations

Consider grade separating this intersection as per the original design of Lyari expressway.

5.16 Uncontrolled intersection of Lyari Expressway and Mirza Adam Khan road with N-25

Location

End point of SBC of Lyari Expressway

Problem Statement

Three leg uncontrolled intersection is provided between Lyari Expressway road, Mirza Adam khan Road and Mauripur road. Large number of conflicting movements are observed at the intersection location creating safety and congestion issues on Mauripur road.

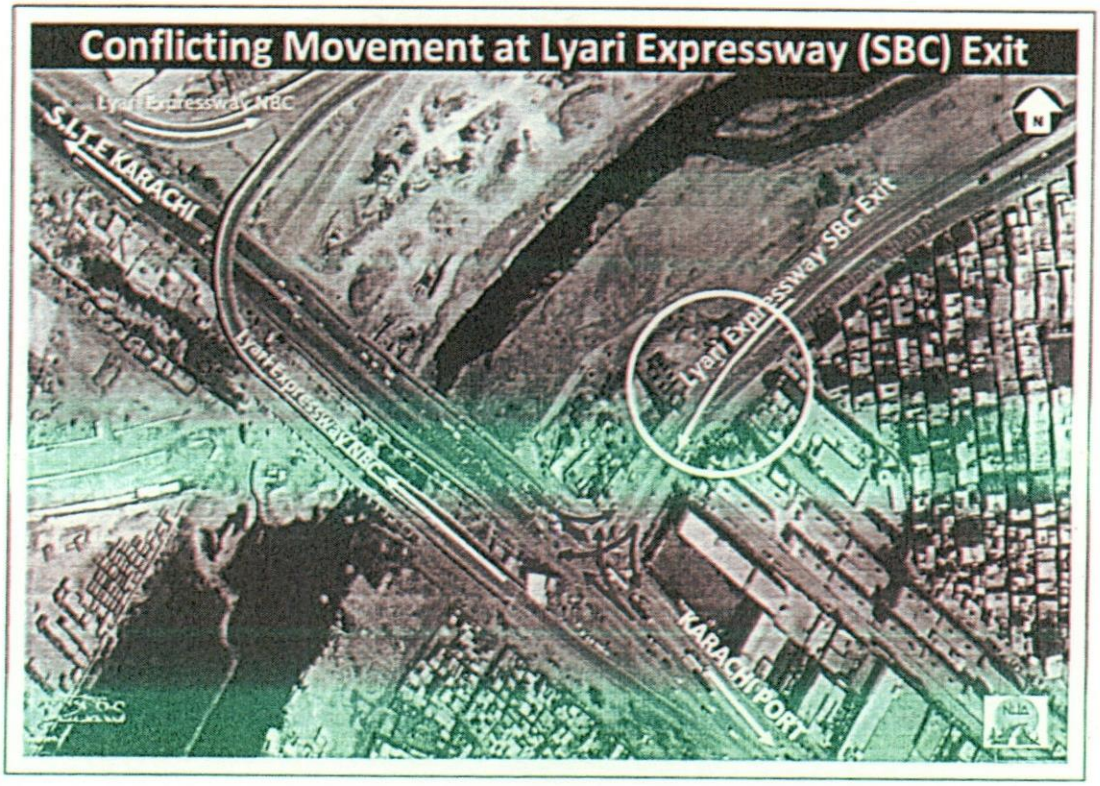


EXHIBIT 23:- CONFLICTING MOVEMENTS NEAR THE END POINT OF SBC OF LYARI EXPRESSWAY

Recommendations

Refer to item 5.15 recommendations.

5.17 Illegal parking at the Entrance

Location

Start point of SBC of Lyari Expressway at Sohrab Goth interchange

Problem Statement

Illegal taxi parking was observed at the entrance ramp of Lyari Expressway interchange which may cause safety issues.

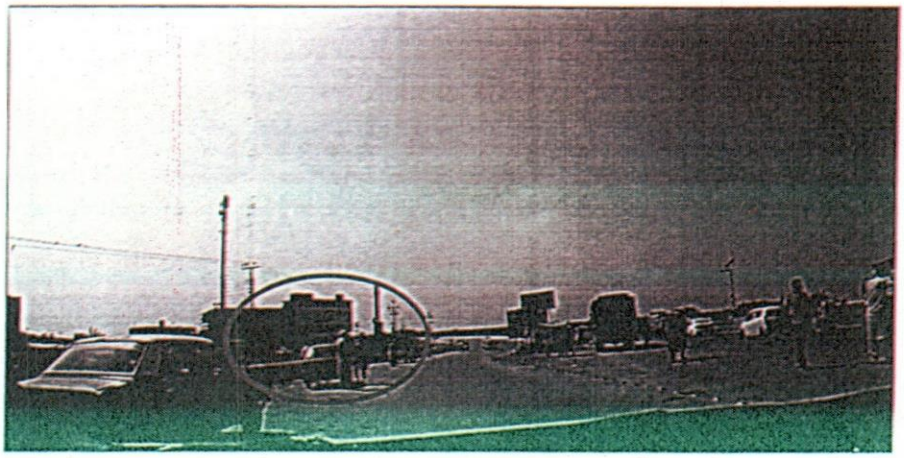


EXHIBIT 24:- ILLEGAL PARKING AT ENTRANCE RAMP

Recommendations

Enforcements should be done to prohibit and remove illegal parking at the entrance ramp location.

