TRUCK BYPASS ANALYSIS OF TWIN CITIES (ISLAMABAD-RAWALPINDI)

FINAL YEAR PROJECT UG 2015

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CERTIFICATION

This is to clarify that thesis entitled

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Has been accepted towards fulfillment
of the requirements

For Bachelor's in Civil Engineering

_____

A/P MALIK SAQIB

NUST Institute of Civil Engineering, NICE

School of Civil and Environmental Engineering, SCEE

Dedicated

To

OUR LOVING PARENTS AND INSTITUTE

WHO GAVE US INSPIRATION,

COURAGE,

MORAL AND FINANCIAL SUPPORT

FOR OUR STUDIES

ACKNOWLEDGEMENT

All thanks and praises to ALMIGHTY ALLAH who gave the patience and perseverance and enabled me to complete our bachelor's degree. We are extremely grateful to our parents for their sincere prayers and to our family for their support during the entire length of my course and research work.

My heartfelt thanks and gratitude to our final year project supervisor, A/P Malik Saqib for his valuable advice and inestimable guidance during my research work.

ABSTRACT

Pakistan has experienced a rapid modernization in last one decade. In this duration the vehicle population raised up to 11 million and one of the major reasons is fast Urbanization because people are migrating from Villages to big Cities. To meet the demand of increase traffic, old transportation network must be change.

In this project our focus is basically on Congestion problems faced by Trucks while bypassing the twin cities (Islamabad-Rawalpindi). We have analyzed the possible sources of delays and all the factor responsible for delay. One of the main reasons for delay is Heterogeneous traffic Mix. After analyzing we mitigate these sources for delays by implementing certain strategies. So, we can have fast truck mobility and improved LOS.

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CHAPTER 1

INTRODUCTION

1.1 General

The inter-junction principle road is dividing boundary between twin cities i.e. Islamabad and Rawalpindi. It is highly significant due to accommodation of heavy traffic coming in and out of Twin cities e.g. cargo carrying trucks are most prominent traffic population of this facility. Referring to our core purpose of the study, we will enlighten facts, disadvantages facing due to present condition of road and advantage of our research work.

1.2 Background

The heavy traffic route measuring 32 kilometers starts from EME Stop to T-Chowk Rawat. It consists of 3 roads section, **Peshawar Road, IJP Road** and **Islamabad Highway**. Peshawar road is 4 kilometers in length, IJP road is 9.9 kilometers in length and Islamabad Highway is 18.1 kilometer in length in this route. IJP road was constructed in 2004 under Capital Development Authority (CDA). This route provides very efficient corridor to bypass two cities maintaining the inner-city calmness. In old time railway got publicity which is due to its cheap freight carrying capability. Modern advancement in transport technology enabled road transport to become so efficient and progressive that everyone prefers to travel on roads. Transportation has become the socio-economic measure of country, city or state. This is busiest route of the twin city. After attack on Marriot hotel (2008) in Islamabad all the trucks using Islamabad Highway were directed to this route (IJP main road) leading to outburst of capacity. There is a considerable increase in volume of route on daily basis. There is requirement of smooth traffic flow. Public safety is another concern for highly populated areas encompassing the route. This route includes many bus stations, vegetable markets and main market on its way attracting the heterogeneous mix of traffic including LTV, HTV, Trucks and Motorcycles. Congestion control is the main concern of the route. A combination of Engineering, Education and traffic law enforcement is needed for mitigation such congestion problem.

1.3 Problem Statement

With exponential increase in population and traffic operations on roads, their maintenance, design and operation become very complex that they involve new procedure and techniques for coping up with traffic demands. Otherwise the traffic will keep on congesting and cause problems for commutes. In our country every aspect that was considered while designing the road conforms to previous traffic data and standards. World is progressing. Technology is changing rapidly and new solutions to engineering problems are included in engineering aspects every day. Modelling software are used now days for queuing, delays and traffic signal operations.

After conducting survey of route some highlighted problems are:

1.3.1 Heterogeneous Traffic:

In real world traffic stream is not uniform in nature rather its is heterogeneous. Traffic mix consists of vehicles of different speed, size and other performance characteristics. Mostly research-based traffic stream is homogeneous. There is no such demarcation between both of traffic flows. Even few vehicles can change nature from one to another. According to recent research if dominant mode of vehicles is 85% of total mix than its is homogeneous, otherwise heterogeneous. Our route has no such percentage of dominant vehicles up to 85% of total mix. So, traffic stream is considered heterogeneous. We use specific term PCU's (Passenger Car Units) for this condition. The hour of need is similar standards and design techniques for smooth traffic operation. Size, headway and speed are important parameters in heterogeneous flow condition.

1.3.2 Road Geometry:

Driver's performance is affected by road geometry. Road geometry includes Cross section of road (width of road, number of lanes, shoulder's width, presence of curbs), intersections, interchanges (approaching lane width, no of lanes) and element of curvature (horizontal and vertical curves). AAHSTO performed different experiments and researches to extract effect of geometric design. Their provided values are taken as

standard throughout the world. Perception reaction time, maneuver time, traffic control devices, sight distances and alignment are notable factors traffic operations and design. Traffic jam is most common in these routes during peak hour. The road sections on these routes are designed for low traffic volume, but due to incident of Marriot hotel as described earlier, traffic volume increased, and heavy traffic vehicles affected the road geometry as exceeding the designed capacity of road. Lane widths are not ample. Intersection design, U-turns and median widths are not uniform leading to jams is peak hours. Truck traffic is increased in few years and road was initially designed on standards of LTV therefore, current road standards are not up to Current traffic Population. so, it must be modified. Motorist suffer mostly at night due to dilapidated road and lack of road lights. There is lack of pedestrian bridges for pedestrian to cross the road.

1.3.3 Pavement Condition:

Due to heavy traffic movement on this route and due to insufficient maintenance measure, road has been subjected to severe problems i.e. rutting, crocodile cracks, heaps of garbage, water problems etc. alongside the road severely effects the traffic flow. There should be proper maintenance of the road especially, IJP road and Peshawar Road. Otherwise it will not be able to cope with the demand of the current traffic.

1.4 Dominant Factors/Causes

One of the reasons behind the problem is the derelict and untidy condition of road because CDA has not issued any maintenance fund since 2004, moreover due to exceed in traffic capacity and heavy traffic flow, traffic jam occurs. Another main factor is encroachment on either side of the road by transporters, motor workshop etc. pavement design is also an important factor. Contrary to legislative requirement of our country there is no such controlling authority to check over these problems.

1.5 Study Scope

The research ambition of this route covers a wide area of traffic studies related to design and improvement of road existing and road furniture. Truck route requirements are major need highlighted in our project which refers to one of the best solutions to heterogeneous

traffic flow. Traffic studies are required for improving existing traffic condition i.e. congestion, delays, public concern regarding development and negative impact of ongoing development.

A comprehensive analysis and survey are done. There is identification of truck routes. Current flow condition of truck traffic passing through routes are analyzed. Cost effective solutions to problem faced by truck traffic will be made.

1.6 Project Objective

Some highlighted objectives of our project are narrated as follows.

- To reduce the arterial delays through infrastructure interventions that provide fast and efficient mobility.
- To provide congestion free route for trucks to minimize delays due to heterogeneous traffic flow.
- Cost vs benefit analysis of truck route.

These objectives are achieved by following procedure and techniques:

- Use of modern software techniques to carry out more detailed analysis and deduce accurate results.
- Use of real time data to complement the solution i.e. addition of more lane, truck bypass, signal time etc.

CHAPTER 2

LITERATURE REVIEW

2.1 General

Road transport is the most important transportation mean. A survey done by U.S Bureau of Transpiration Statistics, shows that almost 88.79% of passengers travel through road and 28.50% freight is carried by trucks (BTS, 2005). Conflict arise when two or more meet at intersection. When two or more road combine at a point or at some angle it is known as **Intersection**. Intersection allow the divergence of the converging traffic. The are supposed to be Bottleneck of the network and utmost care is taken in designing as they are main source of traffic jam and other incidents. In U.S 39.7% of accidents occur at intersection. So, for smooth flow there is proper intersection designed. So, when the designed volume exceed interruption in traffic flow occurs and causes congestion and delays. So, traffic signals are installed, and they also cause many problems like delays, accidents etc. if not proper optimized.

Truck traffic is main cause towards the congestion of traffic, if road infrastructure is not properly designed. There are many factors contributing towards traffic congestion. These will be explained.

2.2 Traffic Stream Characteristics

The traffic streams don't allow the movement of all kind of vehicle at same speed even they are not accelerated or decelerated at equal or same rate. There is huge difference between their maximum and minimum value.

2.2.1 Size:

Different vehicles have different physical dimension i.e. length, width which determine their navigation through the traffic. Size determine efficiency of vehicle travel in roadway

space. Smaller vehicle makes a good use of the provided roadway space. Larger vehicles like truck found difficulty in navigation and need larger roadway space.

2.2.2 Speed:

In real life traffic is Heterogeneous. There is diversity in traffic, and it can't be modeled on same basis. According to research the behavior of slower and faster vehicles in heterogeneous mode (speed density relation) is totally opposite. Heterogeneous traffic can never operate smoothly.

2.2.3 Flow:

Flow is expressed differently in homogeneous and heterogeneous traffic conditions. In homogeneous condition, it is usually expressed as vehicle per lane but in heterogeneous traffic condition, flow is dependent on lateral clearance between vehicles which in turn depends upon spacing. Heavy vehicle like trucks demands greater clearance while smaller vehicle make efficient use of roadways.

2.2.4 Driving and Stopping Pattern:

Driving and Stopping pattern is also different for traffic in heterogeneous traffic condition than in homogeneous condition. Homogeneous condition has lane discipline while heterogeneous condition can't have any.

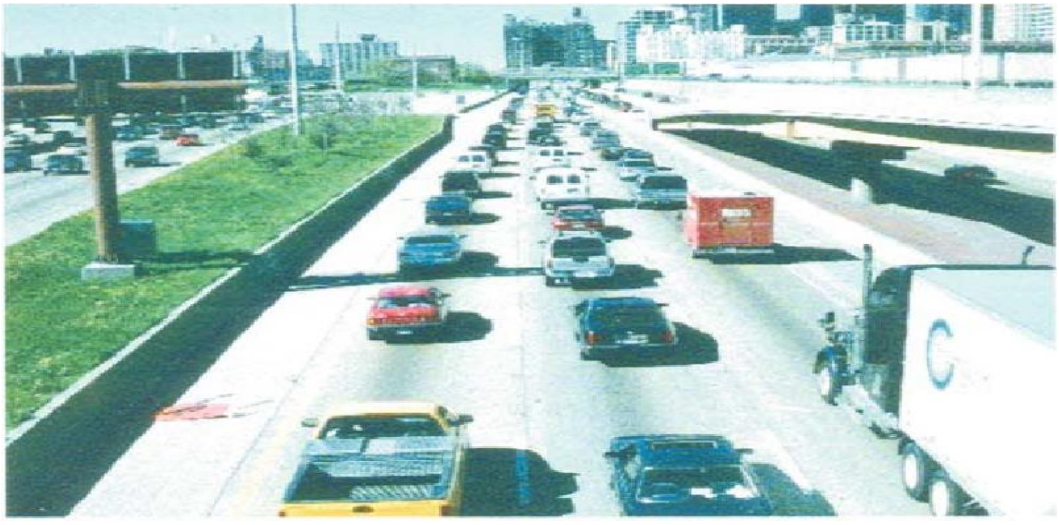


Figure 2. 1 Homogeneous Traffic

Figure 2. 2 Heterogeneous Traffic Condition

2.2.5 Density:

Density of heterogeneous mix is difficult to expressed in term of Lanes discipline. So, technique of areal occupancy is used for such observation. It is defined as how long a size vehicle is passing over a section of road. It can be measured in term of space and time.

2.2.6 Level of Service:

Level of service (LOS) is a qualitative measure used to relate the quality of traffic. Operational conditions of road are represented. There are 6 level of service. Level A represents the best condition (Free Flow Condition) in which a vehicle is not influenced by the other vehicle in a network. While level F represents the breakdown condition and queues develop in such condition.

LOS	Signalized Intersection	Unsignalized Intersection
A	≤10 sec	≤10 sec
B	10–20 sec	10–15 sec
C	20–35 sec	15–25 sec
D	35–55 sec	25–35 sec
E	55–80 sec	35–50 sec
F	>80 sec	>50 sec

Table 2. 1 LOS for At-Grade Intersections

2.2.7 Traffic Congestion:

Traffic congestion occurs as the use increases, and is usually characterized by slower speed, increased vehicular queue and longer trip time. Whenever traffic demand is too high and interaction between vehicles slows down the speed of traffic stream, the result is in traffic congestion. There are following type of congestions:

- **Recurrent congestion:**
  Occurs on regular basis. It can be anticipated easily by the commuter. Examples of recurrent congestion are Peak hour congestion (usually at morning and evening), or regular congestion at markets.
- **Non-recurrent congestion:**
  Occurs at non-regular times at a site. It is totally unexpected and occur usually due to incidents such as accidents, vehicle break down etc.

- **Pre-congestion (Borderline congestion)**

  This occurs when free flow condition breakdowns, but full congestion has yet not occurred. This may be occurred at upstream or at downstream.

2.2.8 Traffic Delay:

The additional travel time experienced by driver, passenger or pedestrian due to some unforced condition that impedes the desirable traffic movement. It is time difference between the actual travel time and free-flow travel time.

2.3 Causes of Congestion:

Congestion is the main problem faced by traffic while passing through the twin cities of Islamabad and Rawalpindi.

Figure 2. 3 Traffic Congestion

There are many causes of traffic congestion. Among them most effective causes are divided into 3 main categories:

- **Physical Highway Features**
  - **Traffic Control Devices:**

    Intermittent disruption of traffic flow by control devices railroad grade crossing and poorly designed traffic signals are main contributing factor towards congestion and travel time variability. Traffic signals if not properly optimized would result in congestion.
  - **Capacity (Physical Bottlenecks):**

    Capacity is the maximum amount of traffic capable of being handled by a section of road. Capacity is dependent on:
- No of lanes
- Width of lane and shoulder
- Grades and Curves
- Merging and diverging areas
- Driver behavior

  Driver behavior is very important factor. Tool booth is also thought a special case of physical bottlenecks as because they restrict the physical flow of traffic.

- **Traffic-Influencing Events**
  - **Traffic Incidents:**

    These are events that disturb the normal working by some impedance in the traveling lanes. Events such as accidents, vehicular breakdown and debris in lanes are the common incidents. Along with blocking the lanes physically, event occurring on shoulder and sides can also distract the driver which may change the behavior of the driver and ultimately it can degrade the quality of traffic flow. These incidents cause traffic congestions.
  - **Work zone:**

    These are activities on that results in physical change in environment of highway section. Changes in road condition may include the reduction in no of lanes, lane

diversion, reduction in shoulder or lane width. Delay by the work zone is cited as the worst condition they encounter on road.

- **Environment Condition:**

  Environment conditions effect driver behavior. Due to reduced visibility, driver will lower their speed. Increase their headways when precipitation, bright sunshine on horizon, fog or smoke are present.

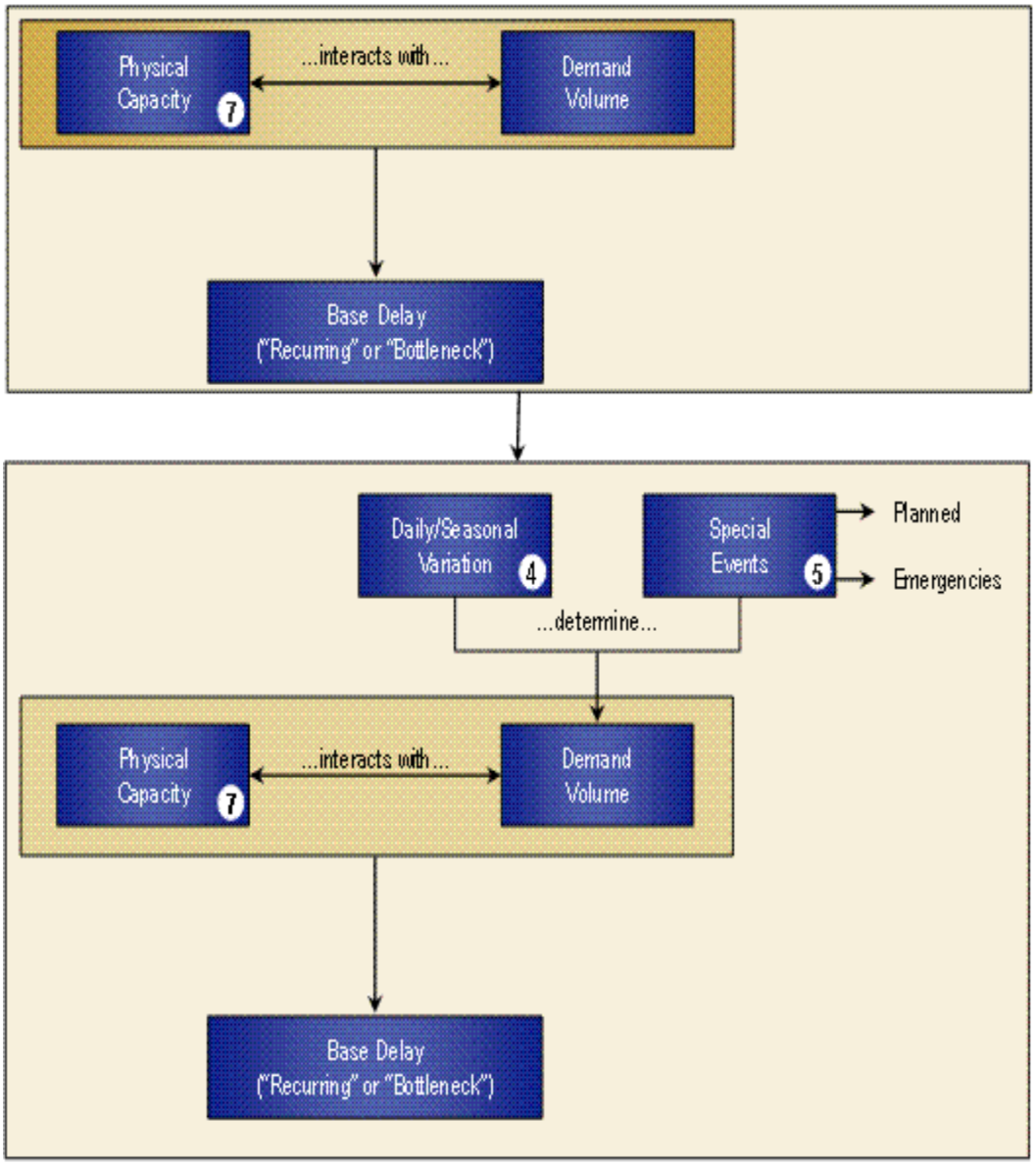
- **Traffic Demand**
- **Fluctuation in Normal Traffic:**

  Day to day variability in network traffic will result in very high volume someday. Due to superimposition of such high volume on network of fixed volume will results in congestion, variable travel time and delays.

