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**INSTITUTE OF ENGINEERING**  
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**Development of Maintenance Management System Applicable to Urban Areas**  
**(A Case Study of Kathmandu Metropolitan City)**

**By**

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**A THESIS**

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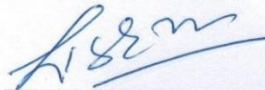
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## **ABSTRACT**

Urban road network is expanding in Kathmandu Metropolitan City with expansion of new settlements. But current urban expansion is very rapid and unplanned, so does the provision of road network. Besides that the urban traffic density is also increasing rapidly. Maintaining these road networks has become challenge to both central level government and other local level governments. It seems, time has come to these agencies to implement more robust, cost effective and planned maintenance approach for better performance in road maintenance to the satisfaction of the urban users. An urban road maintenance management system has been developed with cost comparison with existing approach to justify its applicability. The system developed is much transparent in its planning and implementation. It could encourage even public participation for sharing maintenance cost for better maintenance in specific road section.

**Key Words:** *Maintenance Management, Urban Area, Routine Maintenance, Recurrent Maintenance*

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## ABBREVIATIONS

ADB	Asian Development Bank
ADT	Average daily Traffic
ARMP	Annual Road Maintenance Plan
DM	Drainage/manhole Repair
DOR	Department of Roads
DRO	Division Roads Offices
HIMSU	Highway Information Maintenance System Unit
IRAMP	Integrated Annual Maintenance Plan
IRI	International Roughness Index
KMC	Kathmandu Metropolitan City
ORN	Overseas Road Note
PPMO	Public Procurement Monitoring Offices
PP	Public Participation
PR	Pavement Repair
RBN	Road Board Nepal
SDI	Surface Distress Index
SMDP	Strengthened Maintenance Division Program
SRN	Strategic Road Network
TRRL	Transport Road Research Laboratory
VCA	Visual Condition Assessment
VOC	Vehicle Operating Cost
WB	World Bank
YPO	Yearly Plan of Operation

# **CHAPTER 1: INTRODUCTION**

## **1.1 Introduction**

The basic objective of the maintenance is to ensure that the road that has been constructed or improved is maintained in its acceptable condition. It is accepted that over the life of the road it will deteriorate due to various factors with which maintenance activities alone cannot deal with. Nevertheless, maintenance should be intended to begin on the first day after completion of the road stretch or the road improvement works are completed. I practice the effective regular and timely maintenance postpones the costly rehabilitation and reconstruction. This has several benefits, prominent of them being that it stretches the period over which the benefits of the investment made are available and, therefore, provides a higher rate of return on the initial investment. Road maintenance is often viewed as an activity that is carried out only when the road is damaged. That view is not true. The road once constructed and/or improved has to be looked after on a regular basis.

## **1.2 Background of Study**

In recent years, urbanization in the Kathmandu Metropolitan City is proceeding very rapidly, but in an unplanned, unsystematic and haphazard way. The city has a relatively very high vehicle density and is increasing considerably in each year. In recent time, the construction as well as maintenance cost of the roads is very high. The government as well as other concern local government spends millions of rupees annually on road expansion and maintenance. Considering the amount of money spent on roads, the condition of road should have been good, however it is just opposite. Bumps, potholes water-pounding and dug roads are old facts for the road-users of Kathmandu. The poor condition of road increases the Vehicle Operating Cost (VOC) in one hand and on the other hand it is reflecting negative impression of the KMC to the general public. It seems current practice of road maintenance has to be revisited to find-out an appropriate Road Maintenance Management System with clear scenario of management system for financial allocation/expenditure and road maintenance.

## **1.3 Problem Statement**

Maintaining urban road network in the present context of unplanned urbanization, increasing trend of traffic density, demand of new road construction, poor perception of public towards existing road maintenance, poor coordination and support of other

service providing agencies such as water supply department, inadequate resources etc. has been major challenges for the Kathmandu Metropolitan City (KMC). To sum-up those issues, it can be grouped very similar to one identified/suggested in other context by Derek that the main problem in road maintenance are (i) inadequate finance, (ii) bad management, and (iii) poor design (Derek *et al*, 1986).

These three main problems of road maintenance, to some extent, could be considered, are the current problems of the KMC. Firstly, the road maintenance needs adequate, steady and stable flow of fund for road maintenance. Secondly, absence of systematic management system in place for carrying maintenance activities and financial management, any maintenance practices will be an ad-hoc approach. An ad-hoc approach is not transparent and too much political as current practice of road construction and maintenance. And thirdly, poor design including poor quality of materials and construction is one of the strong reasons for untimely failure of the road structures.

From the above problem statement, a robust Urban Road Maintenance Management System is necessary to help the government how to reduce the cost for maintenance and also to make sure the roads are in acceptable condition with minimum maintenance. In this operation the Roads Board Nepal and Kathmandu Metropolitan City could work jointly for more effective, stable and steady fund flow for the road maintenance. The RBN is providing maintenance fund since last 12 years to KMC.

#### **1.4 Research Objectives**

The main objective of this research is to develop an Urban Road Maintenance Management System applicable to urban road networks such as in Kathmandu Metropolitan City with the following specific objectives:

- i) To identify the main contributory factors in the deterioration of the road;
- ii) To quantify these factors;
- iii) To develop methodology for maintenance management system and its implementation;
- iv) To compare cost effectiveness with existing maintenance approach/practice and explore possibility for public participation in urban road maintenance.

## **1.5 Research Methodology**

To carry out the study, several research methodologies should be used, which includes initial discussion, literature review, data collection, data analysis and conclusion.

## **1.6 Scope and Limitation of Study**

The scope of research is focus only on routine and recurrent maintenance works carried out urban road networks on the Kathmandu Metropolitan City by the Municipality.

The limitations of study are following:

1. This research is focus only on routine and recurrent maintenance.
2. The study area of this research confines within Kathmandu Metropolitan City.
3. This research considers road links which are in maintainable condition only.
4. The system developed has considered short stretch of about 15 km of road lengths, the output could have been more significant if larger road lengths have been considered.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

Literature review is basically focused for routine and recurrent maintenance (also known as programmed maintenance) as most relevant research topic. Therefore two approaches implemented in DOR have been reviewed for development of urban road maintenance management system, which are discussed below

### **2.2 Road Maintenance Management System in DOR**

Department of Roads (DOR) is responsible for Strategic Road Networks (SRN) in Nepal (DOR Policy, 1995). Planned Maintenance is one of the key strategies of DOR. It has adopted conducting road maintenance, even urban road sections of the SRN, under following maintenance types:

#### **2.2.1 Maintenance Types**

##### **i. Routine Maintenance**

Routine maintenance required continually on every road because of environmental degradation, whatever its engineering characteristics or traffic volume. It covers grass cutting drain cleaning, removing debris and draining water from the carriage way, bridge and culvert maintenance, and road furniture maintenance etc.