Newly Constructed/Inaugurated Segment (North Bound Carriageway)

5.18 Sharp diversion angle of Exit ramp

Location

Mangopir Interchange

Problem Statement

The divergence angle of taper type exit ramp does not seem safe enough for exiting vehicles. Exiting vehicles will have to reduce speed in the through lanes, creating rear end collision scenario with through traffic. Also, the location of the exit is at horizontal curve which make the steering task for the exiting traffic a challenging one. Also, the blunt end of concrete barriers at the Exit gore areas are left unprotected. Errant vehicles may hit the blunt ends and face a fatal crash.

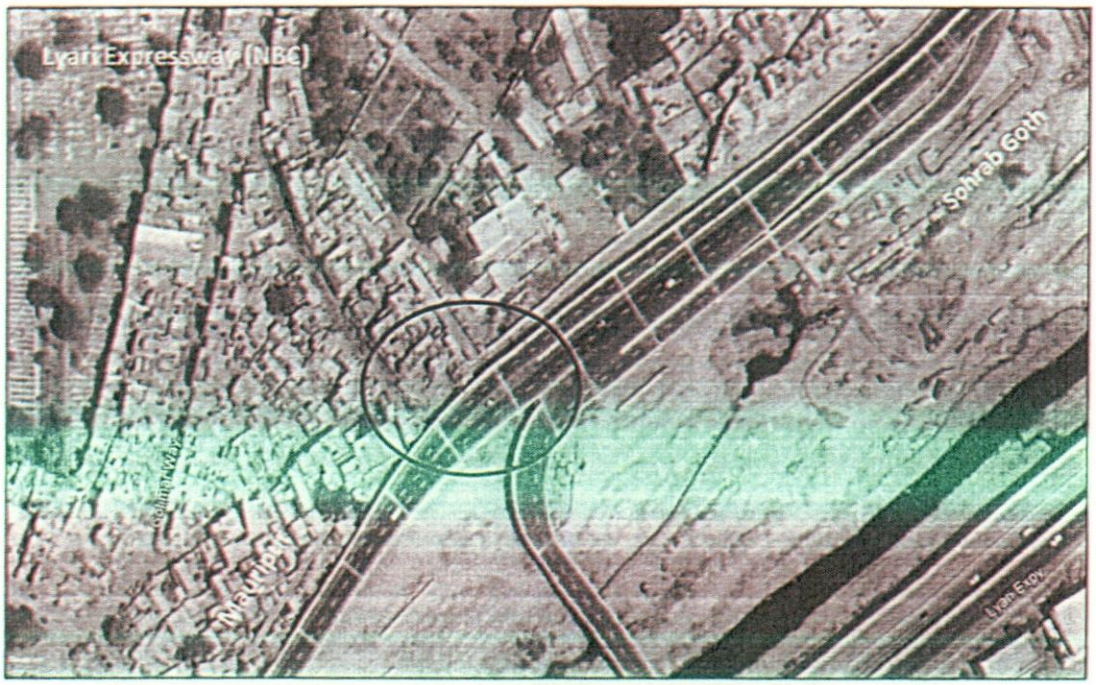


EXHIBIT 25:- IMAGE SHOWING SHARP DIVERSION ANGLE AT EXIT RAMP

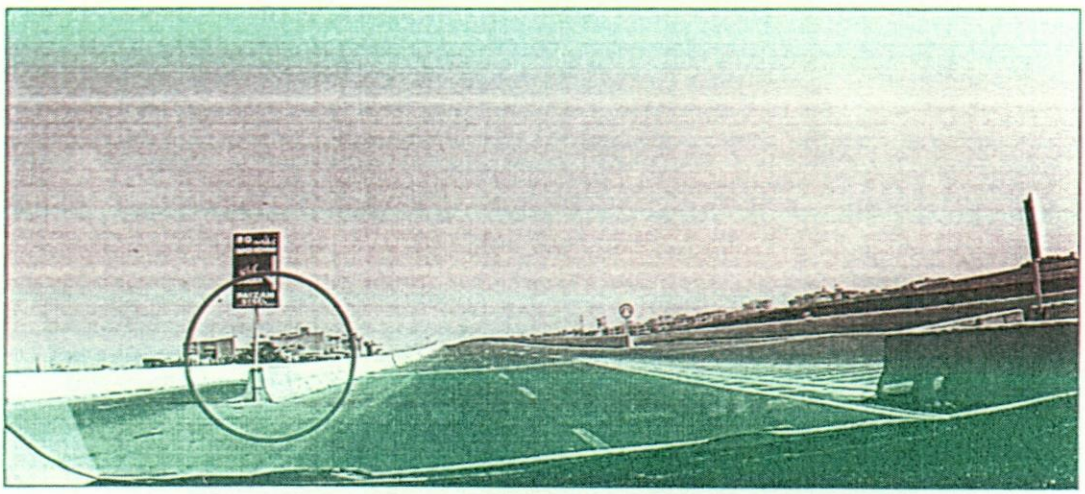


EXHIBIT 26:- BLUNT END OF CONCRETE BARRIER AT MANGHOPIR ROAD EXIT

Recommendations

Review the exit design. Also, protect the blunt end of the rigid concrete barrier with appropriate impact attenuator system.

5.19 Unsafe entrance to NBC of Lyari Expressway from U-Turning Ramp/Exiting Ramp

Location

Manghopir Interchange

Problem Statement

No proper channelization is done at the entrance to NBC of Lyari Expressway which may result in unsafe merging of Ramp/Exiting traffic in the through traffic of Lyari Expressway. This also allows wrong movements from through lanes to right exit ramp which will produce potential conflict scenario with the through traffic. Also, the rigid concrete barrier with a blunt face between the through lanes of Lyari Expressway and Exit ramp is located very close to the U-Turn/Exit Ramp of SBC of Lyari Expressway. Vehicles may hit the concrete barrier and face a fatal crash.