- **Special Events:**

  It is a special case of demand fluctuation where traffic flow in the vicinity of special event is different than the typical one. These events occasionally caused surges in the traffic demand that effects the system.

2.4 Anatomy of Congestion:



Traffic Volumes Interact with Physical Capacity to Produce "Base Delay"

- The starting point for congestion on most days is the amount of traffic and the physical restrictions on the highway (bottlenecks). Traffic varies from day-to-day throughout the year and special events may cause surges in traffic at unexpected times.

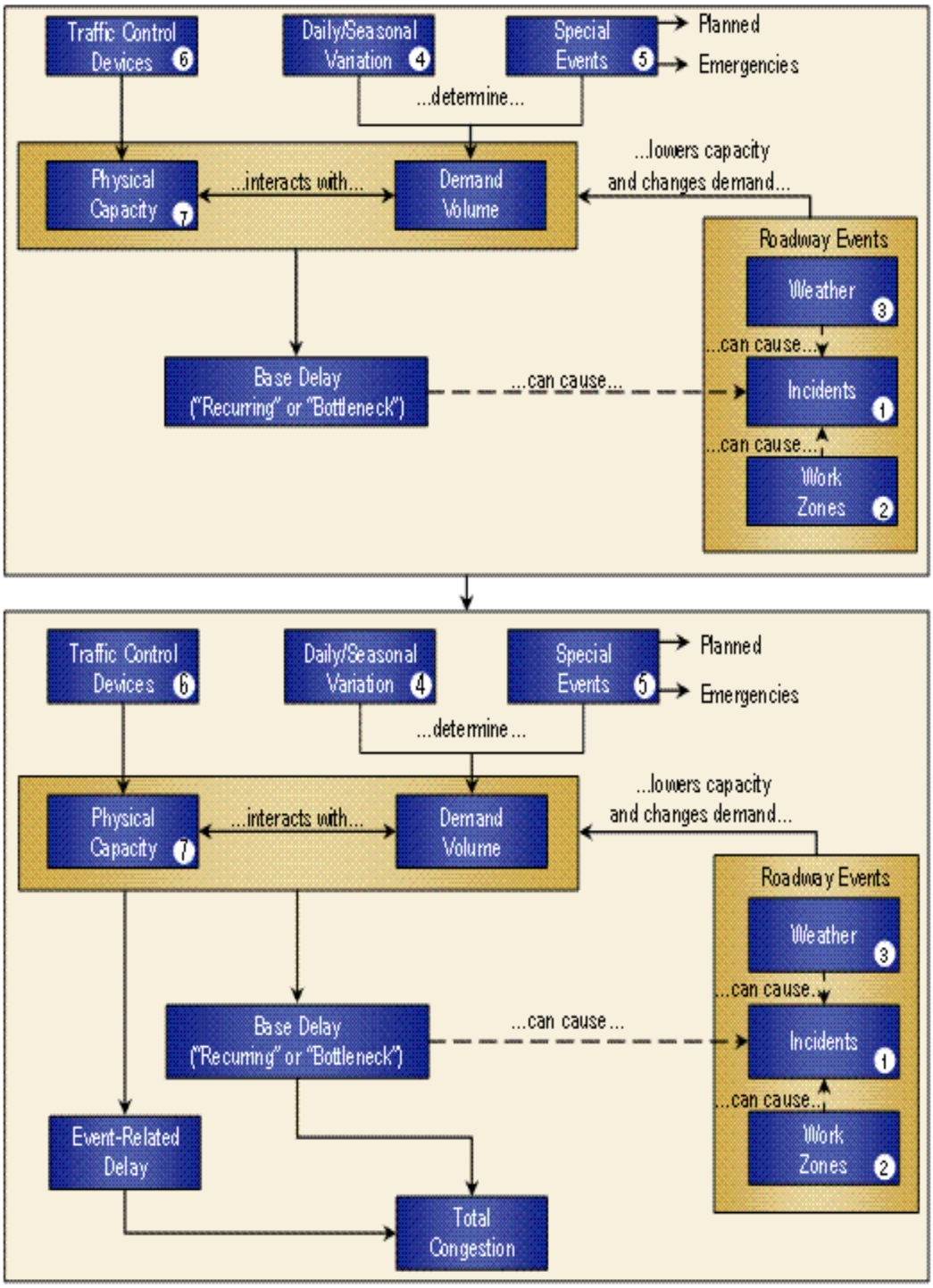


Figure 2. 4 Anatomy of Congestion

- Even with no changes in traffic incident characteristics, traffic incident delay grows as more traffic is added to a roadway. In other words, as the traffic level grows on

a base of fixed capacity, the roadway is more vulnerable to disruptions caused by traffic incidents, or any other traffic-influencing event for that matter.

2.5 Case Studies:

The case studies have been held throughout the world regarding truck lanes on metropolitan road to remove congestion and ease of flow of heterogeneous traffic stream. Some of them are explained as follows:

2.5.1 Interstate 5 (Washington)

United State of America is one of the world most grown nation in terms of traffic, Buildings and economical state. Various problems are encountered on different roads one of which is Interstate 5. It is the busiest road in America with heavy traffic flow through northbound lanes. It exceeds its capacity from 59000 vehicles per day to 66000 vehicles per day on daily basis. School timing from 6-9 am also contribute to congestion and Delays.

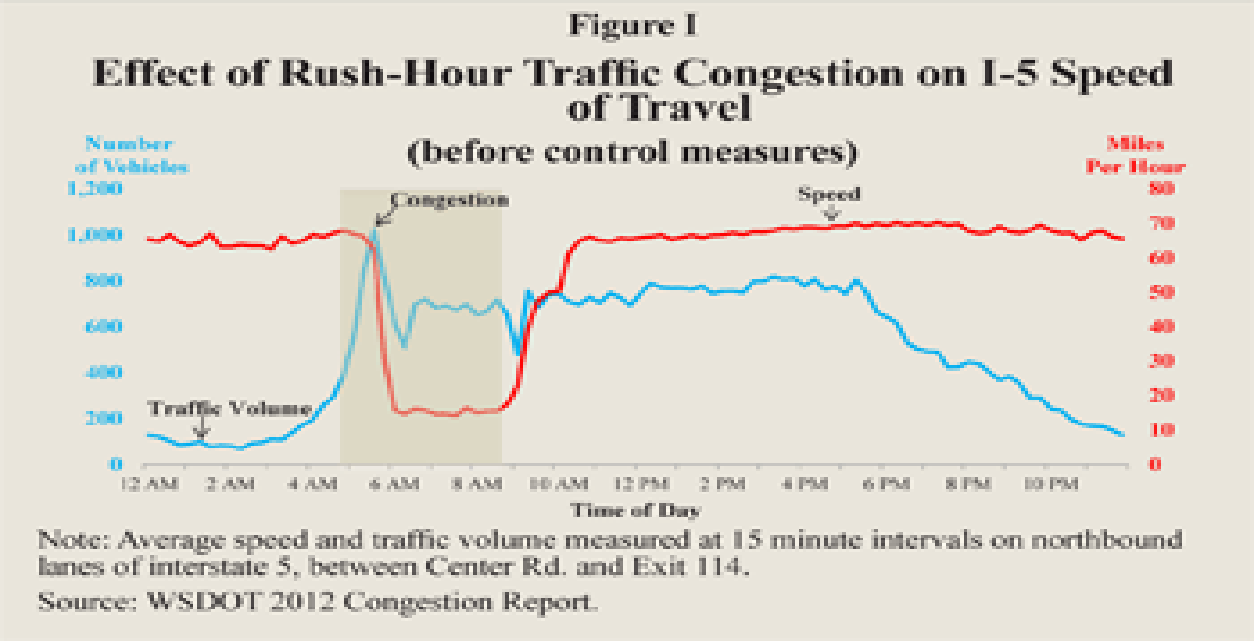


Figure 2. 5 Effect of Rush Hours-Traffic Congestion on I-5 (before control measures)

The above graph shows the traffic graph before the mitigation measures needed and it was improved by taking some measure as explained further.

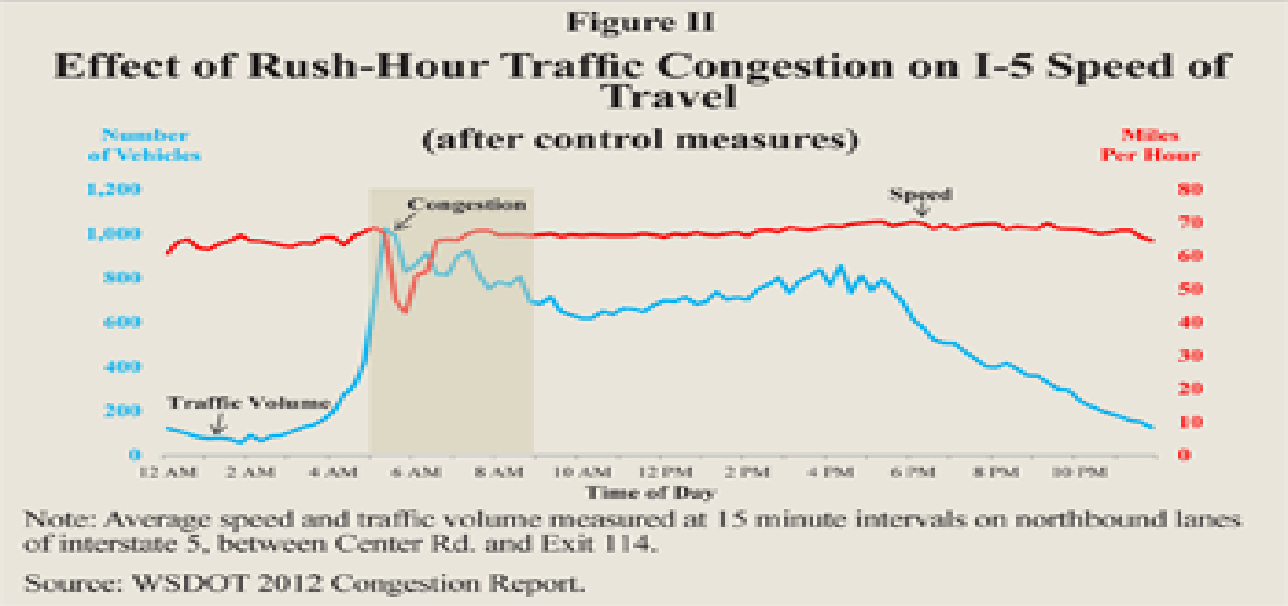


Figure 2. 6 Effect of Rush Hours-Traffic Congestion I-5 (after control measures)

Interstate 5 was improved by:

- Optimization of signals
- Adding two gates for schools for incoming and outgoing traffic

After implementing above measures there was huge improvements in speed (15mph to 60mph) and Delays (Up to 15 mins). Most effective way in congestion control is Congestion pricing.

Congestion Pricing:

It is defined as charge of tool tax during peak hour of traffic because low cost of traffic allows irrelevant traffic to pass and mingle in between.

This technique is implemented in some areas and have better results. It is effectively used in following areas:

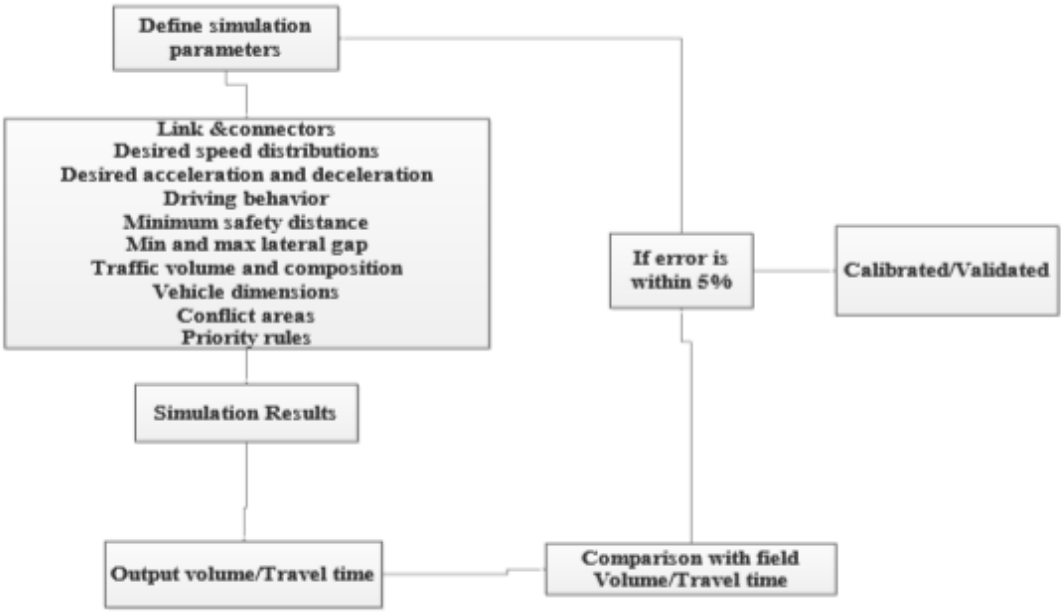
- London, Malian and other European cities have drawn a cordon line which is a limiting boundary around city center for paying tolls to those roads.
- New York has converted fixed tools to congestion tools on bridges to Manhattan. Same is case in California to San-Francisco bay bridge.

- Toronto is also constructing new highways with congestion tolls and replacing gas taxes with toll pricing.

2.5.2 Characterization of Parameters to Mitigate Urban Traffic Congestion in Developing Countries–A Case Study of Peshawar Pakistan.

Traffic flow in Peshawar urban roads is very exciting to be studied because of two main causes. First, the traffic is highly heterogeneous having a blend of different types of vehicles like small-cars sedan- cars, pickups etc. and having high movement and heavy vehicles like trucks and buses. Secondly due to absence of proper lane discipline it leads to a blend of several issues like enforcement and education. During the rush hours the vehicles tend to take any lateral position along the width of roadway if they found some space which results almost in a diamond shaped queue. Traffic congestion results in time wastage, energy consumption, increased pollution and stress, the productivity is reduced, and forces cost on people.

The **GT road** in Peshawar was selected as the pilot scale project. Initial inspection of the research site was done and it is initiated that total length of the section of G.T road stretches from Fort **Balla hisar** to **Peer Zakori Bridge** is **4.9 km**. Main traffic flows through this corridor especially in morning and afternoon peak times due to the direct access to Business areas, educational institutes, Business areas and Motorway. Site data for road geometry, vehicles specification, percent turning vehicles and average spot speeds was collected.



Conceptual framework of the model

Figure 2. 7 Description of driver behavior data collection illustration

Figure 2. 8 Traffic flow condition near Firdose at 9 A.M. (VISSIM)

From the analysis of the data, it was found that:

- Simulation result shows Firdose section and Govt college Peshawar chowk section to be the most congested during the peak hours which is quite in agreement with the ground reality.
- Presence of conflict points was main factor that contributed to Queue Delay due to merging and diverging traffic points and U-TURNS.
- Auto rickshaw model was incorporated in the research for the first time, to create a more realistic simulation model for Peshawar.
- Driving behavior was one of main contributing factor for the delay which ultimately results in an increased travel time on GT road.
- To reduce queue delay, conflict points need to be minimized. This could be achieved by reducing the number of access/exit points along the arterial road (GT road) especially near critical sections.

2.5.3 Truck Bypass (Cost Benefit Analysis):

The California Department of Transportation (Caltrans) has developed plans for a westbound truck bypass on a new alignment for just over six miles. The truck bypass will be two lanes wide with a left shoulder width of 1.5 meters and a right shoulder width of 3.0 meters, standard for a freeway-to-freeway connection. The bypass will merge with mainline I-580 west of Grant Line Road at a point where the high truck volumes can be

safely accommodated with appropriate merging distance.

Caltrans owns and maintains I-205 and I-580, which are included in the Interregional Road System (IRSS). The operational and safety improvements proposed by this project are consistent with the concept of an eight-lane facility for I-205 and a six-lane facility for I-580 with truck separated facilities identified as options on both corridors and would not preclude future transportation improvements in the project area.

According to Caltrans, the project will:

- Relieve traffic congestion and improve safety and operational efficiency by separating slow-moving vehicles from the rest of traffic.
- Improve freight and goods movement between the Bay Area and the Central Valley.
- Reduce movement conflicts.
- Remove a choke point and improve reliability of goods delivery.

2.5.3.1 Type of Analysis:

The Office of Transportation Economics used the California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C) to calculate the project's life-cycle cost, life-cycle benefits, net present value, benefit/cost ratio, internal rate of return, and payback period.

2.5.3.2 Time Period for Analysis:

The time period for the analysis is 20 years

2.5.3.3 Costs:

The initial cost estimate for this project was $58.4 million, with an average future maintenance and operation cost of $169,000 per year. This project is currently programmed for Project Approval and Environmental Document (PA&ED) phase only. Future funding to complete the project is expected primarily from the Interregional Transportation Improvement Program (ITIP); however, there is potential regional local funding for future phases.

2.5.3.4 Benefits:

The benefits considered for this project are those benefits monetized in the Cal-B/C Model. All benefits and costs are in year 2000 dollars. A 5.0% discount rate was used to evaluate future costs and benefits in 2000 dollars. Travel time was valued at $8.16/hour for automobiles, $27.72/hour for trucks. Vehicle operating costs were divided between fuel and non-fuel related costs. Fuel costs were valued at $1.14/gallon. Non-fuel related costs were valued at $0.165/mile for automobiles and $0.285/mile for trucks. Emission benefits were not considered in this analysis.

2.5.3.5Analysis:

The following tables present the results of the Cal-B/C analysis:

2.5.3.5.1 Benefits

Itemized Benefits (mil. $)	1st Year	20 Years
Travel Time Savings	$0.1	$29.8
Veh. Op. Cost Savings	$4.9	$54.4
Accident Reductions	$0.0	-$0.0
Emission Reductions	$0.0	$0.0
Total Benefits	**$5.0**	**$84.2**

2.5.3.5.2 Investment Analysis

Life-Cycle Costs (mil. $)	$62.6
Life-Cycle Benefits (mil. $)	$84.2
Net Present Value (mil. $)	$21.6
Benefit / Cost Ratio:	1.3
Rate of Return on Investment:	8.1%
Payback Period:	10 years

Models Used:

Cal-B/C model was used analysis.

CHAPTER 3

RESEARCH METHODOLOGY AND DATA COLLECTION

3.1 General

This chapter explains the methodology used for the research. The data collection procedure which comprises of through data. These measures are taken to ultimately reach the traffic delay.