##### **ii. Recurrent Maintenance**

Maintenance work which required at varying intervals during the year with a frequency that depends mostly on the volume of traffic using the road such as repairing pot-holes, patching, repairing edges and shoulders, sealing cracks, etc.

##### **iii. Specific Maintenance**

This type of maintenance is done as required by the road condition. The potholes maintenance in large scale, gravelling the shoulder, reconstruction of collapsed retaining structures, drain repair, replacing the traffic signs and cross drains etc. are carried out under this maintenance types.

##### **iv. Periodic Maintenance**

Periodic maintenance works are those maintenance activities which require only at intervals of several years such as resealing (surface dressing, slurry sealing, fog

sealing), re-gravelling shoulders, road surface marking, painting of steel structures, asphalt overlay, etc.

#### **v. Emergency Maintenance**

Maintenance needed to deal with emergencies and problems calling for immediate action when a road is threatened or closed work such as removal of debris and other obstacles in case of landslides, placement of warning signs, construction of diversions in case of flood, river training works for immediate protection of roads and bridges etc.

#### **vi. Preventative Maintenance**

Maintenance required adapting the road to the changing nature of slopes and streaming (i.e. to the geophysical, environment). Preventive maintenance is road side support maintenance to lessen emergency situation.

### **2.2.2 Implementation Methodology**

#### **i. Routine Maintenance**

DOR has adopted length worker system for carrying out of routine maintenance. It has standards including Norms and guidelines for implementation. According to Norms, the section of road length to be maintained by a length worker is different for dry season and rainy seasons. All 34 Division Road Offices (DRO) contract length workers as per approved contract standard and Norms and deploy as per guidelines.

#### **ii. Recurrent Maintenance**

DOR has approved Norms for quantification of recurrent maintenance and all DROs contract out recurrent maintenance works as per PPMO standard procurement document. Maintenance works are carried out according to defined cycles (2-3 cycles per year) adopting DOR Standard Specification for Road and Bridges.

#### **iii. Specific Maintenance**

Specific maintenance is basically a localized rehabilitation works; therefore all divisions adopt usual engineering procedures for quantification and implementation adopting approved standards. Divisions prepare priority list of works and carried out through the contractors.

#### **iv. Preventative Maintenance**

Divisions carry out the preventative maintenance works as and when fund is available as per priority and urgency. Methodology adopted for implementation similar to specific maintenance.

#### **v. Periodic Maintenance**

Periodic maintenance needs are established by the DROs and the Projects based on DOR Policy (DOR Policy, 1995). Quantification, estimation and implementation are carried out as per Standards including SDI, traffic, and IRI database from HIMSU, Norms, contract documents, Specification.

#### **vi. Emergency Maintenance**

DOR every year prepares an emergency action plans and deploys necessary resources including heavy equipment, manpower etc. in all potential and pre-identified locations.

### **2.2.3 Planning Maintenance Activities**

The planning of maintenance activities is initiated from the Division level. All 34 Division Road Offices prepare their Annual Road Maintenance Plan (ARMP) since 2004 which was known as Yearly Plan of Operation (YPO) in early pilot phases of 1993/94 (DOR, SMDP 2005). The main purpose of ARMP is to plan needs-based budget in transparent and logical manner in line with approved DOR standards. It is usually gets prepared in March/April by all DROs. It is then forwarded to the Regional Directorate for preparation of Regional ARMP, where Regional Management prioritizes in its overall program and establishes its regional requirements before forwarding to Central Management. The Central Management prepares DOR Integrated Annual Maintenance Plan (IRAMP) based on divisional and regional ARMPs with taking consideration of central level priorities and requirements, and budget limitations. It is the basis for funding demand to the Roads Board Nepal (RBN) for maintenance budget.

### **2.2.4 Funding for Maintenance**

With the establishment of Roads Board Nepal (RBN), there is a provision of Road Fund, which provides fund for road maintenance including bridges as per IRMP.

### **2.2.5 Institutional Arrangement for carrying out the Maintenance Activities**

There are currently 34 Division Road Offices under 5 Regional Road Directorates at the implementation level, who are directly responsible for maintenance planning, contract preparation and implementation including deployment of Length workers. All other DOR central level offices including HIMSU are also directly or indirectly responsible for carrying out maintenance activities.

### **2.3 Road Maintenance Management System based on Roughton International Maintenance and Resource Management Methodology**

Road signifies combination of many structural elements including pavement, side drains, retaining walls, slope protection measures, and cross-drains/bridges. Road network passes through many different locations and environment. Road networks passing through the urban locations may have different environment than others. But in all cases, road maintenance management system suggested by Roughton International Maintenance and Resource Management methodology could be applicable for development of urban road maintenance management system.

The methodology offers specific strategies to meet the road maintenance needs under following two heads

#### **A. Programmed Maintenance Strategy**

- Routine Maintenance and Recurrent Maintenance

#### **B. Responsive Maintenance Strategy**

- Periodic Maintenance
- Miscellaneous Emergency Repairs
- Preventative Maintenance Projects

#### **2.3.1 Programmed Maintenance:**

(In general programmed maintenance comprises Routine Maintenance and Recurrent maintenance (or reactive maintenance).

Most common road damage results from the steady accumulation of deterioration due to the effects of normal traffic usage, climate and ageing. Such damage is widely distributed and occurs at rates which depend on the magnitude of specific factors in the local engineering environment.

The repair strategy for such type of deterioration is to estimate the rate at which damage will accumulate on each section of the road network and to set a limit to total allowable levels of deterioration. Such limits may differ across the network depending on the desired maintenance standards.

Any maintenance program intends to prevent the accumulation of deterioration exceeding the maximum levels. Appropriate repair resources are also defined and their annual operating costs established. These are usually either day labour or contract road gangs, but may include road grading and spot gravelling teams on gravel roads. The duration and cost of each maintenance intervention depends on the level of deterioration and on the productivity and cost effectiveness of the available repair resources.