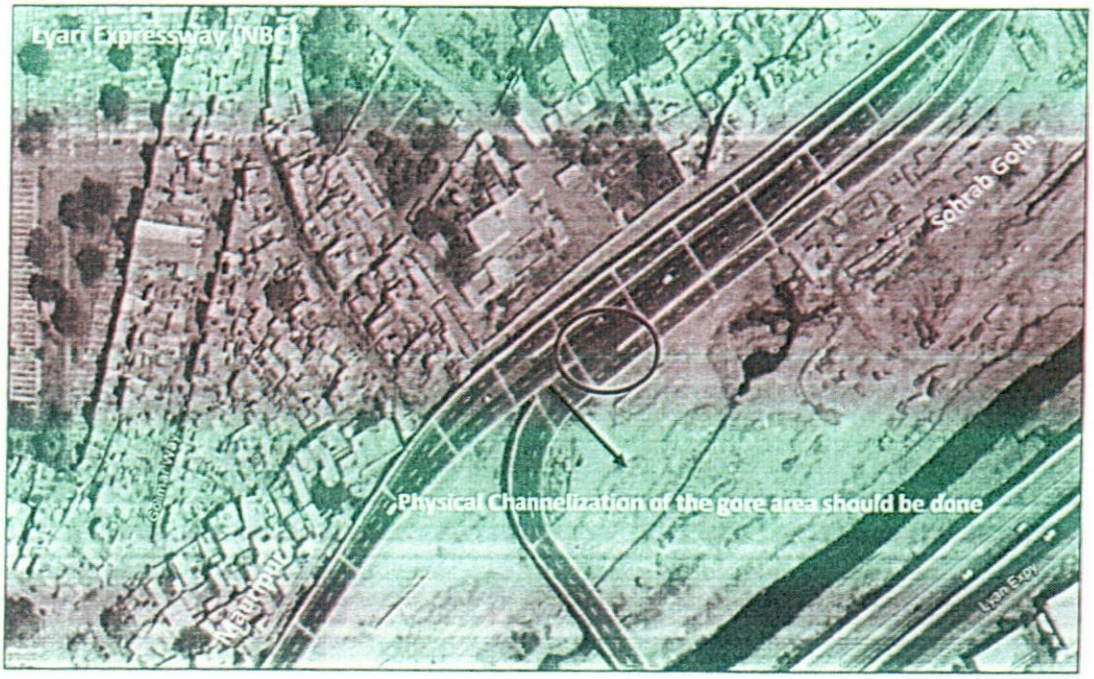


EXHIBIT 27:- IMAGE SHOWING COCNRETE BARRIER LOCATED VERY CLOSE TO THE EXIT/U-TURN RAMP

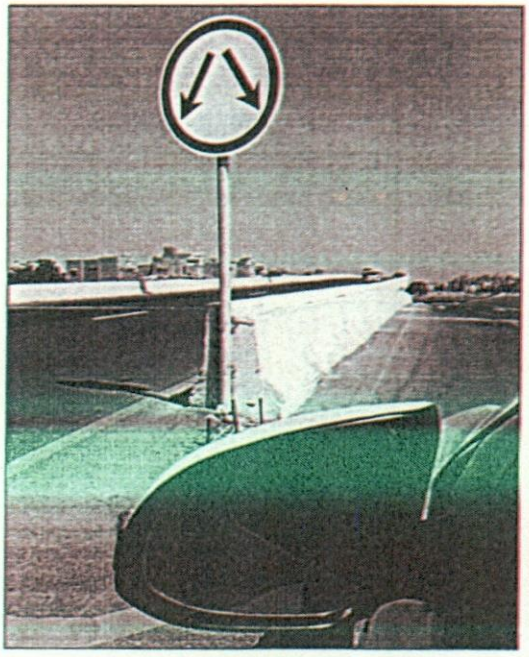


EXHIBIT 28:- BLUNT END OF CONCRETE BARRIER AT THE EXIT RAMP

Recommendations

Proper Channelization should be done between Exit/U-turning ramp and NBC of Lyari Expressway to ensure safe merging between Exiting/U-Turn Ramp traffic and through traffic of Lyari Expressway. It is also, recommended to move the concrete barriers away from the U-Turn turning ramp (turning trajectory of vehicles) as far as possible and install appropriate impact attenuator system at the blunt face location of rigid concrete barriers. Lane assignment guide signs should also be installed on U-Turning/Exiting ramp to guide traffic to select the right lane for Manghopir Road.

6. Conclusion

Design standard included in PC-1 does not mention the design vehicle used for the design *(Refer to Appendix B for PC-1 "Geometric design standards" of Lyari Expressway).* However, according to design consultant (Engineering Associates) Lyari Expressway structure was designed to handle heavy vehicle load. According to Resident Engineer from EA, currently light traffic is permitted on LE and heavy vehicles/container traffic is prohibited as primary objective of the project was to provide congestion relieve to city commuter traffic.

Currently container traffic is using N25/Northern bypass to access M9 which is 55 Km length trip from Mauripur to M9 toll Plaza. While LE can potentially reduce this trip length to about 35 KM, it has many safety issues as described above. Ideally to serve Karachi port M9 bound traffic, the fully controlled access highway (to Motorway standard) need to be provided from Mauripur to connect with fully controlled access M9 which begins from M9 first toll both near Baqai dental college. This will require to convert open access section between LE terminal in Sohrab Goth and M9 Toll Plaza (about 15 KM) into fully controlled access roadway and construction of service road on both sides of fully controlled access highway. New interchanges will also need to be constructed at major intersections. Design consultant should be tasked to study the feasibility of developing controlled access highway as described above and opening of heavy traffic particularity container traffic on LE. This audit report should be provided to the design consultant and contractor, so they may respond/address all identified safety issues.