We started the data collection from 26 N0. Stop and EME bus stop Peshawar road manually. This data includes both entering and leaving the Twin cities. Then the Next location was T chowk Rawat. Same manual counts were done for the traffic entering and leaving the Twin Cities. We are Considering two routes. One from EME stop to T-Chowk Rawat.

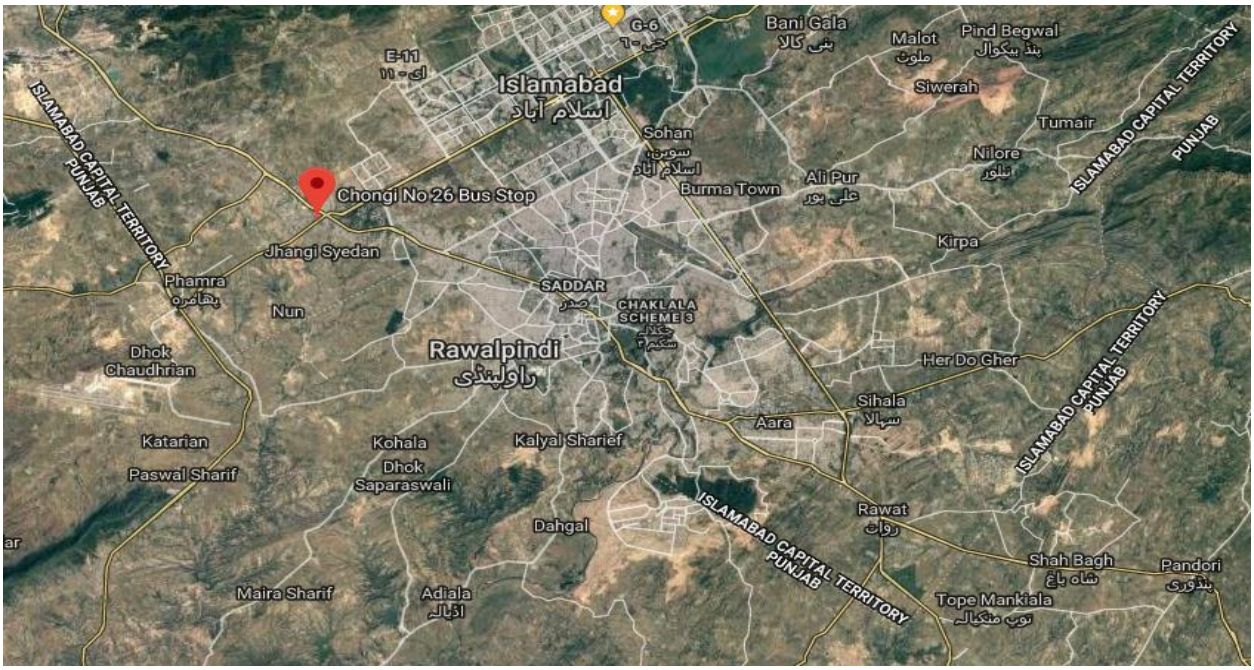


Figure 3. 1 Project Location (Route-1)

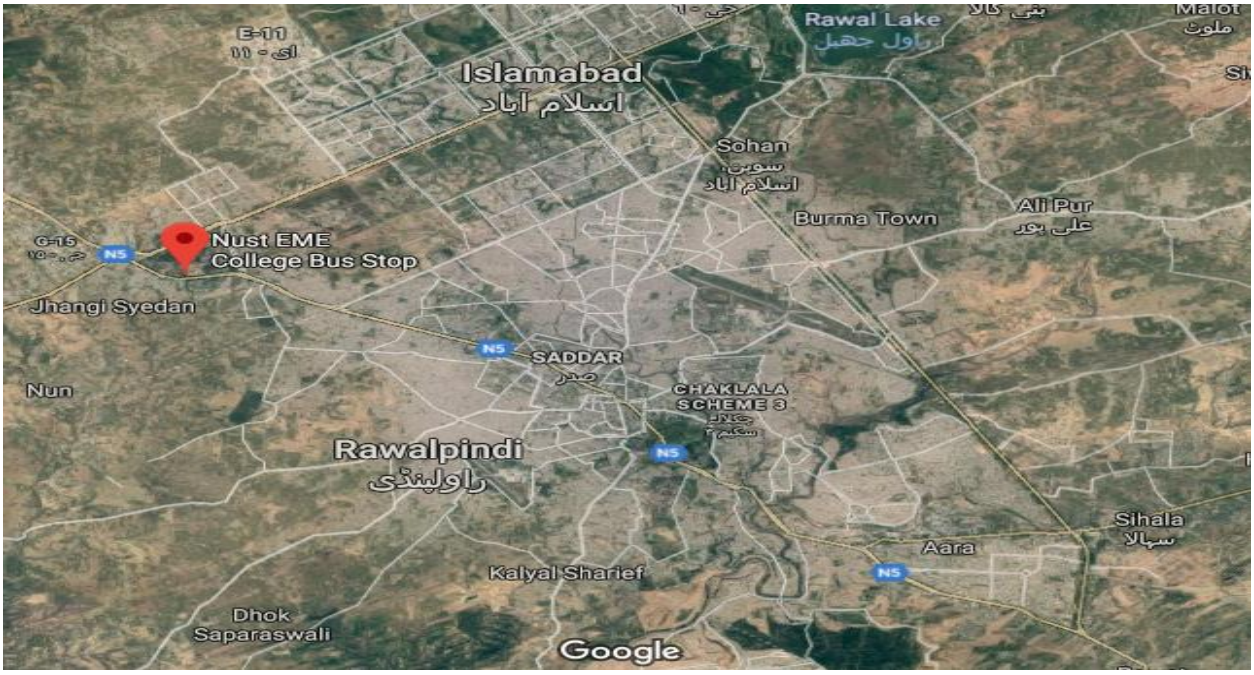


Figure 3. 2 Project Location (Route-2)

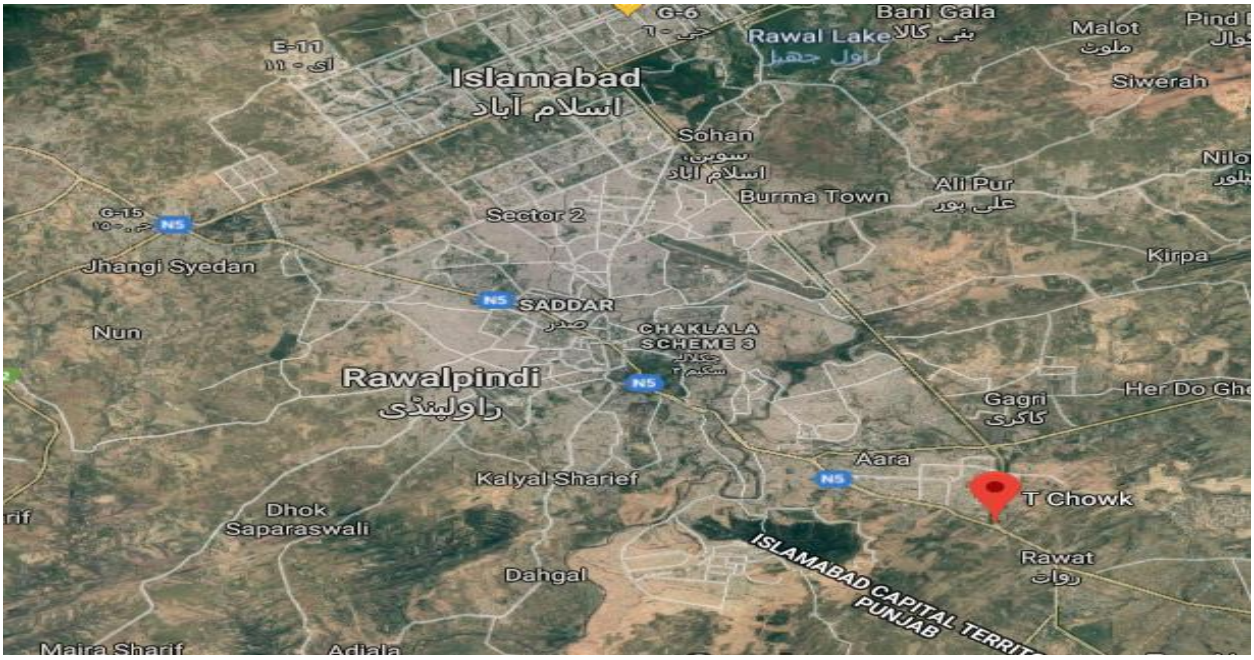


Figure 3. 3 Project Location (Route-3)

3.2 Working Methodology:

The following flow chart represents the generalized framework of the project. The work started with literature review. Our most important phase was data collection phase. There were two locations for data collection. These were entrance and exit points of twin cities. One is EME stop and other one is T-Chowk Rawat.

After completing first phase of data collection, we head towards the Data Analysis part. The next part was modelling using VISSIM. In VISSIM based on existing conditions on road, Base Model of routes were prepared. Than different strategies are modelled. Results were obtained. Final Part was Cost vs Benefit Analysis of the strategies and then results were compared.

Generalized Study Framework

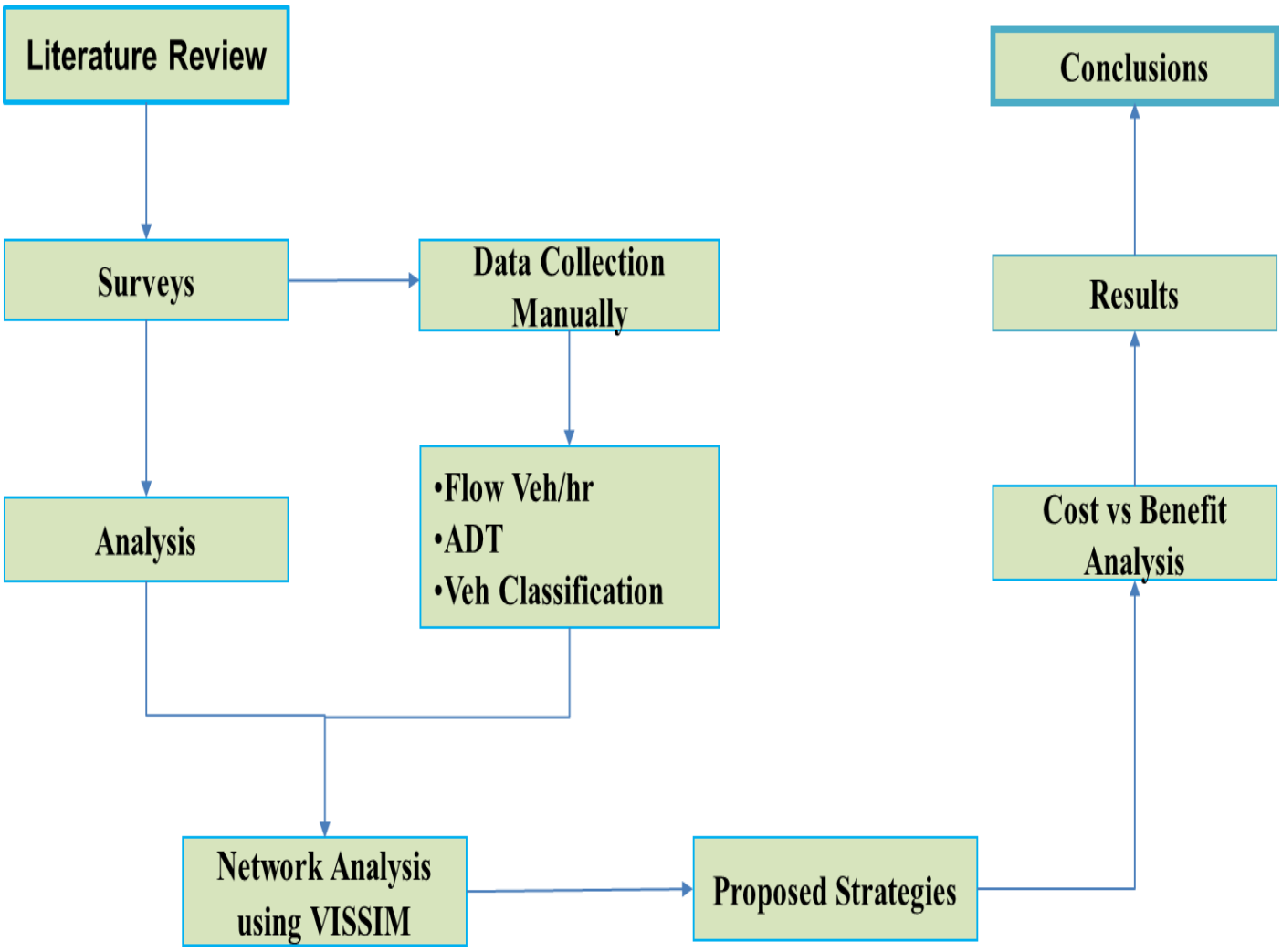


Figure 3. 4 Working Framework

3.2.1 Survey

Survey is divided into two categories:

3.2.1.1 Data Collection Manually:

Data was collected for 3 hours. From (1:00 PM to 4:00 PM). We choose two spots. EME bus stop and T-Chowk RAWAT. The collected count is categorized as:

- **LTV**
- **HTV**
- **Trucks / Trailer**
- **Motorcycles**

The data was than extrapolated to 24-hours data to find ADT (Average daily Traffic) using peak hour data. Peak hour of trucks was first calculated based on data collected of trucks.

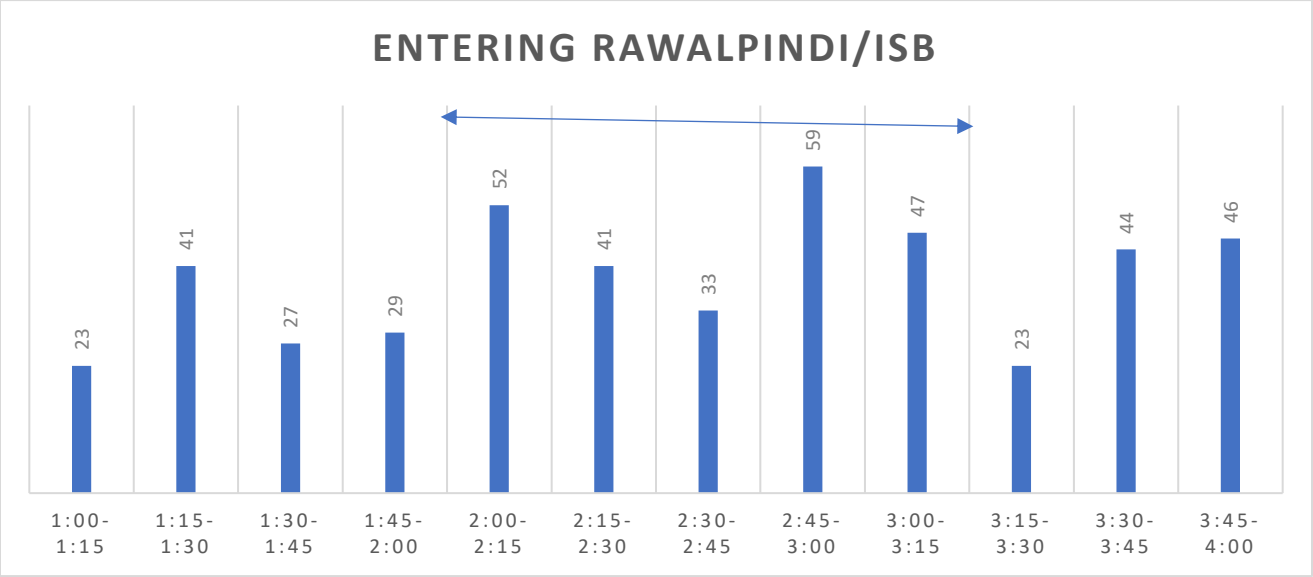


Figure 3. 5 Trucks Entering Twin Cities

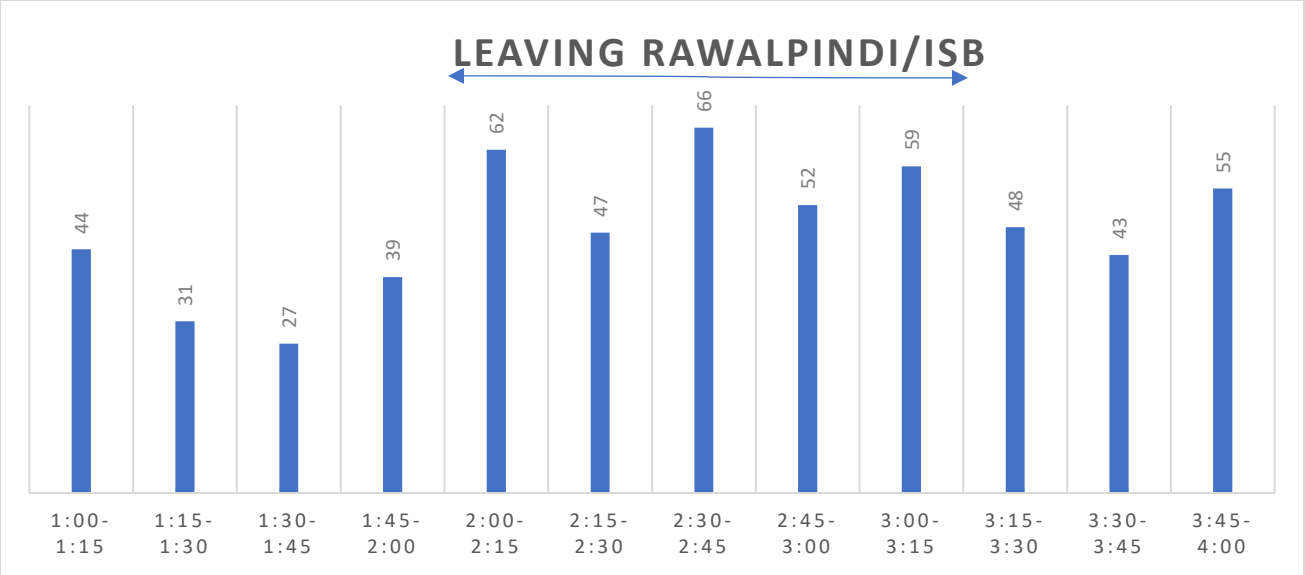


Figure 3. 6 Trucks Leaving Twin Cities

As peak hour is 15% - 8% of ADT, so

- **Traffic entering Islamabad /Rawalpindi (ADT)**

  40000 veh/day

  HTV 1000 veh/day

  Trucks/Trailers 4800 veh/day

- **Traffic Leaving Islamabad / Rawalpindi (ADT)**

  48875 veh/day

  HTV 1200 veh/day

  Trucks/Trailers 3910 veh/day

3.2.1.2 O-D Survey:

An O-D study is a review of travel information used to determine the future travel pattern. The purpose of the survey is to collect data about the actual trips being made in project study area. The interview of 200 truck drivers are conducted in order to know about the

problems they face while passing through the twin cities. The result is compiled in excel sheet and trending graphs are prepared. They are interviewed with following questions:

Nature of Travel	Avg travel speed	Speed within city	Congestion Points	Problems facing	Suggestion
Stay	0-20 km/hr	0-20 km/hr	26 no Stop	Traffic congestion	Separate lane
Temporary Stay	20-40 km/hr	20-40 km/hr	Garden town entrance on Isb highway	LTV disturbance	Alternate route
Bypass (Through RWP)	40-60 km/hr	40-60 km/hr	Peshawar Mor	Restriction to enter city	No restrictions to enter
Motorway	60-80 km/hr	60-80 km/hr	EME stop	No entry during peak hrs. check posts stoppage	Reduce traffic restrictions
	more than 80 km/hr	more than 80 km/hr	IJP road	for no reasons	No suggestion
			Westridge Carriage factory		Lane discipline implementation
			Mandi Mor		Divided lane Reduce interference by LTV
			Double road stop		NO time restrictions
			Faizabad interchange		LTV should not be allowed in truck lane
			T-chowk		Speed limit
			Soan Garden Signal		

Table 3. 1 O-D Survey Results

CHAPTER 4

ANALYSIS AND RESULTS

4.1 GENERAL

This chapter includes the output/results of our analysis performed. Both routes were analyzed.