In general, resource utilization efficiency increases with the duration of the intervention cycles. Against this the achieved maintenance standards depend on the frequency of interventions. The more frequent intervention result in lower levels of deterioration and thus repairs cycles of shorter duration.

The repair needs for each separate section of the road are evaluated taking account of the local engineering environment and require maintenance standard. Each individual repair task is costed and totaled to yield the budget estimate. When a budget allocation is received, it is distributed back to the individual maintenance activities according to a dissection based on the component parts of the original estimate.

When activity repair allocations are totaled by repair resource, the value of the allocation sub-totals can be used to determine the affordable annual resource levels. In all cases, the resulting resource availabilities are expressed in working days. Finally, the available resource times are assigned or committed to individual activities according to each activity repair allocation. This means that even under conditions of adequate maintenance funding, resources will be distributed according to expected deterioration and desired maintenance standards.

When funding is less than the estimate, affordable resource availabilities are reduced accordingly. After resource allocation, the duration of repair interventions will then be insufficient to repair all foreseen deterioration. This will inevitably result in unrepaired damage accumulating on the network.

The RI methodology allows for anticipated under-repair to be distributed in various ways, depending on concerned highway authority's maintenance policy. Funding

shortfalls are often distributed by rules which protect the highest class of road or the most heavily trafficked roads. By default, however, the RI procedure distributes available resource in proportion to required maintenance standards, i e in proportion to the needs estimate made for the budget bid.

### **2.3.2 Responsive Maintenance:**

Other forms of road damage occur quite suddenly as isolated local events which are based reinstated by resources that can be deployed as and when required. To quantify the required repair capability, the risk or likelihood of such damage. This classification is linked to the magnitude of selected parameters in the local engineering environment. So far as possible historical records are used to associate likely annual repair costs with values observed for the chosen parameters. In following this procedure, the different parts of the road network will have different damage liabilities and these will be reflected in the budget estimate.

Appropriate responsive resources are defined and costed to yield annual running cost. The responsive maintenance allocations and resource operating cost are used to determine the deployment level for such resource on an annual basis. Operating procedures are then formulated to ensure that the available resources are used to best effect.

### **Fundamental**

Theoretical concept of programmed maintenance is discussed below. It has been considered because the research study is focused to on Routine and Recurrent Maintenance under Programmed Maintenance

Under cyclic maintenance, the average typical maintenance requirements of the road network is established by either

- i) Local knowledge and maintenance track record for small management schemes or
- ii) By deterioration modelling and productivity work studies for more extensive management projects.

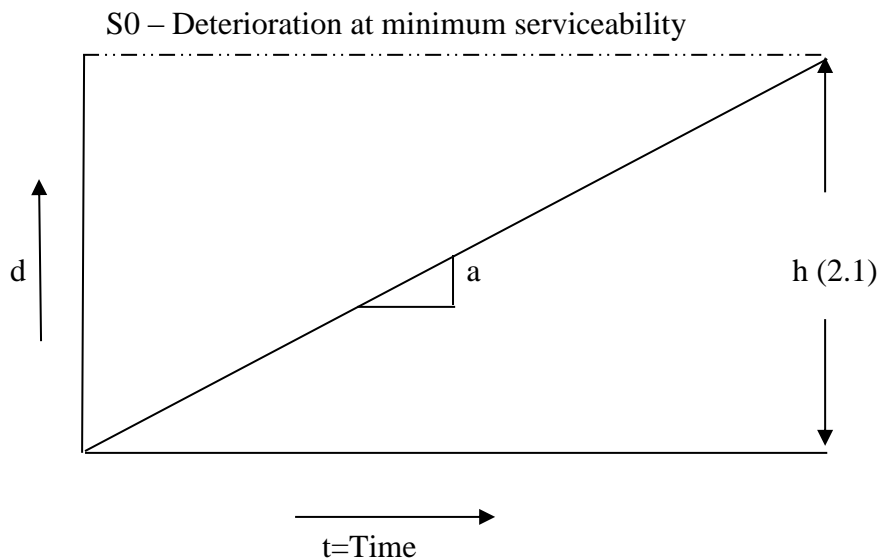
But the output of either approach is:

- The number of intervention per year

- For a given combination of labour and equipment, the duration of each maintenance intervention or cycle.

#### Deterioration modelling

- In deterioration modelling, the average rate of element deterioration is linear rate which results in the predictable annual workload.
- This depends on
  - local engineering environment
  - standard of local road construction



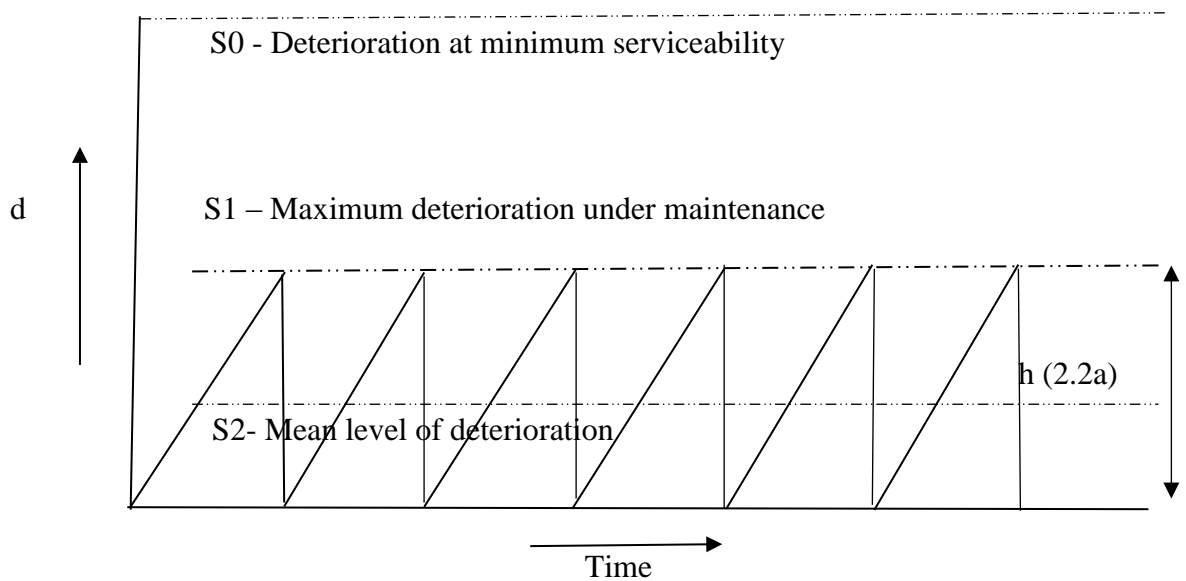
**Figure 2.1 Un-Checked deterioration**

So in Figure 2.1, there is no maintenance, the deterioration is shown continuing at a uniform rate, shown as “a” until the value S<sub>0</sub> is reached and the road becomes unserviceable. But under all cyclic maintenance models the element deterioration line has a saw-tooth profile in which a linear increase in deterioration is notionally returned to a base value at regular intervals throughout the year.