7. Audit Team Statement

We, the undersigned, certify that the audit team reached consensus on the findings of the RSA. Any recommendation made in this report for safety improvement should be studied further before implementation.

Muhammad Adam Khan
Transportation Engineer

Aizaz Ahmed, PE PTOE
Audit Team Leader

Appendix A- Glossary of Terms used in RSA report

Average Daily Traffic: The average 24-hour volume, being the total volume during a stated period divided by the number of days of that period. Unless otherwise stated, the period is a year. The term is commonly abbreviated a "ADT"

Encroachment: Unauthorized use of highway rights of way or easements by such items as signs, fences, buildings, utilities, vehicle parking, storage, vendors etc.

Functional Classification: Roads are classified according to their primary function-mobility for through trips or access to adjacent lands. A four-class system is used to designate roads (principal arterials, minor arterials, collectors, local streets).

Mobility: Mobility is defined as the ability to move various users efficiently from one place to another using highways and streets. Mobility can sometimes be associated with motorized vehicular movement and capacity. For the purposes of this report, mobility is meant to be motorized vehicles ability to move efficiently.

Road Safety Audit: RSA is a formal safety performance examination of an existing or future road or intersection by an independent qualified audit team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users.

Right Of Way: A general term denoting land, property or interest therein which is acquired, dedicated or reserved by the NHA.

Shoulder: The portion of the roadway contiguous with the traveled way, outside of the edge of the pavement, for accommodation of stopped vehicles, emergency use and lateral support of base and surface courses

Advisory speed signs: The advisory speed is a relative value that, for most vehicles, under WET pavement conditions, provides an adequate margin of safety and is reasonably comfortable for most drivers.

Impact Attenuator System: An impact attenuator is a device intended to reduce the damage to structures, vehicles, and motorists resulting from a motor vehicle collision. Impact attenuators are designed to absorb the colliding vehicle's kinetic energy

Appendix B - PC-1 "Geometric Design Standards" of Lyari Expressway

Appendix C- Decision Tracking Form