4.2 O-D Survey Analysis

Analysis is done based on interviews performed. Followings are the results of analysis:

4.2.1 Nature of Travel

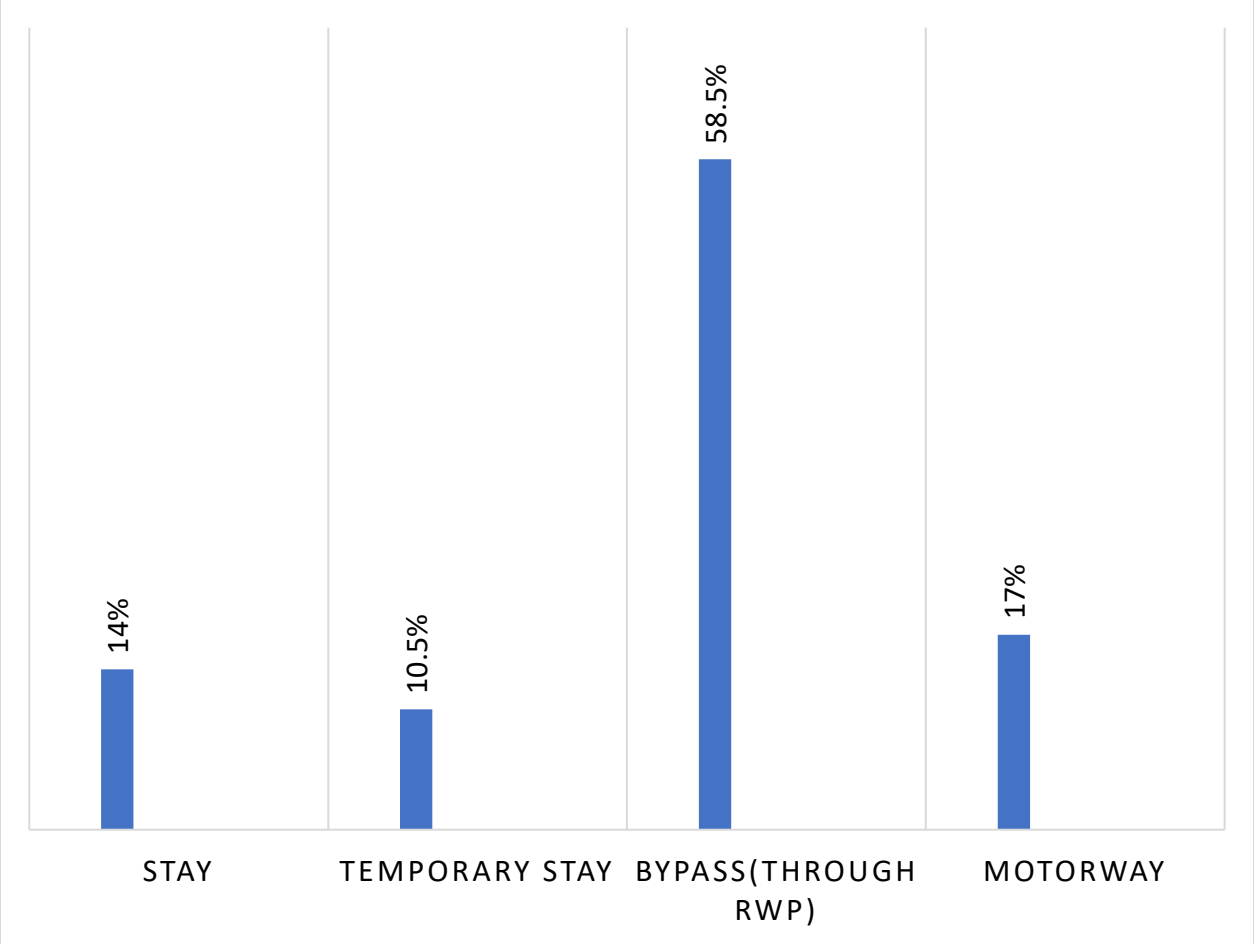


Figure 4. 1 Nature of Travel

According to the data obtained, about 86% of truck traffic is bypassing through the twin cities. Only 14% of truck traffic is staying.

4.2.2 Time to Bypass City:

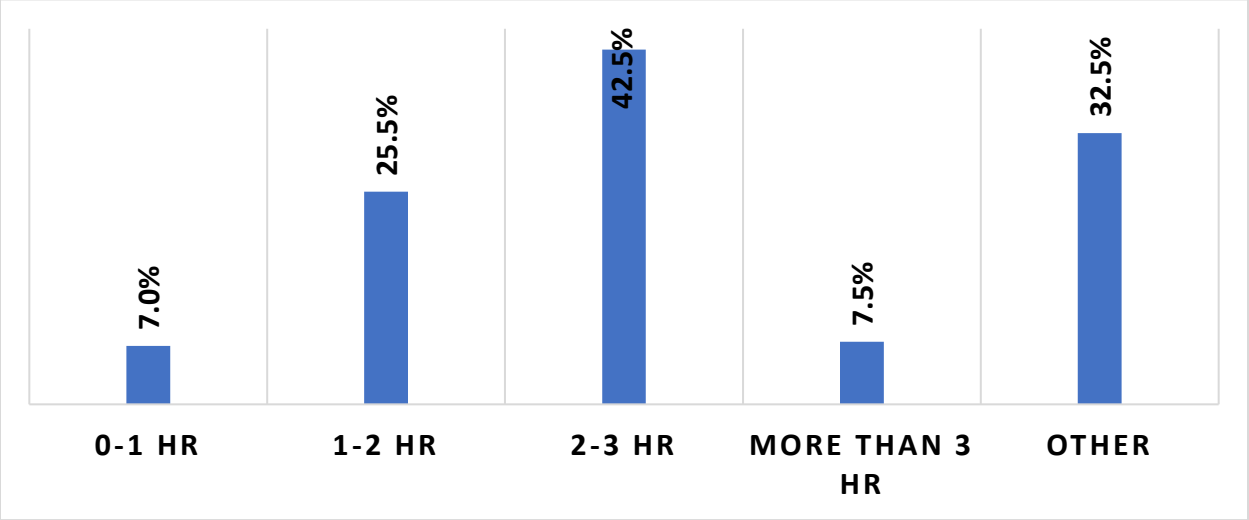


Figure 4. 2 Time to Bypass City

Due to congestion throughout the corridor, most of the truck traffic take 2-3 hours to bypass the city. This is mainly during peak hours. Traffic delay is the main problem faced by these truck drivers.

4.2.3 Speed Within City:

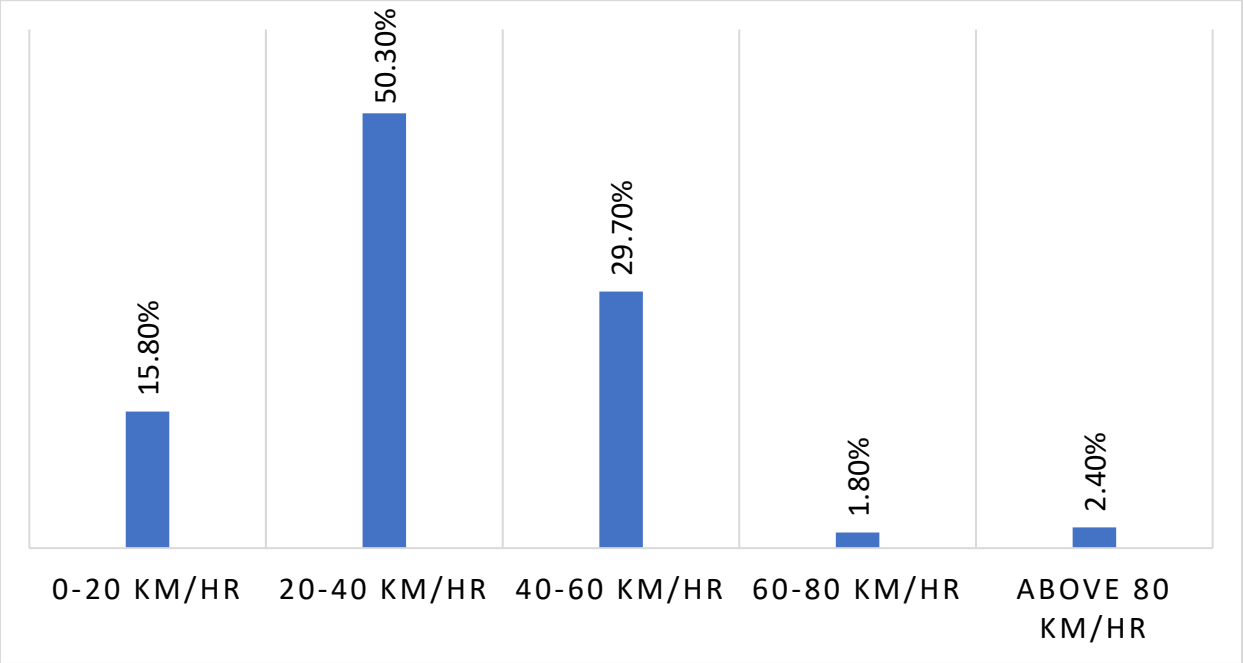


Figure 4. 3 Speed Within City

Average speed with the city is in range of 20-40 Km/hr. Although the length of the route is less, but due to high congestion and delay, the average speed with the twin cities is low.

4.2.4 Congestion Points:

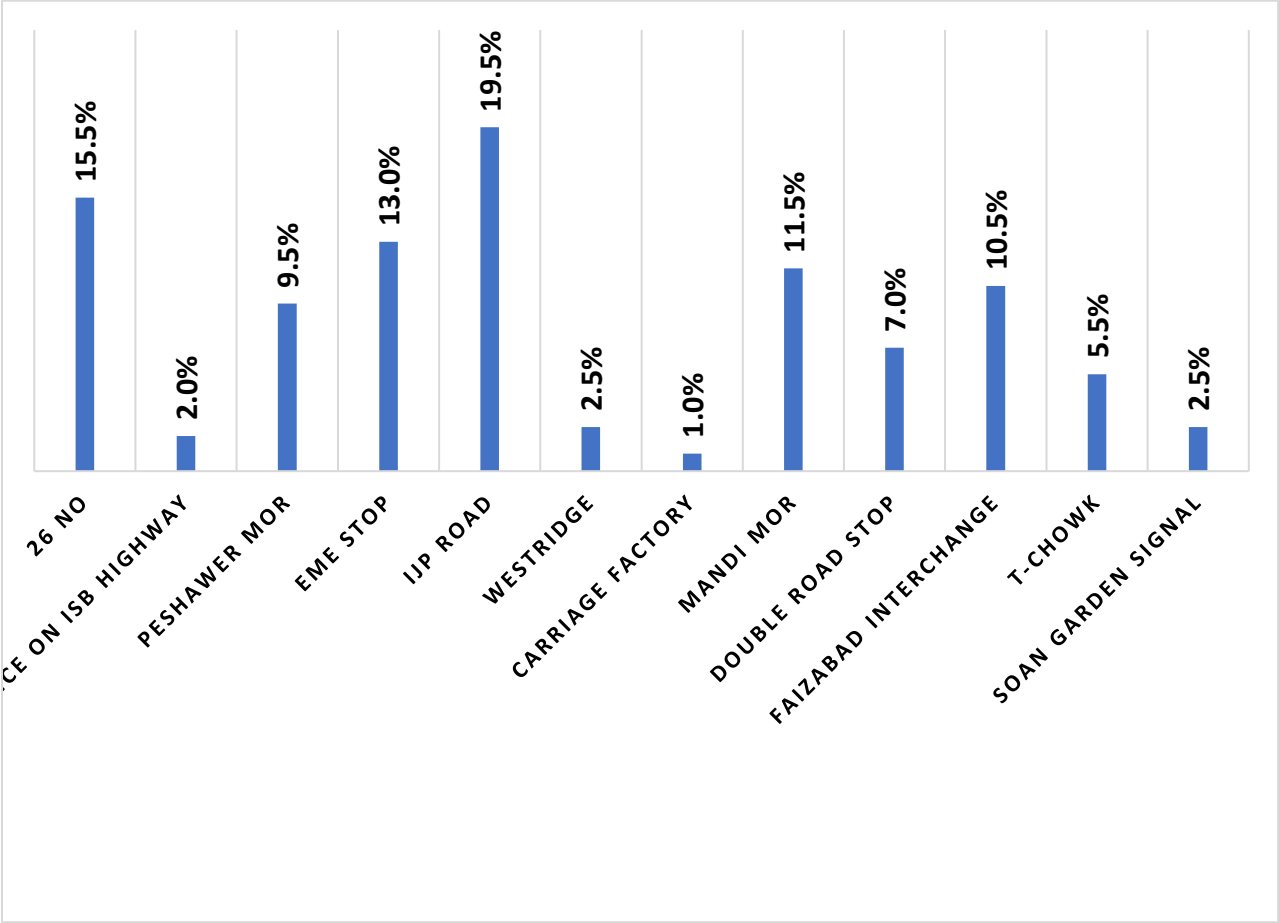


Figure 4. 4 Congestion Points

Congestion is throughout the corridor. There are plenty of congestion points. The most congested part of route is IJP road with a percentage of almost 20%. 26 No is the second most congested with a percentage of almost 16%.

4.2.5 Problem Faced:

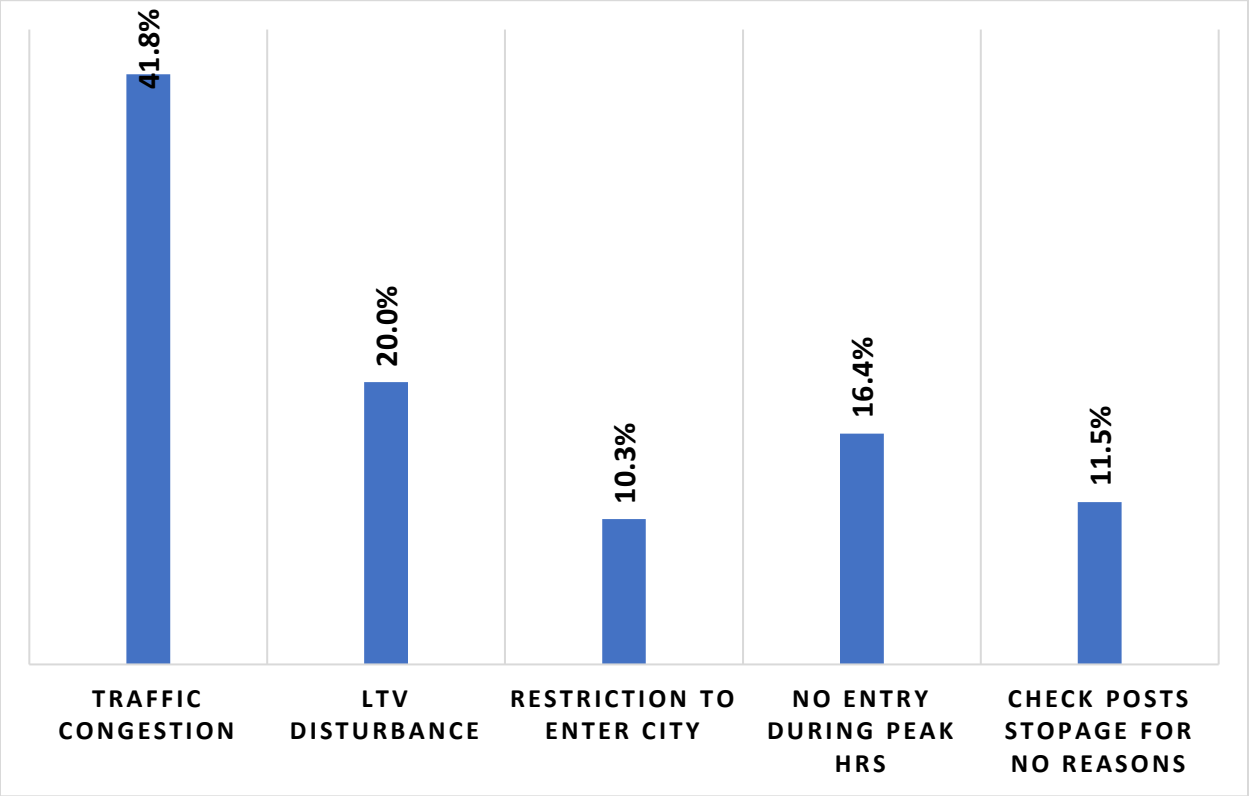


Figure 4. 5 Problem Faced

We interviewed them about the main problems the face while passing the twin cities. Most of them mention these problems. Traffic congestion is the main problem for the truck drivers up to 42%.LTV disturbance and few other restrictions are other problems which should be mitigated. These are the constant source of disturbance for the truck drivers.