The ideal value of S<sub>2</sub> depends

- On cost /benefit analysis
- Acceptable element maintenance standard

Case 1 If there is adequate resources, the deterioration in each cycle could be repaired on each maintenance cycle. The value of S<sub>2</sub> then depends only on the rate of deterioration “a” and repair intervention frequency, Figure 2.2a



**Figure 2.2a Maintenance at a high standard**

Case 2 When funds are in short supply, the number of repair (maintenance) cycle must be reduced. This reduces the average standard of the road. But in principle, does not shorten its serviceable life Fig.2.2b

The cost of each intervention has two parts

- A fixed cost per mobilization
- A work related cost

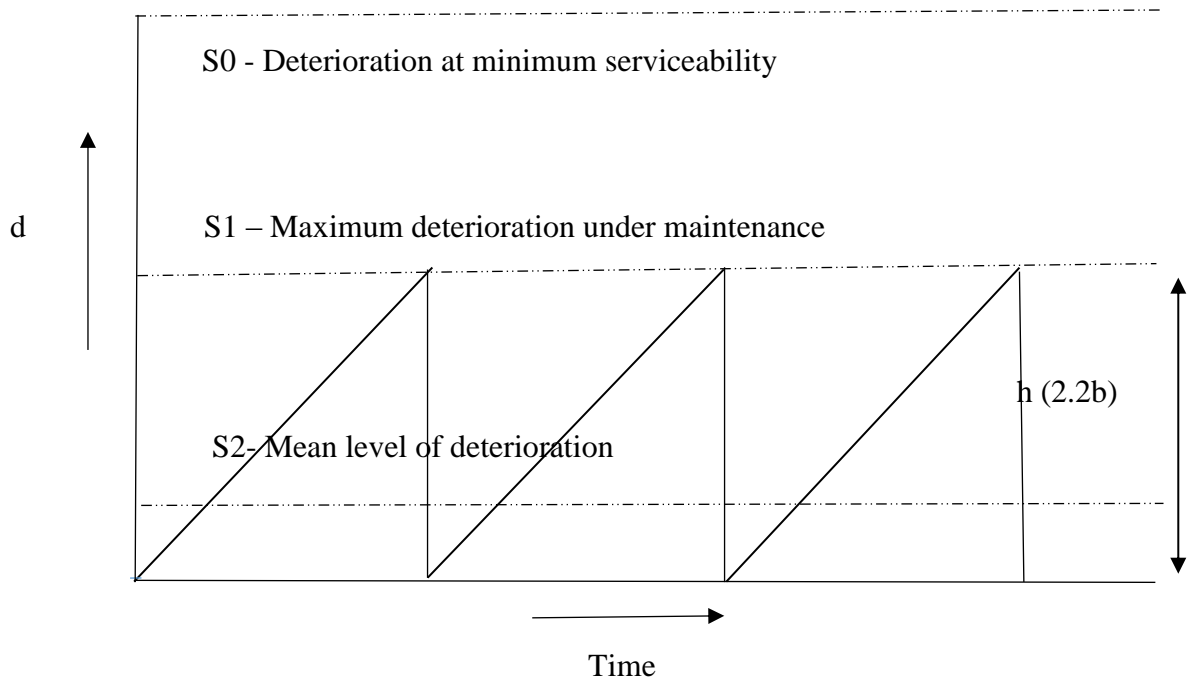
The work related costs are taken to be same for schemes 2.2a and 2.2b

Both show the same amount of repair work over the year

i.e. work  $h (2.2a) \times \text{number of cycle}$

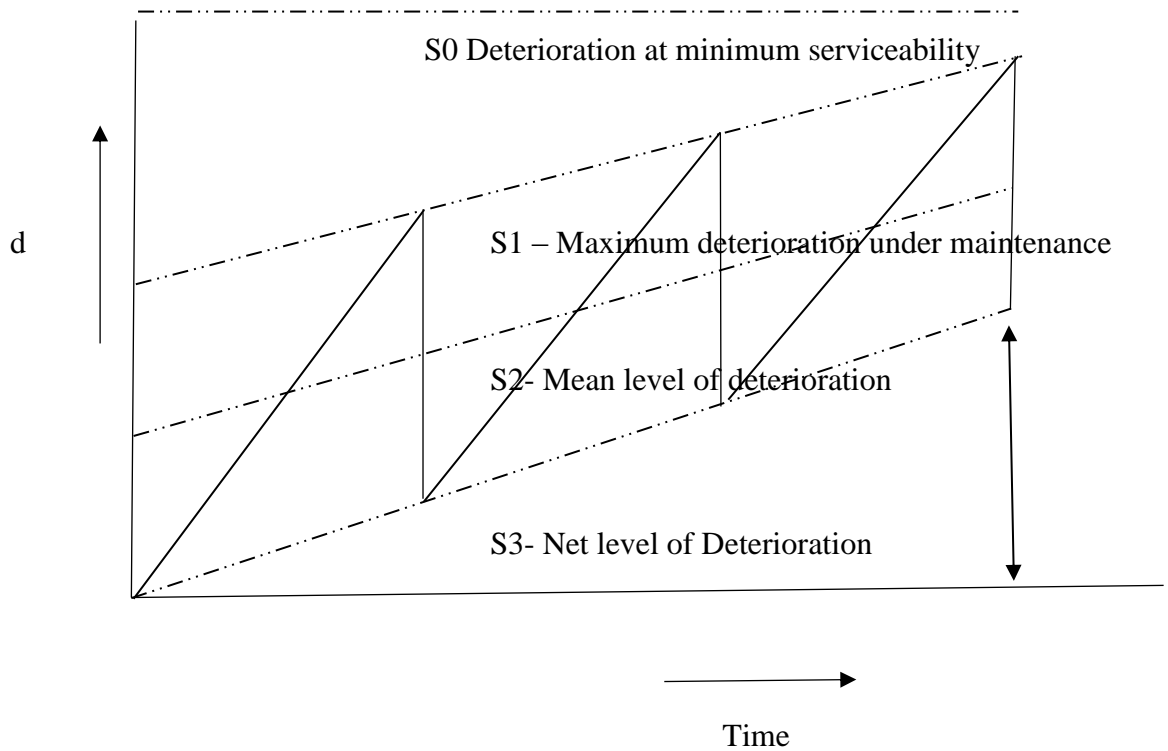
= work  $h (2.2b) \times \text{number of cycle}$

= work  $h$



**Figure 2.2b Maintenance at a low standard**

Case 3 But, when funds are restricted that full repair cannot be carried out, there will be an accumulative net decrease in serviceability, Fig.2.3



**Figure 2.3 Inadequate Maintenance**

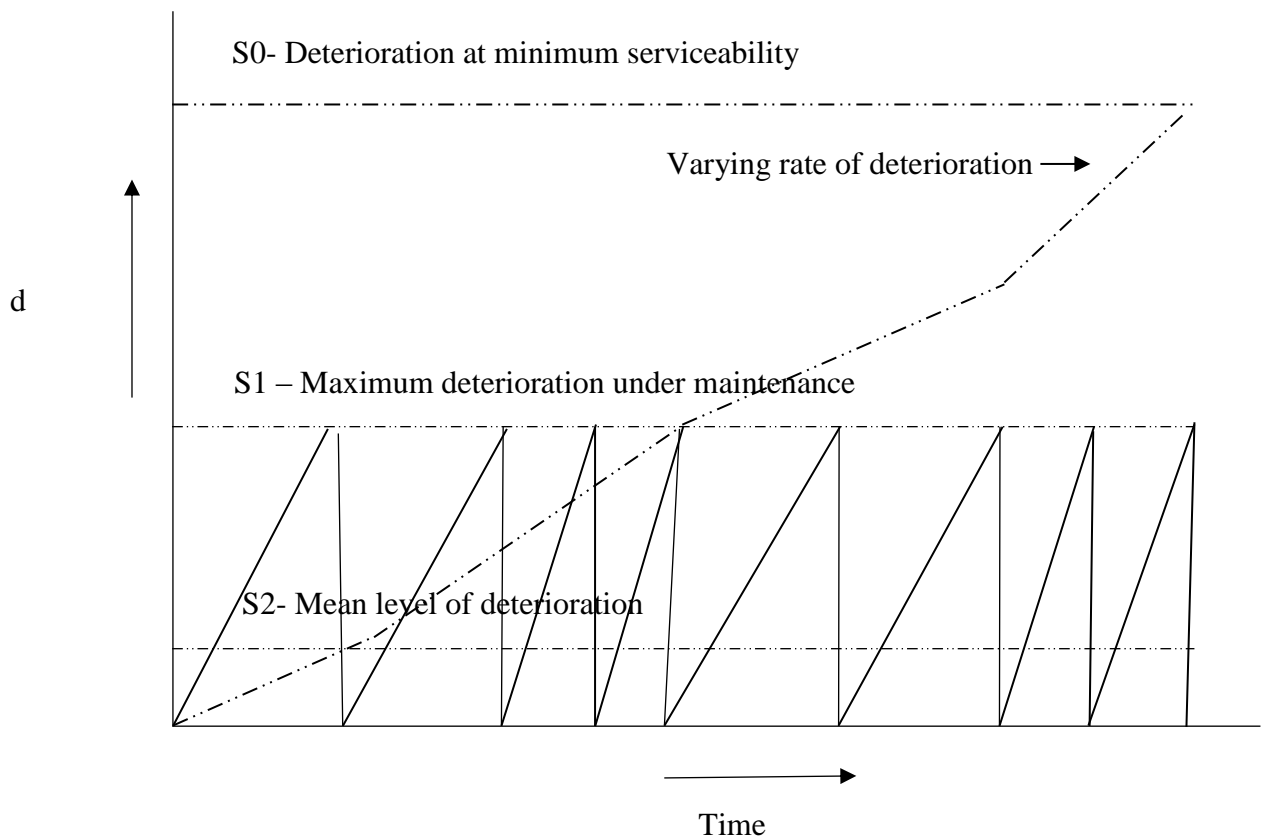
Note. Case 3 conditions is likely to be “real” case in all conditions of many maintenance elements, as some deterioration such as sub-grade and pavement fatigue cannot be easily repaired. It require specific maintenance in localized cases or rehabilitation in overall.

The level of serviceability S3 may therefore be expected to approach so (poor serviceability) over the design life of the road under all the maintenance regimes represented by Fig.2.2a and 2.2b.

#### Case 4 Seasonal maintenance variation

In practice the road deterioration is never linear. However, while the engineering environment and maintenance input remain constant the deterioration may be expected to be similar on average from year to year for much of the roads life.

The actual rate may also well show marked seasonal variation due to factors such as wet and dry seasonal changes and long national holidays like Dashain and Deepawali etc. which can result in big increase in traffic loading



**Figure 2.4 Seasonal Maintenance Variation**

To incorporate the seasonal variation case 4 has been presented. On small time scale there can be great seasonal variation. Some of this is predictable and can be accommodated by varying the time between repair cycles as shown in above Figure 2.4 So degree flexibility needed to ensure that resources are used effectively:

- RI methodology handles this by making each change task mandatory on the day programmed.
- The first day of each new activity is regarded as a “Red Letter Day” for the maintenance gang (unit) and each marked as such on the units Year Planner.
- Daily or weekly task-sheets are prepared which ensure that the worst deterioration is always repaired first.
- If the required repairs can be completed in less than the scheduled time, the remaining time in the cycle can be re- allocated by supervisor as needed.
- The essential feature of this system is that if road inspections are not done, the default activity is to follow the program exactly.
- This ensures that all road elements receive adequate if not optimum maintenance according to the affordable level of resources.

**The Programmed Maintenance planning procedure under RI methodology:**

The following stepwise procedures are explained

- Identify the maintenance elements
- Identify the significant engineering parameters in the local environment.
- Define relationships between maintenance treatments, repair costs and values of the significant engineering parameters.
- Inventories the network by work section and evaluate the significant engineering parameter in each local environment.
- Assign section element treatments and repair costs according to the parameters values in the inventory.
- Total the section element repair costs. This total and the supporting element/cost matrix make up the budget estimate.