4.2.6 Suggestions:

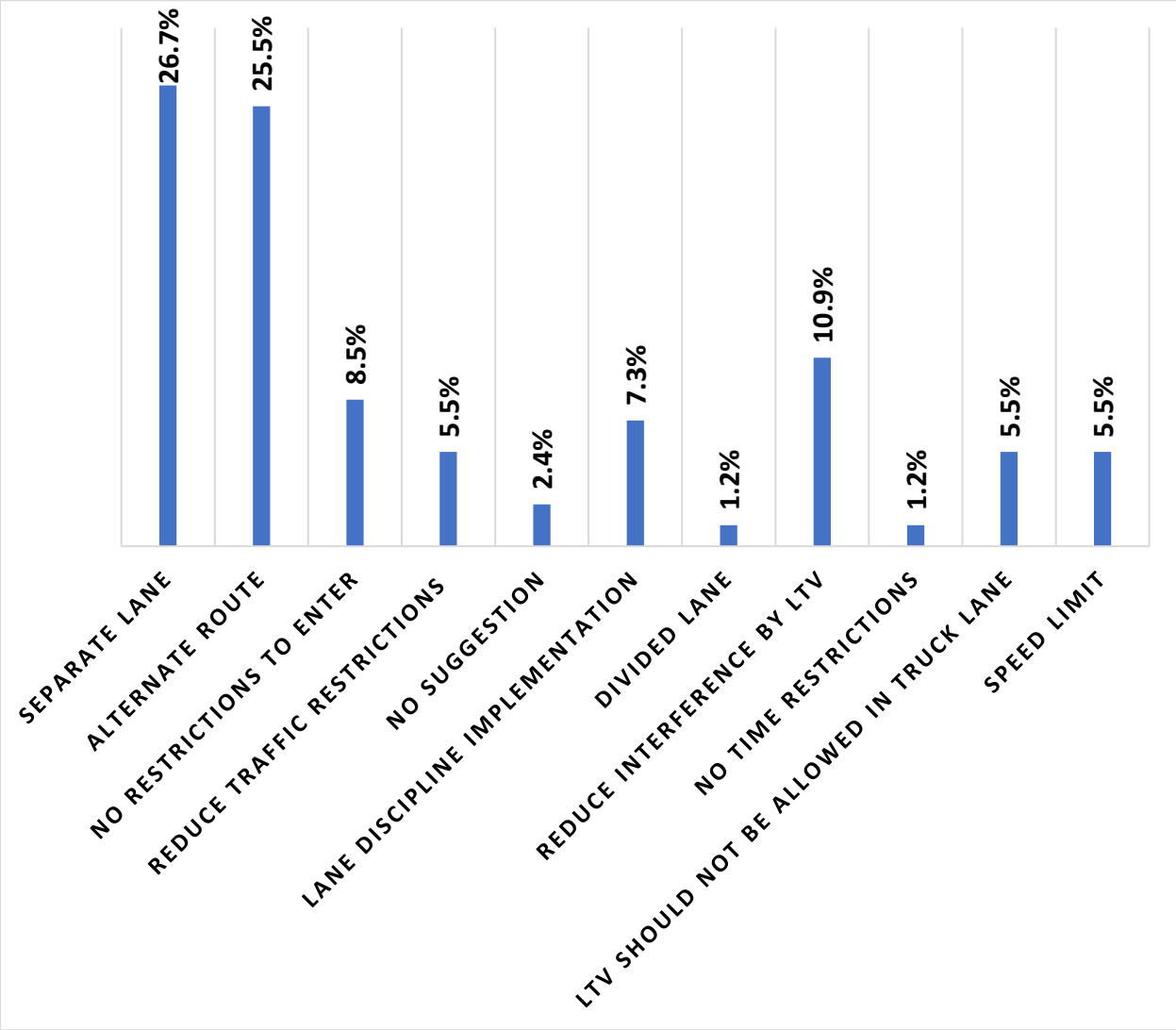


Figure 4. 6 Suggestions

Certain suggestions are given by truck drivers. Addition of exclusive truck lanes and separate bypass for trucks are the most eminent suggestions. The implementation of these strategies is also possible. Further we will modal the current road condition and implement these suggestions and compare the results.

4.3 PTV-VISSIM

Overall both networks are analyzed using PTV VISSIM. Firstly, base model is prepared and then strategies are implemented to find out results.

4.3.1 PTV-VISSIM:

PTV-VISSIM is basically a microscopic and unique multi modal software for traffic simulation developed by PTV planning transport Verkher A.G, A German based company. In this software micro-simulation is done, each traffic entity like car, tram, pedestrian is simulated individually. i.e. we can evaluate and present all the real-life entities and condition for traffic simulation.

A salient feature of this is its uniqueness (multi-modality), means more than one kind of traffic can be simulated by this software. Such as:

- Vehicles (cars, buses, trucks, Oil tankers)
- Public Transport (Trams, buses)
- Cycles (Bicycles, Motorcycles)
- Pedestrian
- Rickshaws

4.3.2 Benefits of VISSIM:

Other than multi modelling, there are many other effective features of software to be explored.

4.3.2.1 Visualization in 2D and 3D:

Switch perspective helps you to display your analysis results in both 2D and 3D. This assists in public-making processes with the help of detail reports. This salient feature makes the traffic simulations more appealing and understandable to all.

4.3.2.2 Ease of Use and Productivity:

We can build our model efficiently by using various inter-faces (Driver Model, driving simulator etc.) to import existing networks. The interface with flexible dock able windows allows for efficiently creating and editing network objects and their attributes as well as gives results for numerous variables, which makes it more user friendly.

4.3.2.3 Maximum Accuracy:

With the help of this software maximum accuracy can be achieved. In this software, we can map network and any desired geometry can be achieved, i.e. from a standard node to a complex intersection. Realistic behavior of all road users within the existing and planned infrastructure is possible in this software.

4.3.2.4 Flexibility and Integration Capacity:

The Generic COM interface allows interacting with external applications. It enables you to have manual settings for drivers and vehicle properties at different levels. For current studies it helps you to test the environment. Besides this, a person can connect his work with any other PTV software.

4.4 Analysis Parameters

For analysis of routes basically two parameters are considered in PTV VISSIM:

- **Travel Time**
- **Delays**

These parameters are first observed in current road condition in base model. After applying strategies same parameters are observed. We required reduction in both travel time and Delays (Stop and Vehicle).

4.5 Route Visit

To model current condition of routes on PTV VISSIM we had to visit routes. We planned our visit in peak hour of trucks, so that we can have a maximum delay and a maximum travel time. There was huge congestion throughout the route caused by the trucks, and we must mitigate that. While our route visit from "**EME Stop to T-Chowk Rawat**" we had total travel time of "**1 hour 49 mins (109 mins)**". While in other route "**T-Chowk Rawat to EME STOP**", the total travel time was "**1 hour 31 mins (91 mins)".** There was

congestion throughout the corridor with a huge amount of congestion points with different delays. Delays on the routes were as follows:

Congestion Points and their Delays

s/o	Congestion Points	Timings
	EME Stop (Start)	
1	Golra Mor	1.5 min
2	Kohinoor Mil	40 sec
3	Social Security Hospital	25 sec
4	Westridge	30 sec
5	Carriage Factory Signal	1 min
6	Mandi Mor	45 sec
7	9th Avenue Turn	3 min
8	Faizabad Signal	45 sec
9	Faizabad Area	1 min
10	ISB Highway-Faizabad Underpass	20 sec
11	Gulberg	11 min
12	2 lanes till PWD Soan Garden U turn	4 min
13	PWD U turn Signal	2 min

(EME Stop to T-Chowk Rawat)

s/o	Congestion Points	Timings
	T-Chowk Rawat (start)	
1	Soan Garden Signal	3.5 min
2	Faizabad Area	2 min
3	Faizabad Signal	1.5 min
4	9th Avenue Turn	2 min
5	Mandi Mor	50 sec
6	Westridge	40 sec

(T-Chowk Rawat to EME Stop)

Table 4. 1 Congestion Points and Delays

4.6 Base Model

First step before analysis in PTV VISSIM, we had to model the current route conditions in software. Such model is known as "**Base Model**". It depicts the current road condition. Our first route is from EME stop to T-Chowk Rawat. It is almost 29 km road. This route includes:

- **Peshawar Road**
- **IJP**
- **Islamabad Expressway**

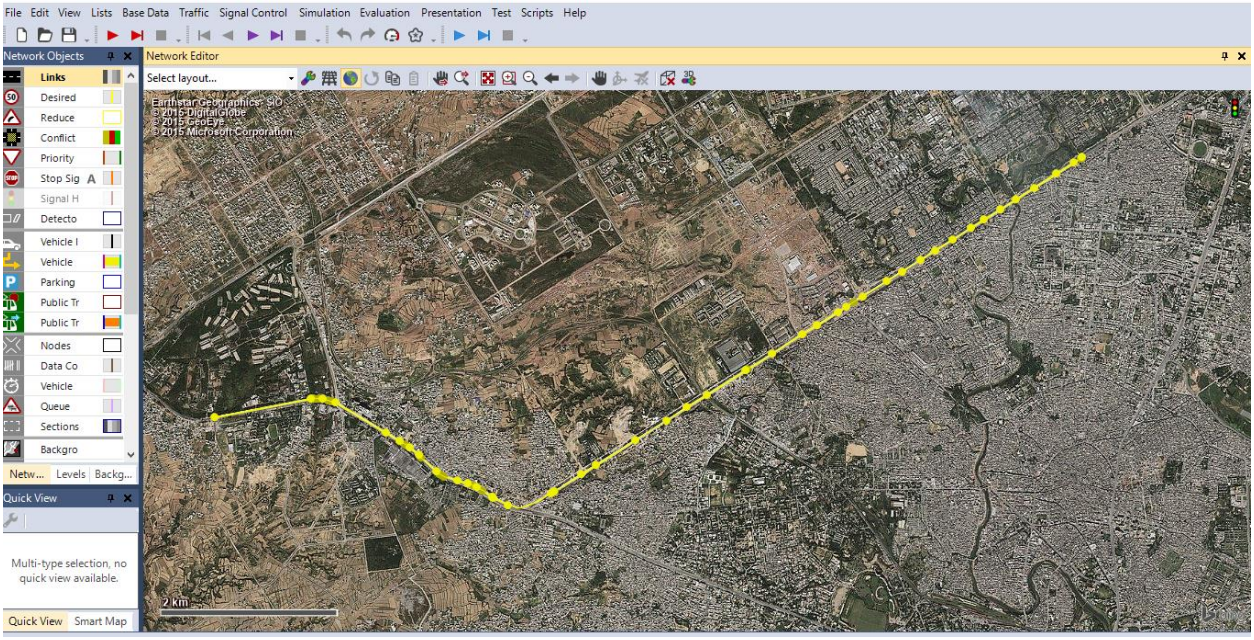
The other route is from T-Chowk to EME stop. This route includes following Hierarchy:

- **Islamabad Expressway**
- **IJP**
- **Peshawar Road**

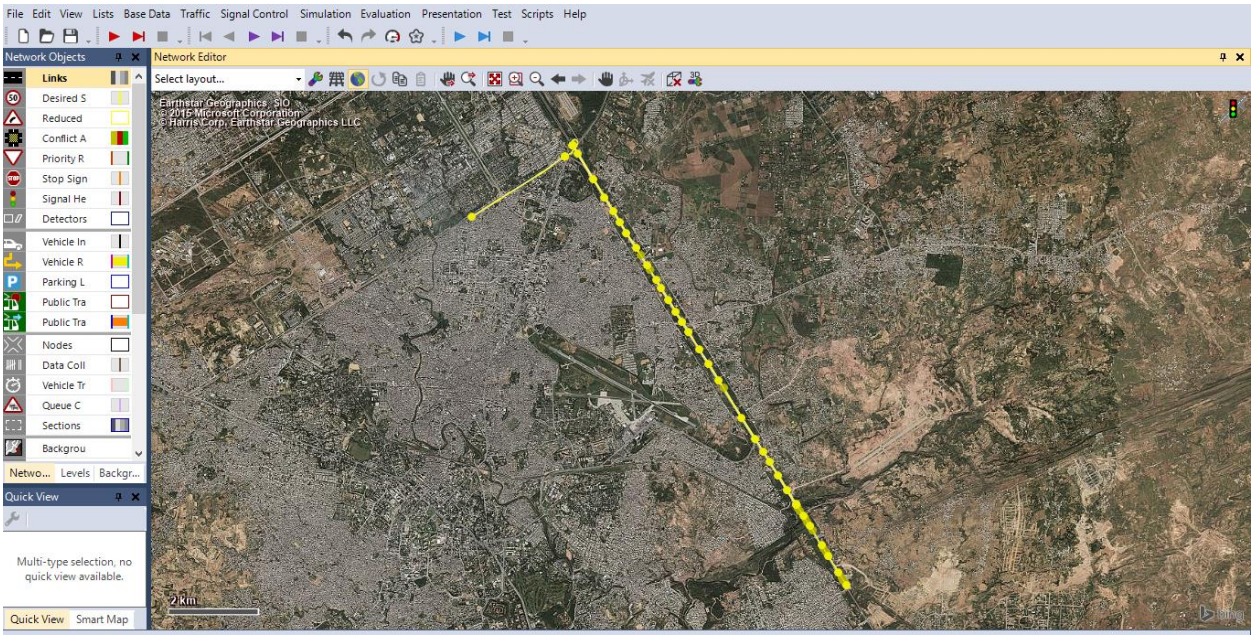
There are certain limitations in PTV VISSIM provided. It can draw network up to 10km length. So, we must divide our model into patches. Each route consists of 3 patches.

4.6.1 EME to T-Chowk Rawat:

(Patch 1)



(Patch 2)



(Patch 3)

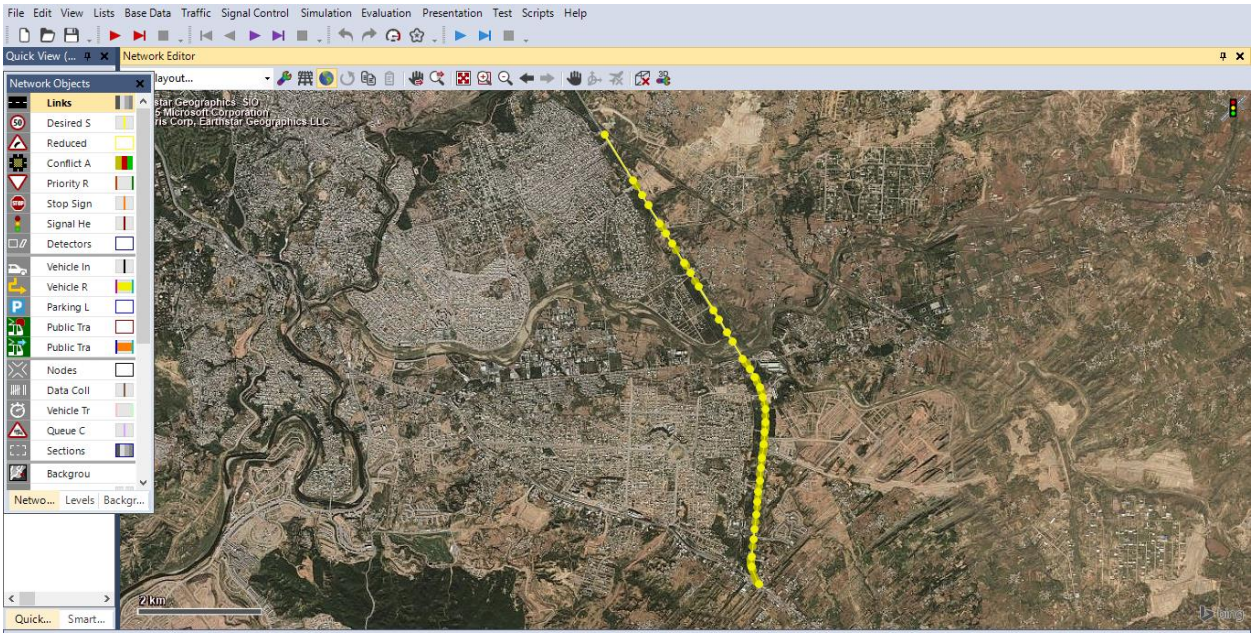
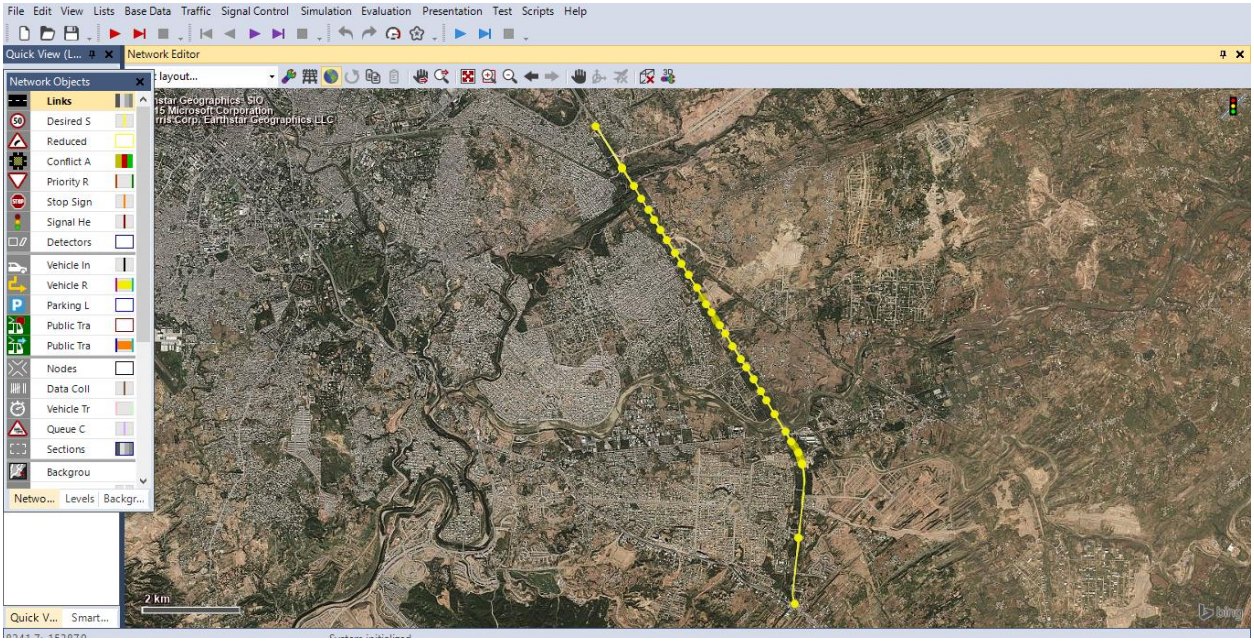