**Procedures for Programmed Maintenance Operation**

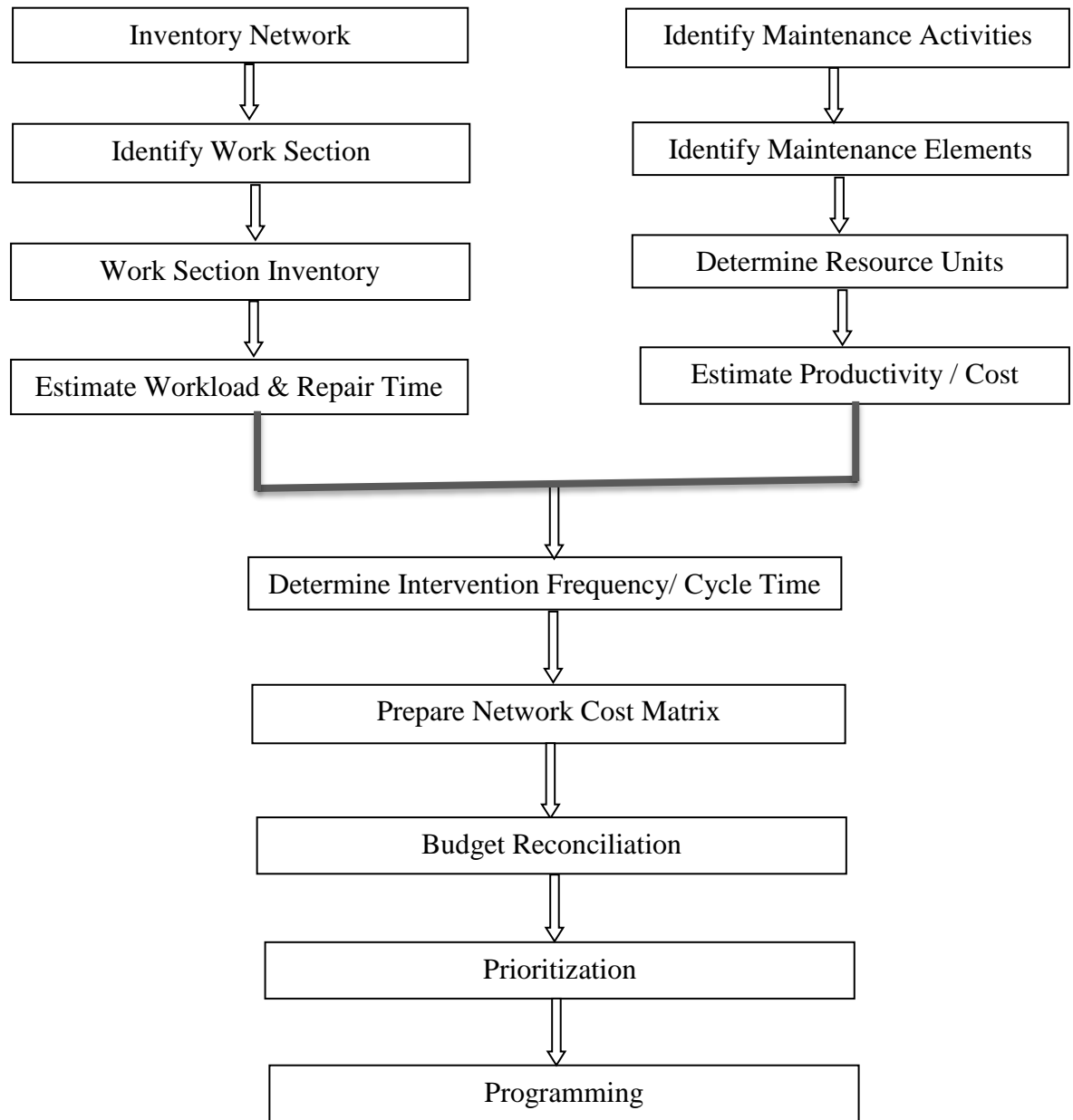
- Under the procedures for Programmed Maintenance, the first day of each new task assignment shown on the year planner is mandatory. This means that all new tasks must commence at the scheduled time. To emphasize this, starting dates are

highlighted on the Year Planner as Red Letter Days. The utilization of the time allocated to each task is planned in detailed by the Supervisor.

- Supervisor will use a Year Planner to schedule his/her planning inspections and inspect work progress. This planning inspection will be required about one week before each resource red letter day and may last for 2 to 3 days.
- Planning inspection will have to be carried out jointly by concerned supervisor and sub-engineer. As a result, they will identify the tasks to be carried out in next week as per Year Planner. And calculate the resources required such as labour, materials and equipment to complete the task identified.
- It is essential that the whole work section should be inspected before maintenance tasks are prioritized. It is ensure that the most urgent task is identified and assigned as the first days' work, and so on,
- If resource allocations are close to the desirable level, the planning inspection will sometimes show that a repair time allocation is longer than needed. If this happens, any excess time may be used for urgent repair work elsewhere on the network, provided Red Letter Day is followed as planned.
- If maintenance allocations are below the desirable level, on that case, the repair time available per cycle may be insufficient to carry out all necessary repairs. Any outstanding work at the end of repair cycle will reflect a lowering of maintenance standards due to the budget restrictions.

## 2.4 Summary of the procedures for preparing Program/Estimate under RI Maintenance Management Methodology

### Flow Chart



## 2.5 Road Maintenance in Kathmandu Metropolitan City (KMC)

### i. Introduction

In Nepal there are 217 municipalities including one Metropolis, 11 sub- metropolises. Kathmandu Metropolis is the only one Metropolitan city in the Kingdom of Nepal. It has been divided in 35 wards for administrative and development purpose. Its

importance is quite obvious as it is the capital city. The area of KMC is 51.30 km<sup>2</sup> and population is 9, 75,463 (B.S. 2068). Total length of roads= 1036 km with following standard surfacing:

Table 2.1 Total length of Roads in KMC

Surface Type	Bituminous surface	Gravel	Earthen	Other
% of surface	31	16	26	27

## ii. Local Body

The responsibility of urban road network transferred from DOR to local Government such municipality after effective of local self-government act in 1998. However it is still in the institutionalization process although KMC look after roads of some network in Kathmandu valley.