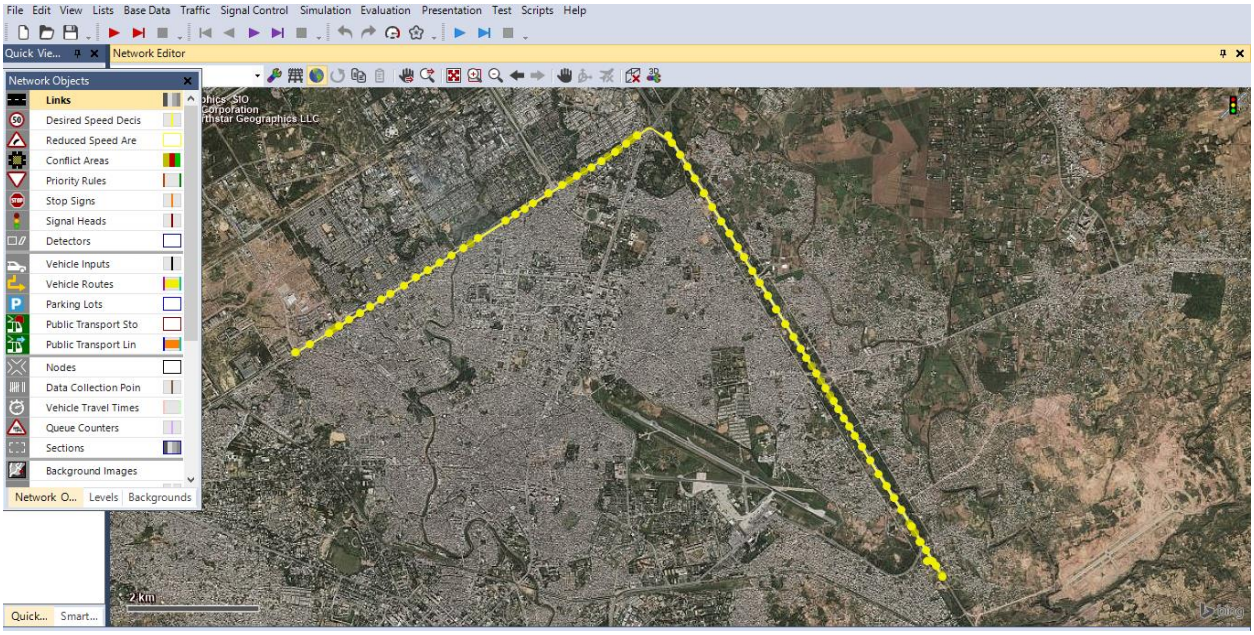
Figure 4. 7 EME to T-Chowk Rawat Route (VISSIM)

4.6.2 T-Chowk Rawat to EME Stop:

(Patch 1)



(Patch 2)



(Patch 3)

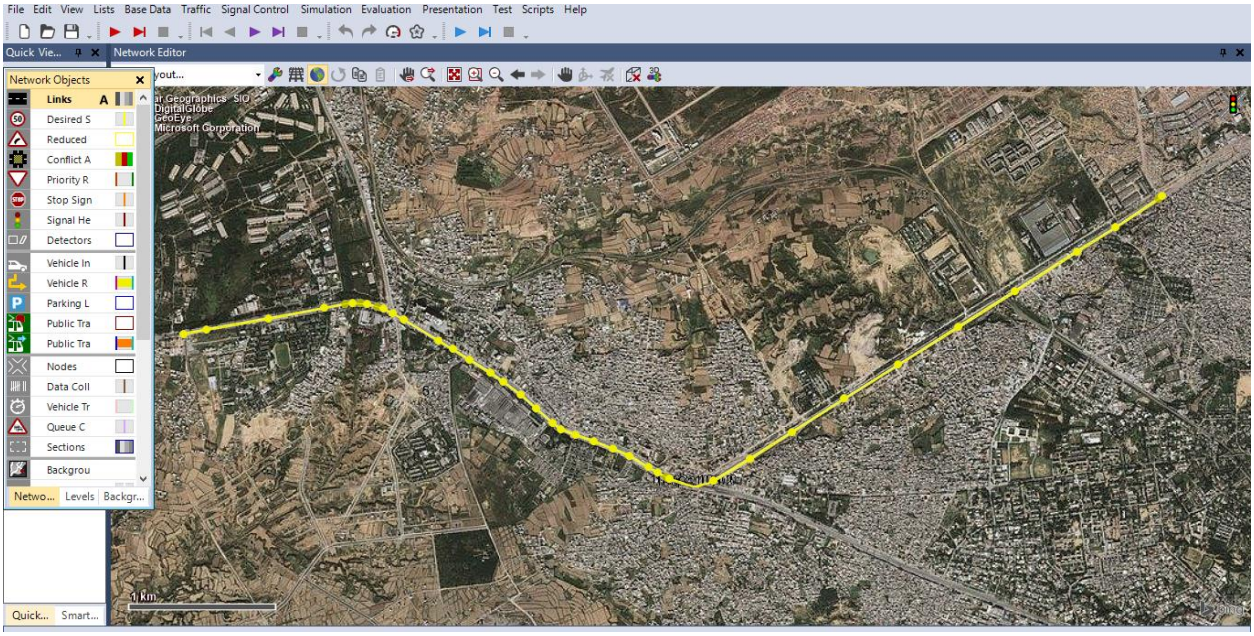


Figure 4. 8 EME to T-Chowk Rawat Route (VISSIM)

4.7 Network Analysis of Base Model

The overall network analysis was performed using VISSIM to find the Network delays. The network delays give an idea about the overall performance of the network under given conditions.

4.7.1 Results:

Results obtained in different routes are:

4.7.1.1 EME Stop to T-Chowk Rawat:

Time Interval	107 min
Stop Delay Average (All)	15.9 min
Vehicle Delay Average (All)	21.7 min

Table 4. 2 Base Model Result (EME Stop to T-Chowk Rawat)

4.7.1.2 T-Chowk Rawat to EME Stop:

Time Interval	91 min
Stop Delay Average (All)	12.5 min
Vehicle Delay (All)	13.7 min

Table 4. 3 Base Model Result (EME Stop to T-Chowk Rawat)

4.8 Strategies for Improving Congestion

There could be many strategies in improving congestion. Most effective strategies are as follows:

- **By building bypass for heavy traffic**
- **By increasing current number of lanes**
- **By providing grade separation**
- **By providing truck only lanes**
- **By restricting trucks passage during peak hour**

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 General

The analysis on the Arterial Segment suggests that the existing condition is not satisfactory in providing efficient traffic movement and with the increasing traffic; the situation is becoming worst. The level of service in the existing condition is also not adequate.

5.2 Interventions

Hence after the analysis of the base model, we conclude that in order to improve the existing traffic condition we need some infrastructure improvements. These are based on the results obtained from the software. These are based on the results obtained from software. Following are some strategies which could be implemented:

- **By using bypass for heavy traffic**
- **Addition in no. of lanes**
- **Grade separation**
- **Exclusive Truck lanes**
- **By restricting trucks passage during peak hour**

5.2.1 Bypass:

In order to solve the congestion problem, first strategy is to build bypass for bypassing trucks. Bypass would be from Pir Wadhai Mor to T-Chowk Rawat. It would have following parameters:

Bypass length	35km
Total Route Length	39 km
No of lanes (Bypass)	3 (each side)

By modelling the Bypass in PTV VISSIM following results are obtained:

T-Chowk to EME Stop:

Travel Time	50 min
Time Saved	41 min
Stop Delay	1.47 min
Vehicle Delay	1.71 min

EME Stop to T-Chowk:

Travel Time	47 min
Time Saved	62 min
Stop Delay	1.2 min
Vehicle Delay	1.8 min

Table 5. 1 Rawalpindi Bypass Results (VISSIM)

These results show improvement in term of travel time and delays.

5.2.2 Addition in no. of lanes:

No of lanes can be increased in order to improve the congestion problem. We have basically 3 different roads in both of our routes:

- **Peshawar Road**
- **IJP Road**
- **Islamabad Expressway**

No of lanes can be increased in either of the road or may be increased throughout the route. Existing lanes are not enough for such traffic. Heavy Traffic contributes a huge amount to the traffic PCU's.

5.2.2.1 Addition of 2 Lanes in Peshawar Road:

Lanes are added in existing Peshawar road from EME stop to start of IJP. Following are the road parameters:

Length for Addition	4 km
Length of route	29 km
Lanes Addition	2

By modelling the Addition in PTV VISSIM following results are obtained:

T-Chowk to EME Stop:

Travel Time	83 min
Time Saved	8 min
Stop Delay	9.93 min
Vehicle Delay	11.1 min

EME Stop to T-Chowk:

Travel Time	94 min
Time Saved	15 min
Stop Delay	15.2 min
Vehicle Delay	21.4 min

Table 5. 2 Addition of 2 Lanes in Peshawar Road Results (VISSIM)

5.2.2.2 Addition of 2 Lanes in IJP:

Lanes are added in existing IJP road from Pir Wadhai Mor to Faizabad Interchange. Following are road parameters:

Length of Addition	9.9km
Length of route	29 km
Addition lane	2

By modelling the Addition in PTV VISSIM following results are obtained:

T-Chowk to EME Stop:

Travel Time	70 min
Time Saved	21 min
Stop Delay	11.1 min
Vehicle Delay	11.4 min

EME Stop to T-Chowk:

Travel Time	83 min
Time Saved	26 min
Stop Delay	12.2 min
Vehicle Delay	18.1 min

Table 5. 3 Addition of 2 Lanes in IJP Results (VISSIM)

5.2.2.3 Combined Addition of 2 Lanes in IJP and Peshawar Road:

Lanes are added from EME Stop to Faizabad Interchange. Following are road parameters:

Length of Addition	13.9 km
Route length	29 km
Addition Lanes	2

By modelling the Addition in PTV VISSIM following results are obtained:

T-Chowk to EME Stop:

Travel Time	76.4 min
Time Saved	33 min
Stop Delay	9.93 min
Vehicle Delay	10.6 min

EME Stop to T-Chowk:

Travel Time	65 min
Time Saved	26 min
Stop Delay	12.1 min
Vehicle Delay	17.45 min

Table 5. 4 Combined Addition of 2 Lanes in IJP and Peshawar Road Results (VISSIM)

5.2.2.4 Combined Addition of 2 Lanes in IJP, Peshawar Road and Islamabad Expressway after Korral Chowk:

Lanes are added from EME stop to Faizabad Interchange and in Islamabad Expressway after korral chowk. Following are road parameters:

Length of Addition	25km
Route Length	29 km
Addition lane	2

By modelling the Addition in PTV VISSIM following results are obtained:

T-Chowk to EME Stop:

Travel Time	57 min
Time Saved	33.9 min
Stop Delay	8 min
Vehicle Delay	10.2 min

EME Stop to T-Chowk:

Travel Time	70.5 min
Time Saved	38.5 min
Stop Delay	10.6 min
Vehicle Delay	15.4 min

Table 5. 5 Combined Addition of 2 Lanes in IJP, Peshawar Road and Islamabad Expressway after Korral Chowk Results (VISSIM)

5.2.2.5 Extension of road (Peshawar Road, IJP and Islamabad Expressway) plus Uninterrupted flow:

In this strategy main intersections are converted into interchanges. Extension of road is same as the previous case. There is a reduction in the traffic delay. Road parameters are same as the previous one.

T-Chowk to EME Stop:

Travel Time	57 min
Time Saved	33.9 min
Stop Delay	5 min
Vehicle Delay	7 min

EME Stop to T-Chowk:

Travel Time	70.5 min
Time Saved	38.5 min
Stop Delay	7 min
Vehicle Delay	11 min

Table 5. 6 Extension of road (Peshawar Road, IJP and Islamabad Expressway) plus Uninterrupted flow Results (VISSIM)

5.2.3 Grade Separation:

It is not possible to have a grade separation in these routes. This is because congestion is throughout the corridor, specifically not along some points (Junctions etc.). So, it is not possible to modal such strategy.

5.2.4 Exclusive Truck Lanes:

There is no effect on travel time and delay by use of exclusive truck lanes in existing network. So no of lanes must be increased.

5.2.5 Restricting Truck Passage in peak hours:

Trucks can be restricted to enter city during peak hours. This could reduce the congestion.

5.3 Comparison

Comparison between strategies are made based on travel time and Delays.

EME Stop to T-Chowk Rawat

s/o	Strategies	Stop Delay (min)	Vehicle Delay (min)	Travel Time (min)
1	Rawalpindi Bypass (86% Trucks)	1.2	1.8	47
2	IJP Extension (2 Lanes)	12.2	18.1	83
3	Peshawar Road Extension (2 Lanes)	15.2	21.4	94
4	Combined IJP and Peshawar road (2 lanes)	12.1	17.45	76.4
5	Combined IJP, Peshawar road and korral chowk extension (2 lanes)	10.6	15.4	70.5
6	Combined IJP, Peshawar road and korral chowk extension (2 lanes) plus uninterrupted flow	7	11	70.5

Table 5. 7 Comparison of Strategies from EME stop to T-Chowk Rawat

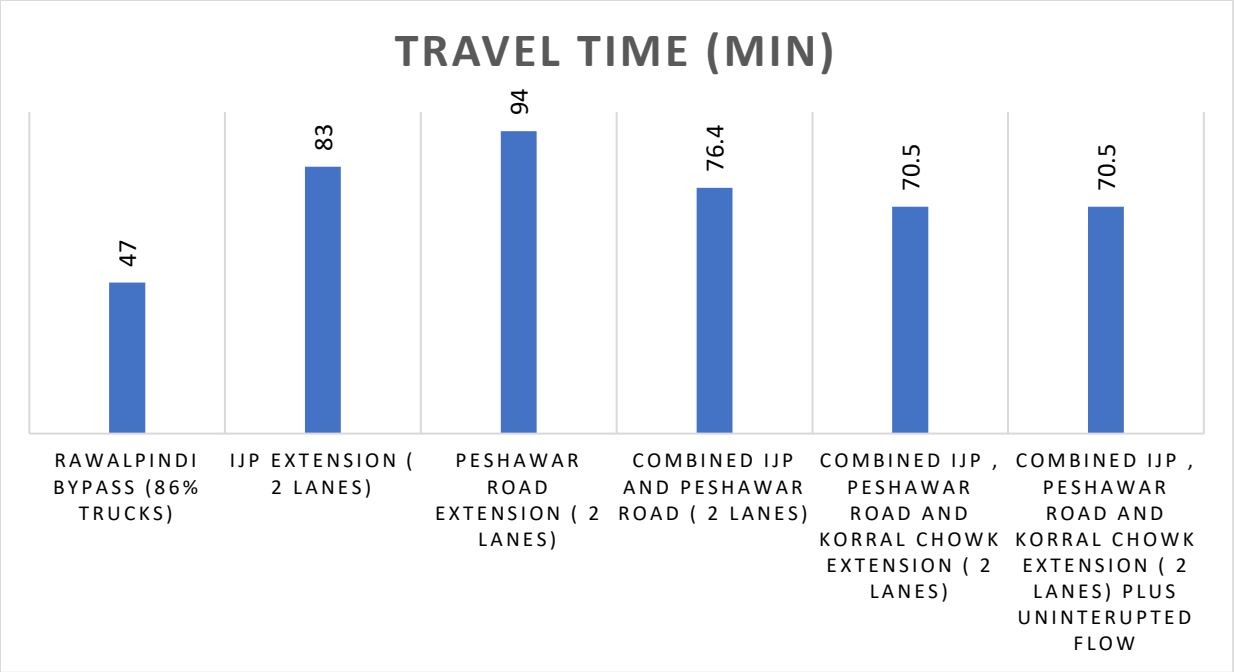


Figure 5. 1 Comparison of Strategies from EME to T-Chowk Rawat (Travel Time)

As per travel time, minimum travel time is for Rawalpindi Bypass (86% of truck bypassing) and maximum is for Peshawar road extension (2 lanes).

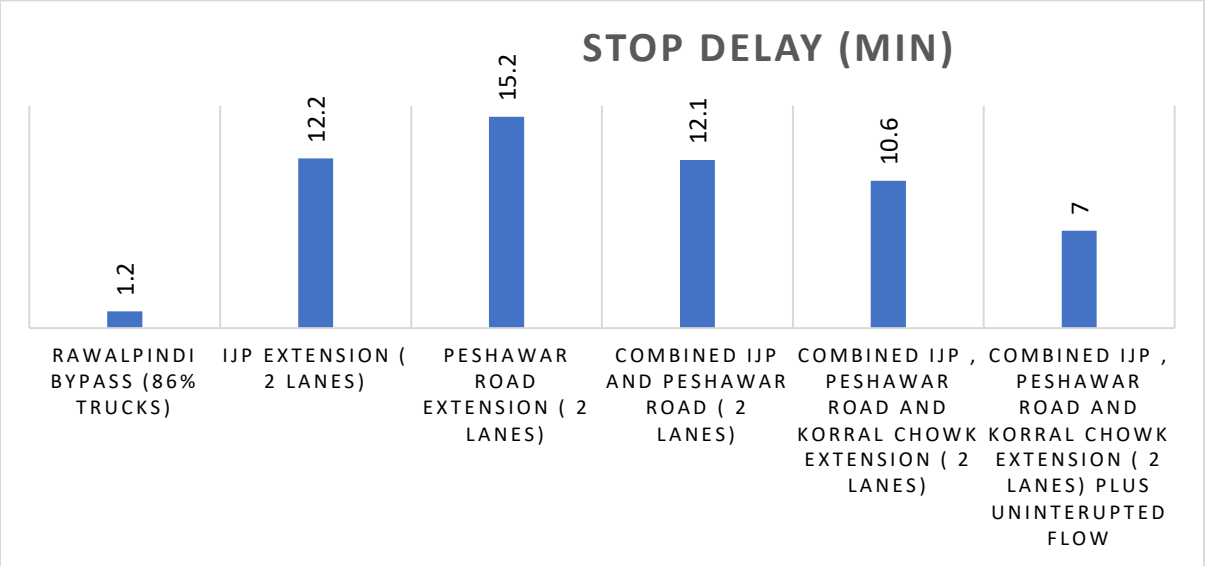


Figure 5. 2 Comparison of Strategies from EME to T-Chowk Rawat (Stop Delay)

As stop delay, minimum stop delay is for Rawalpindi Bypass (86% of truck bypassing) and maximum is for Peshawar road extension (2 lanes).