## iii. Road Infrastructure and its Condition

KMC invests huge amount of money on roads. The condition of roads should have been good but it is just opposite. In most of the places blacktopped roads have been totally destroyed contributing to air pollution due to generation of dust and public discomfort and increased VOC.

## iv. Current Practice of Road Maintenance in KMC

Approximately 75% of urban infrastructure development department of KMC budget is occupied by roads infrastructure every year. KMC is working with government of Nepal in road widening project. KMC is also working with Road Board Nepal in road maintenance. KMC, in absence of any planned maintenance approach, its current maintenance practices are not showing satisfactory result. Many roads are deteriorating rapidly. These roads had to be either rehabilitated or reconstructed earlier than its full life incurring heavy financial burden to the KMC. That is, KMC has no proper urban maintenance management system. KMC has virtually recurrent maintenance practice other than periodic and rehabilitation/ reconstruction works.

# CHAPTER 3: STUDY DATA

## 3.1 Introduction

In this chapter, first of all study area was selected and Visual Condition Assessments (VCA) was done to collect several data. Here, traffic data, geometric data, pavement condition, drainage condition, urban nature type, workload and productivity data's were collected.

## 3.2 Study Area

The study is focused on Kathmandu Metropolitan City.

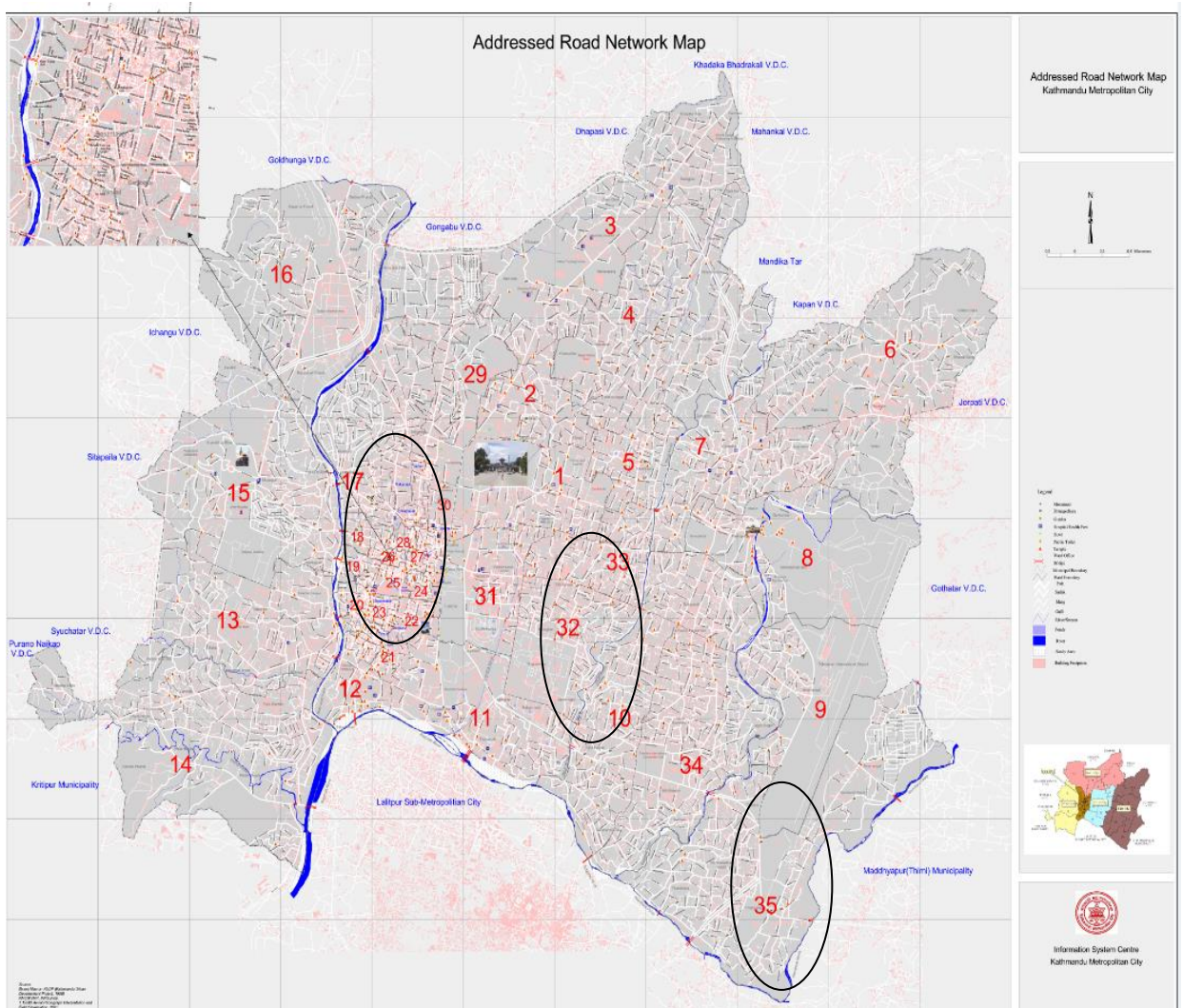


Figure 3.1 Kathmandu Metropolitan City map

## 3.3 Road Section under Study

The following roads of KMC were selected for the study.

Table 3.1 Road Section under study

Road Section No.	Section Name	Section Length	Width
		km	m
1	Seti Opi Marg	1.20	8.00
2	Sahayogi Marg	1.70	8.00
3	Subidha Marg	0.55	8.00
4	Ganesh Marg	0.35	6.00
5	Simrik Marg	0.09	8.00
6	Shiva Marg	0.30	6.00
7	Kharibot Marg	0.12	6.00
8	Pancheshwor Marg	0.23	6.00
9	Danfe Chari Marg	0.75	6.00
10	Thamel area	2.20	4.00
11	Swayambhu Marg	0.65	8.00
12	Adwait Marg	0.63	6.00
13	Jyatha Marg	0.41	6.00
14	Bina Marg	0.34	6.00
15	Shahid Marg	0.69	4.00
16	Bishnumati Link Road	2.80	14.00
17	Raja Birendra Marg	0.84	4.00
18	Pipa Gaushwara Marg	0.29	8.00
19	Ghattekulo Marg	0.71	6.00
20	Radhe Marg	0.53	6.00

### 3.4 Data Collection

Data can be obtained from various sources. Data required for research purpose can be divided into two types, Primary data collected through Rapid Visual Condition Assessments and Secondary data can be obtained through literature, references such as books, journals, conference papers, magazines, newspapers, reports, internet surfing and so on.