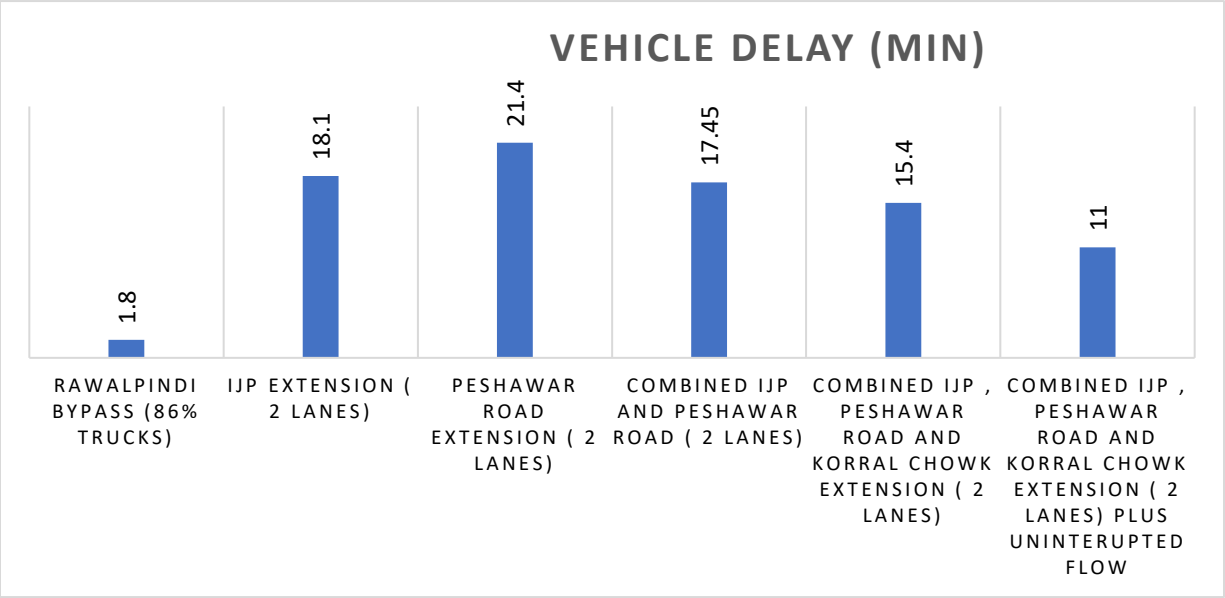
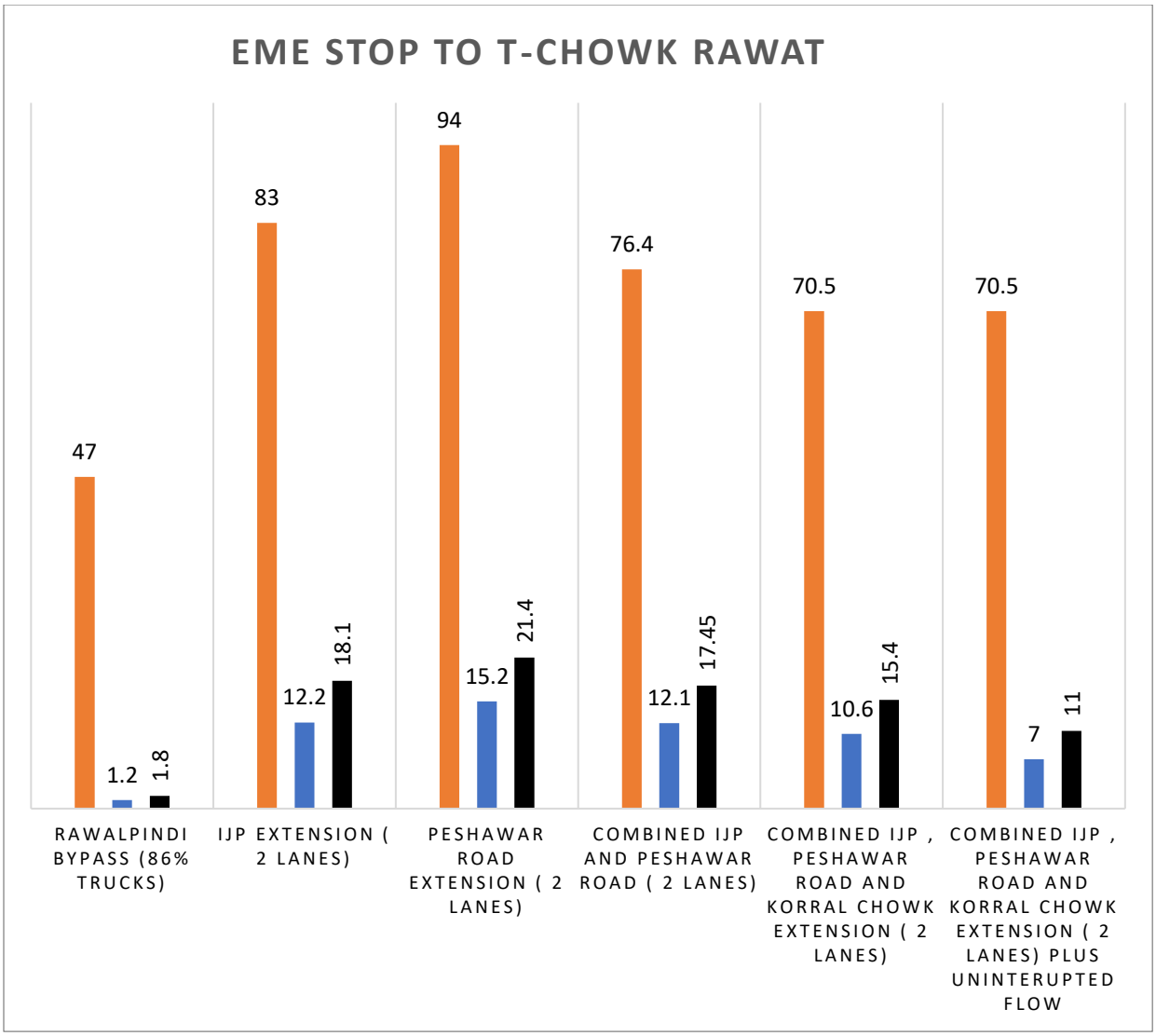


Figure 5. 3 Comparison of Strategies from EME to T-Chowk Rawat (Vehicle Delay)

As vehicle delay, minimum vehicle delay is for Rawalpindi Bypass (86% of truck bypassing) and maximum is for Peshawar road extension (2 lanes).



Legends

	Travel Time
	Stop Delay
	Vehicle Delay

T-Chowk Rawat to EME Stop

s/o	Strategies	Stop Delay (min)	Vehicle Delay (min)	Travel Time (min)
1	Rawalpindi Bypass (86% Trucks)	1.47	1.71	50
2	IJP Extension (2 Lanes)	11.1	11.4	70
3	Peshawar Road Extension (2 Lanes)	9.93	11.1	83
4	Combined IJP and Peshawar road (2 lanes)	9.93	10.6	65
5	Combined IJP, Peshawar road and korral chowk extension (2 lanes)	8	10.2	57
6	Combined IJP, Peshawar road and korral chowk extension (2 lanes) plus uninterrupted flow.	5	7	57

Table 5. 8 Comparison of Strategies from T-Chowk Rawat to EME Stop

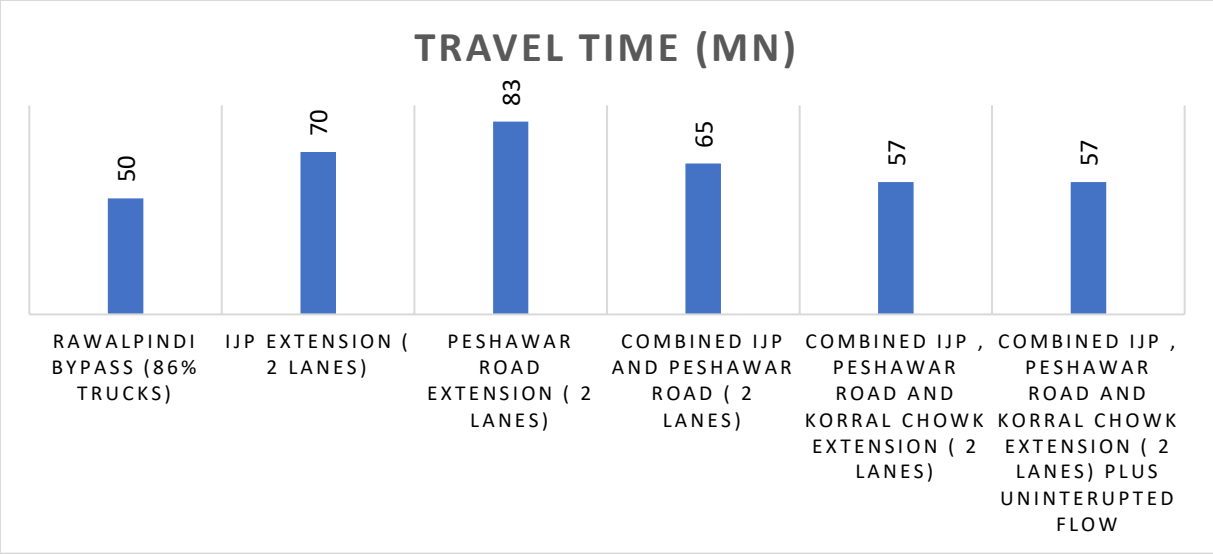


Figure 5. 4 Comparison of Strategies from T-Chowk Rawat to EME (Travel Time)

As per travel time, minimum travel time is for Rawalpindi Bypass (86% of truck bypassing) and maximum is for Peshawar road extension (2 lanes).

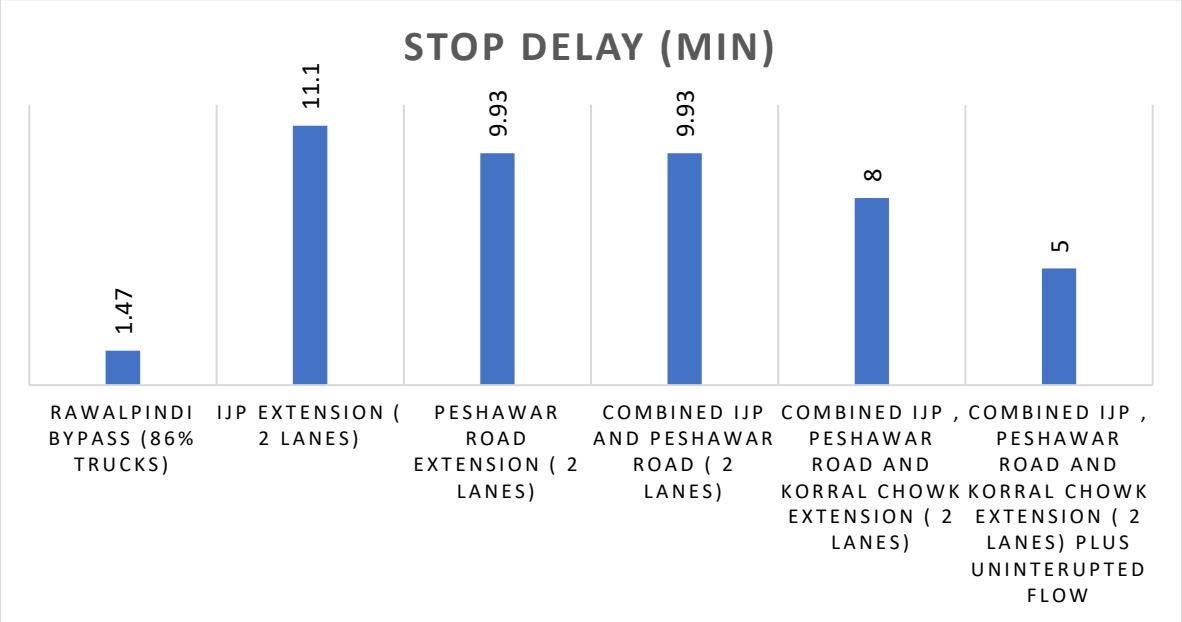


Figure 5. 5 Comparison of Strategies from T-Chowk Rawat to EME (Stop Delay)

As stop delay, minimum stop delay is for Rawalpindi Bypass (86% of truck bypassing) and maximum is for IJP extension (2 lanes).

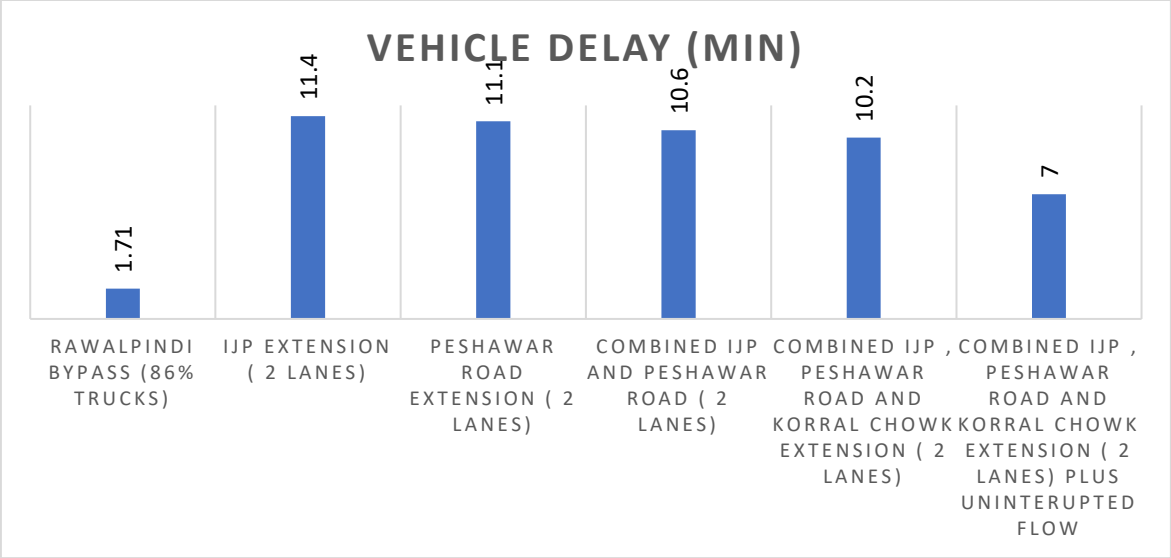
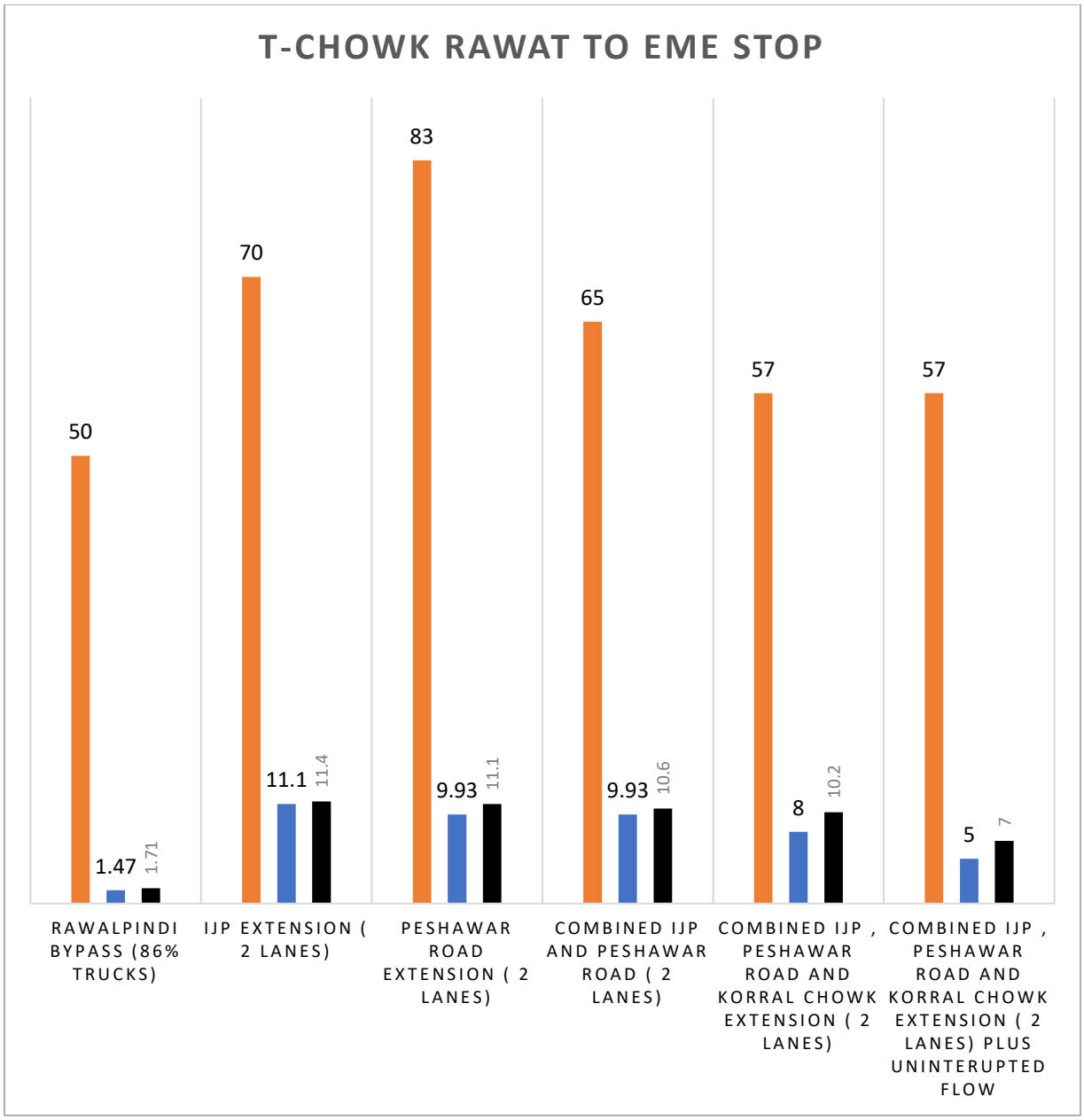


Figure 5. 6 Comparison of Strategies from T-Chowk Rawat to EME (Vehicle Delay)

As vehicle delay, minimum vehicle delay is for Rawalpindi Bypass (86% of truck bypassing) and maximum is for IJP extension (2 lanes).



Legends

	Travel Time
	Stop Delay
	Vehicle Delay

5.4 Cost / Benefit Analysis:

5.4.1 Cost

Construction cost of approximately 50 Million for 1 km (1-lane) road in 1 direction. **(Source: NHA)**

5.4.2 Benefit

3 parameters are used for calculation Benefit:

- Travel Time Cost

  Travel Time Cost = No of Vehicles * Time Travel * Occupancy Rate * Value of Time

- Fuel Saving

  Fuel Consumption = ∑ (Fuel Consumption Quantity* Fuel Price* Proportion of mode use)

  Vehicle operating cost = Fuel Consumption * Travel Time * No of Vehicles

  It is also calculated using VISSIM and we calculated it using VISSIM.

- Accident Prevention

Total benefit is calculated based on these 3 parameters.

Cost/Benefit ratio is calculated which further determines, the return time period of investment.

Strategies	Cost	Travel Time Cost (Benefit)	Fuel Saving (Benefit)	Accident Prevvention (Benefit)	Benefits
Bypass	10.5 Billion	9.08 Billion	-0.82 Billion	0.262 Billion	8.5 Billion
IJP Extension	1.98 Billion	3.63 Billion	0.058 Billion	0.126 Billion	3.8 Billion
Peshawar Road Extension	0.8 Billion	1.91 Billion	0.031 Billion	0.04 Billion	1.97 Billion
IJP and Peshawar Road Extension	2.8 Billion	4.63 Billion	0.075 Billion	0.166 Billion	4.87 Billion
IJP, Peshawar Road and After Koral Chowk Extension	5 Billion	5.54 Billion	0.089 Billion	0.199 Billion	5.8 Billion

Table 5. 9 Cost and Benefits of Strategies

- **Return Period**

It is calculated by **365*Cost/Benefit.**

Strategies	Cost/Benefit Ratio	Return Period
Bypass	1.23	450 days (1 year 3 months)
IJP Extension	0.51	190 days (6 and half months)
Peshawar Road Extension	0.40	147 days (4 months and 27 days)
IJP and Peshawar Road Extension	0.57	209 days (7 months)
IJP, Peshawar Road and After Koral Chowk Extension	0.85	313 days (10 months and 13 days)

Table 5. 10 Cost / Benefit Analysis

5.5 Strategic Plan:

There could be **Short term**, **Medium term** and **long-term solution**.

- **Short Term:**

  Peshawar Road Extension

- **Medium Term:**

  IJP Extension

  IJP and Peshawar Road Extension

- **Long Term:**

  Rawalpindi Bypass

  IJP, Peshawar Road and After Koral Chowk Extension

5.6 Conclusion

Based on the above results we conclude that:

- The main cause of congestion for heavy traffic is heterogeneous traffic as identified by O-D Survey. The existing route infrastructure should be improved as per listed strategies.
- Cost Benefit Analysis of listed strategies are performed and based on results, **Short-term, Medium-term** and **Long-term** solutions are proposed.
- Arterial delays are reduced in our route by implementation of these strategies.
- Congestion free routes for trucks are provided for heavy traffic.

5.7 Recommendations

Based on our certain limitations in our research, these are recommendations for further research:

- In Cost / Benefit analysis, we considered few factors. There should be a separate detailed analysis involving every major and minor aspect like land acquisition, maintenance cost etc.
- A detailed study of all other possible entrances / leaving spots should be carried out in future. Traffic only entering / leaving twin cities from two major spots is considered.
- The existing conditions could be remodeled on other traffic modeling soft wares for advanced research and planning.

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ANNEXURES

O-D Survey Results (Digitalized):

Traffic Survey Digitalizaton

Vehicles	Nature of travel	Entrance Point	Exit point	Travelling Route	Time to bypass c	Avg travel spee	Speed within city	Problems facing	Suggestions
1	Temporary Stay	26 no. to golr	Rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	more than 3 hr	0-20 kph	0-20 kph	Traffic congestion	Reduce interference by LTV
2	Motorway								
3	Bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	LTV disturbance	No restrictions to enter
4	Motorway								
5	Bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	Reduce interference by LTV
6	Bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	more than 80 kp	20-40 kph	No entry during peak hrs	Reduce traffic restrictions
7	Bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	0-20 kph	Traffic congestion	Alternate route
8	Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	0-20 kph	Restriction to enter city	Divided lane
9	Motorway								
10	Motorway								
11	Bypass(Through RWP)	Rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	0-1 hr	60-80 kph	40-60 kph	Traffic congestion	LTV should not be allowed in truck lane
12	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	0-1 hr	40-60 kph	0-20 kph	Traffic congestion	Speed limit
13	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	Reduce interference by LTV
14	motorway								
15	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	40-60 kph	0-20 kph	Traffic congestion	Alternate route
16	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	20-40 kph	Restriction to enter city	No restrictions to enter
17	motorway								
18	motorway								
19	motorway								
20	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Lane discipline implementation
21	motorway								
22	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	No entry during peak hrs	Separate lane
23	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Speed limit
24	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	60-80 kph	60-80 kph	Traffic congestion	LTV should not be allowed in truck lane
25	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	20-40 kph	No entry during peak hrs	Separate lane
26	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	0-20 kph	Traffic congestion	NO time restrictions
27	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	0-20 kph	0-20 kph	LTV disturbance	Separate lane
28	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	2-3 hr	40-60 kph	20-40 kph	Restriction to enter city	No suggestion
29	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	No suggestion
30	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Alternate route
31	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	1-2 hr	20-40 kph	0-20 kph	Traffic congestion	No suggestion
32	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	40-60 kph	check posts stopage for no reasons	Lane discipline implementation
33	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	Traffic congestion	Divided lane
34	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	LTV disturbance	Separate lane
35	motorway								
36	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	0-20 kph	No entry during peak hrs	Alternate route
37	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	0-1 hr	40-60 kph	40-60 kph	Traffic congestion	Reduce interference by LTV
38	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Alternate route
39	motorway								
40	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	LTV disturbance	LTV should not be allowed in truck lane
41	temporary Stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	0-20 kph	Restriction to enter city	Speed limit
42	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Lane discipline implementation
43	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	LTV disturbance	Alternate route
44	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	20-40 kph	No entry during peak hrs	Speed limit
45	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Lane discipline implementation
46	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	No entry during peak hrs	Alternate route
47	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	Reduce interference by LTV
48	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Restriction to enter city	Alternate route

49	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	20-40 kph	20-40 kph	LTV disturbance	Speed limit
50	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	more than 3 hr	40-60 kph	40-60 kph	Traffic congestion	Lane discipline implementation
51	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	No suggestion
52	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Alternate route
53	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	60-80 kph	60-80 kph	LTV disturbance	Speed limit
54	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	Traffic congestion	No restrictions to enter
55	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	20-40 kph	40-60 kph	Traffic congestion	LTV should not be allowed in truck lane
56	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	0-20 kph	20-40 kph	check posts stopage for no reasons	No restrictions to enter
57	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Speed limit
58	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	60-80 kph	60-80 kph	LTV disturbance	Alternate route
59	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	40-60 kph	LTV disturbance	Reduce interference by LTV
60	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	40-60 kph	No entry during peak hrs	Alternate route
61	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	LTV disturbance	No restrictions to enter
62	temporary Stay	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	20-40 kph	LTV disturbance	Separate lane
63	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	Traffic congestion	Separate lane
64	motorway								
65	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	0-1 hr	40-60 kph	40-60 kph	No entry during peak hrs	Alternate route
66	motorway	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	20-40 kph	20-40 kph	No entry during peak hrs	Alternate route
67	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	20-40 kph	20-40 kph	No entry during peak hrs	Speed limit
68	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	60-80 kph	20-40 kph	LTV disturbance	Lane discipline implementation
69	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	40-60 kph	No entry during peak hrs	Alternate route
70	temporary Stay	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	1-2 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	LTV should not be allowed in truck lane
71	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	60-80 kph	40-60 kph	No entry during peak hrs	Speed limit
72	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	more than 80 kp	more than 80 kph	No entry during peak hrs	Alternate route
73	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	40-60 kph	No entry during peak hrs	Lane discipline implementation
74	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	1-2 hr	40-60 kph	20-40 kph	No entry during peak hrs	Separate lane
75	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	more than 3 hr	60-80 kph	40-60 kph	Traffic congestion	No restrictions to enter
76	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	more than 3 hr	40-60 kph	20-40 kph	No entry during peak hrs	Reduce traffic restrictions
77	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	LTV disturbance	No restrictions to enter
78	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	60-80 kph	40-60 kph	check posts stopage for no reasons	Separate lane
79	motorway								
80	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	20-40 kph	20-40 kph	LTV disturbance	Alternate route
81	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	40-60 kph	LTV disturbance	Alternate route
82	motorway								
83	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Alternate route
84	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	40-60 kph	check posts stopage for no reasons	Alternate route
85	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Alternate route
86	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	20-40 kph	20-40 kph	No entry during peak hrs	Reduce traffic restrictions
87	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	check posts stopage for no reasons	Separate lane
88	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Lane discipline implementation
89	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Alternate route
90	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	check posts stopage for no reasons	Separate lane
91	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Reduce traffic restrictions
92	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	20-40 kph	Restriction to enter city	Alternate route
93	motorway								
94	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	Traffic congestion	Alternate route
95	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Alternate route
96	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	No entry during peak hrs	Alternate route
97	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	Separate lane
98	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	more than 3 hr	40-60 kph	0-20 kph	Traffic congestion	No restrictions to enter
99	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	LTV disturbance	Alternate route

100	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	LTV disturbance	Separate lane
101	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	No restrictions to enter
102	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	0-20 kph	Traffic congestion	Separate lane
103	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	40-60 kph	0-20 kph	LTV disturbance	No restrictions to enter
104	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	0-20 kph	Traffic congestion	Separate lane
105	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	1-2 hr	40-60 kph	20-40 kph	Traffic congestion	Alternate route
106	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	Restriction to enter city	Alternate route
107	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	20-40 kph	20-40 kph	LTV disturbance	No restrictions to enter
108	motorway								
109	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	1-2 hr	20-40 kph	20-40 kph	Traffic congestion	Alternate route
110	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	Separate lane
111	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Reduce interference by LTV
112	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	0-20 kph	0-20 kph	LTV disturbance	Alternate route
113	motorway								
114	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Reduce traffic restrictions
115	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Reduce interference by LTV
116	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	0-20 kph	check posts stopage for no reasons	No restrictions to enter
117	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	0-20 kph	0-20 kph	Traffic congestion	Separate lane
118	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	more than 3 hr	20-40 kph	0-20 kph	No entry during peak hrs	No restrictions to enter
119	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	0-20 kph	20-40 kph	Traffic congestion	No restrictions to enter
120	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	Separate lane
121	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	check posts stopage for no reasons	Reduce interference by LTV
122	motorway								
123	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	Traffic congestion	Reduce interference by LTV
124	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Reduce interference by LTV
125	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	LTV disturbance	Separate lane
126	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	1-2 hr	0-20 kph	20-40 kph	check posts stopage for no reasons	Separate lane
127	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	Separate lane
128	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	LTV disturbance	Reduce interference by LTV
129	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	0-20 kph	20-40 kph	Traffic congestion	Reduce interference by LTV
130	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	LTV disturbance	Separate lane
131	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	40-60 kph	40-60 kph	Traffic congestion	LTV should not be allowed in truck lane
132	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	0-1 hr	more than 80 kp	40-60 kph	LTV disturbance	Separate lane
133	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	0-1 hr	more than 80 kp	40-60 kph	Traffic congestion	Alternate route
134	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	40-60 kph	check posts stopage for no reasons	Separate lane
135	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Separate lane
136	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	20-40 kph	20-40 kph	LTV disturbance	Separate lane
137	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	0-20 kph	0-20 kph	Traffic congestion	LTV should not be allowed in truck lane
138	motorway								
139	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	0-20 kph	20-40 kph	Traffic congestion	Reduce traffic restrictions
140	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	Reduce traffic restrictions
141	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	1-2 hr	20-40 kph	20-40 kph	No entry during peak hrs	Separate lane
142	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Alternate route
143	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	0-20 kph	0-20 kph	Traffic congestion	Reduce interference by LTV
144	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	1-2 hr	40-60 kph	20-40 kph	No entry during peak hrs	Lane discipline implementation
145	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	more than 3 hr	0-20 kph	0-20 kph	Restriction to enter city	Separate lane
146	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	Traffic congestion	LTV should not be allowed in truck lane
147	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	40-60 kph	20-40 kph	No entry during peak hrs	Separate lane
148	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Lane discipline implementation
149	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	more than 3 hr	40-60 kph	20-40 kph	LTV disturbance	Separate lane
150	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	Alternate route

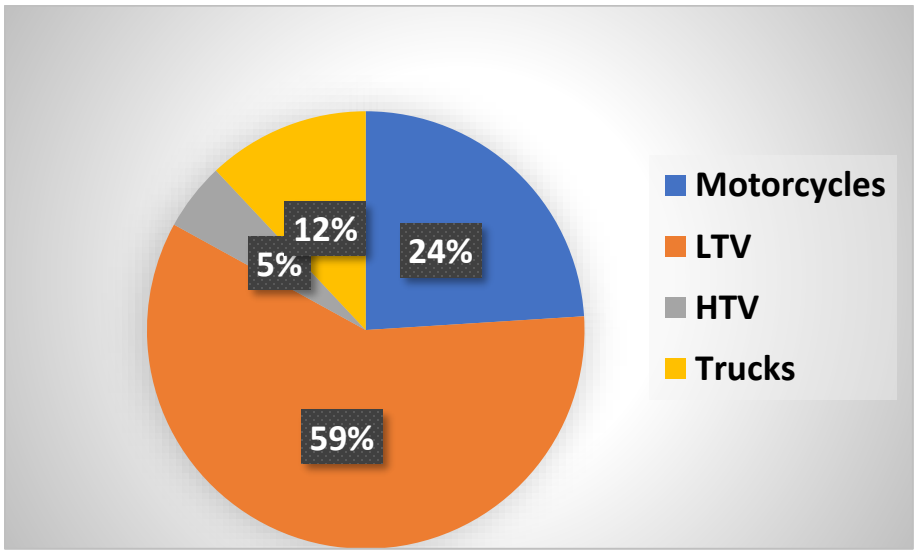
151	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	0-20 kph	check posts stopage for no reasons	Separate lane
152	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	0-20 kph	0-20 kph	No entry during peak hrs	LTV should not be allowed in truck lane
153	motorway								
154	motorway								
155	motorway								
156	bypass(Through RWP)	rawat	26 no.	Rawat - IH - Faizabad - IJP - Golra Morh - 26 no	1-2 hr	more than 80 kp	more than 80 kph	LTV disturbance	Separate lane
157	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	No entry during peak hrs	Separate lane
158	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Separate lane
159	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	No entry during peak hrs	Alternate route
160	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	40-60 kph	40-60 kph	Traffic congestion	Separate lane
161	motorway								
162	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	20-40 kph	20-40 kph	Traffic congestion	Separate lane
163	stay	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	0-1 hr	40-60 kph	20-40 kph	Restriction to enter city	Reduce interference by LTV
164	temporary Stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Restriction to enter city	Separate lane
165	motorway								
166	motorway								
167	motorway								
168	temporary Stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	more than 80 kp	more than 80 kph	No entry during peak hrs	Alternate route
169	stay								
170	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	more than 80 kp	more than 80 kph	Traffic congestion	Lane discipline implementation
171	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	Restriction to enter city	Alternate route
172	bypass(Through RWP)	rawat	26 no.	Rawat - ISB Highway - kashmir highway - 26 no	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Separate lane
173	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	check posts stopage for no reasons	Alternate route
174	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	40-60 kph	Traffic congestion	Reduce interference by LTV
175	motorway								
176	motorway								
177	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	0-20 kph	0-20 kph	Restriction to enter city	NO time restrictions
178	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	20-40 kph	Restriction to enter city	Separate lane
179	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	more than 80 kp	40-60 kph	Traffic congestion	Reduce traffic restrictions
180	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	40-60 kph	Traffic congestion	Separate lane
181	bypass(Through RWP)	rawat	26 no.						
182	motorway								
183	motorway								
184	temporary Stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	0-1 hr	40-60 kph	40-60 kph	No entry during peak hrs	Alternate route
185	temporary Stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	20-40 kph	20-40 kph	Traffic congestion	Separate lane
186	motorway								
187	motorway								
188	temporary Stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	20-40 kph	Traffic congestion	Lane discipline implementation
189	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	Restriction to enter city	Separate lane
190	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	20-40 kph	Restriction to enter city	Alternate route
191	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	20-40 kph	0-20 kph	Traffic congestion	Alternate route
192	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	1-2 hr	40-60 kph	40-60 kph	Traffic congestion	Separate lane
193	motorway								
194	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	Restriction to enter city	Reduce traffic restrictions
195	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	20-40 kph	20-40 kph	Traffic congestion	Separate lane
196	bypass(Through RWP)	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	40-60 kph	0-20 kph	Traffic congestion	Alternate route
197	bypass(Through RWP)	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	more than 3 hr	20-40 kph	20-40 kph	check posts stopage for no reasons	Reduce interference by LTV
198	stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	2-3 hr	60-80 kph	40-60 kph	Traffic congestion	Separate lane
199	stay	26 no. to golr	rawat	26 no - Golra Morh - Ijp - Faizabad - IH - Rawat	2-3 hr	60-80 kph	40-60 kph	Restriction to enter city	Alternate route
200	temporary Stay	26 no. to kash	rawat	26 no - kashmir Highway -ISB Highway - Rwat	1-2 hr	40-60 kph	20-40 kph	Traffic congestion	Reduce interference by LTV

Vehicle Counts (Summary):

Based on peak hour, following is a brief summary:

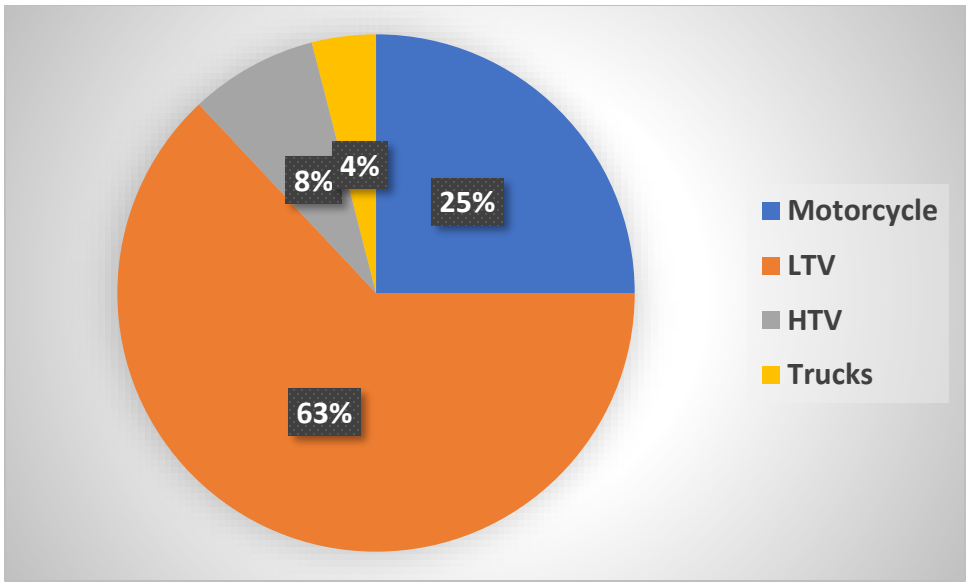
- EME Bus Stop (Total Vehicles = 3190 veh/hr)

Vehicle Type	Count
Motorcycle	765
LTV	1882
HTV	160
Trucks	383



- T-Chowk Rawat (Total Vehicles = 3343 veh/hr)

Vehicle Type	Count
Motorcycle	836
LTV	2106
HTV	267
Trucks	134



- 26 No. Stop (Total Vehicles = 4844 veh/hr)

Vehicle Type	Count
Motorcycle	1073
LTV	3197
HTV	484
Trucks	97