Data collection is the first step for the development of urban road maintenance management system, followed by analysis of data. Limited roads are selected for the study, which is shown in the Table 3.1. There are altogether 20 roads of short stretch of length totaling around 15 km. As there is next to no technical database for traffic, road condition, urban nature, drainage types and condition etc. of these roads in KMC except name of road, length, width of road, year of construction and technical specification such as pavement/surface type, and thickness of pavement. Except available data, traffic data were collected. Besides that other data required as per methodology to be adopted being collected, which includes urban nature in terms of core city, semi core city and non-core city. Financial data of maintenance carried out by KMC were also collected.

### **3.5 Data Preparation**

The data collected from KMC and from those road stretches had been processed prior to analysis and this was necessary to identify the unreliable data before analysis.

## **CHAPTER 4: METHODOLOGY AND ANALYSIS**

### **4.1 Introduction**

In order to achieve the overall objective to develop an Urban Road Maintenance Management System applicable to urban road networks such as in Kathmandu Metropolitan City the following procedure was followed:

### **4.2 Steps Followed**

#### **STEP 1**

##### **Inventory Network**

The road network is divided into manageable sections considering type and volume of traffic, road geometry, surface type, structural composition, construction history, classification and condition including environmental information and location of construction materials. Data is collected to provide information on permanent physical features of the road network and presented on sections according to the chainages.

#### **STEP 2**

##### **Identify Work Sections**

An engineering environment applies to a specific length of road called work section. The primary characteristic of a work section is that its engineering environment can be described by a single set of parameter values, secondary definitions of a work section are:

- The length of a work section should normally be 5 and 50 km.
- A work section need not be continuous throughout its length
- All parts of a given work section should lie within administrative area
- Within any section, similar maintenance work should be undertaken by the same repair resource.

Traffic, urban nature, drainage condition and the pavement condition are considered as the engineering parameters with assigned value according to the Average Daily Traffic (ADT), type of urban nature, drainage condition and pavement condition for the identification of the work section within the maintenance area.

Table 4.1 Assigned value according to Traffic Volume

Assigned value according to Traffic Volume

Assigned value (Importance)	ADT	Surface Type
1	Strategic Roads	
2	Greater than 1000	Asphalt Concrete
3	500 – 1000	Asphalt Concrete
4	200 – 500	Asphalt Concrete
5	Greater than 200	Unpaved
6	Less than 200	Asphalt Concrete
7	50 – 200	Unpaved
8	Less than 50	Unpaved

(Table 7.5 Road Traffic Level by other of Importance ORN -1)

Table 4.2 Assigned value according to urban nature

Type of urban nature	Assigned Value	Degree of Urban Activity
Non-Core	1	Low
Semi-Core	2	Average
Core	3	High

Table 4.3 Assigned Value according to Traffic

Traffic	Assigned Value	Damaging effects
<250	1	Low
250 to 1000	2	Average
>1000	3	High

Table 4.4 Assigned Value according to Pavement Condition

Traffic	Assigned Value	Deterioration rate
Good	1	Low
Average	2	Average
Poor	3	High

Table 4.5 Assigned Value according to Drainage Exist

Traffic	Assigned Value	Deterioration rate
Both side exist	1	Both site of road
Partially exist	2	Partially exist
Non-exist	3	No. drainage facility

Table 4.6 Inventory Network

Section Name	ID NO.	Start	End	Length	Width	Urban Nature	Traffic	Drainage Facility
		Chainage	Chainage	km	m			
Seti Opi Marg	1	Police beat	Jhulunge Bridge	1.20	8.00	1	3	1
Sahayogi Marg	2	Prabhu Bank	Manohara River	1.70	8.00	1	3	1
Subidha Marg	3	0+00	0.55	0.55	8.00	1	3	1
Ganesh Marg	4	0+00	0.35	0.35	6.00	1	3	2
Simrik Marg	5	0+00	0.09	0.09	8.00	1	3	2
Shiva Marg	6	0+00	0.3	0.30	6.00	1	1	2
Kharibot Marg	7	0+00	0.12	0.12	6.00	1	1	2
Pancheshwor Marg	8	0+00	0.23	0.23	6.00	1	2	1
Danfe Chari Marg	9	0+00	0.75	0.75	6.00	1	1	2
Thamel area	10	0+00	2.2	2.20	4.00	3	3	2
Swayambhu Marg	11	0+00	0.65	0.65	8.00	3	3	2
Adwait Marg	12	0+00	0.63	0.63	6.00	3	3	2
Jyatha Marg	13	0+00	0.41	0.41	6.00	3	3	1
Bina Marg	14	0+00	0.34	0.34	6.00	3	1	2
Shahid Marg	15	0+00	0.69	0.69	4.00	3	2	2
Bishnumati Link Road	16	Kalimati Bridge	Sorhakhutte	2.80	14.00	2	3	1
Raja Birendra Marg	17	0+00	0.84	0.84	4.00	2	1	2
Pipa Gaushwara Marg	18	0+00	0.29	0.29	8.00	2	3	2
Ghattekulo Marg	19	Anam Nagar	Pipalbot	0.71	6.00	2	3	3
Radhe Marg	20	0+00	0.53	0.53	6.00	2	3	1
			<b>Total</b>	<b>15.38</b>				

### STEP 3

#### Work Section Inventory

The work section inventory indicates the expected deterioration rates by classification of the general condition of maintenance element in each road section. The purpose of road condition survey is to acquire data on the general condition of the road network under the responsibility of the maintenance organization. The survey identify the following

- Assesses the general condition of the road network.
- Identifies those sections of the road which are in a critical condition.
- Detects severe damage that requires immediate maintenance action.

From the Condition Survey of the road, work section inventory quantifies numerically the quantitative condition/deterioration with a value of the maintenance elements within the work section. Those are as follows.

Table 4.7 Pavement Rating Condition

<b>Condition</b>	<b>Value</b>	<b>Deterioration Rate</b>
Good	1	Low
Average	2	Average
Poor	3	High

Work section inventory is prepared with the field inspection or the visual inspection.

Table 4.8 Work Section Inventory

Road Section No.	Section Name	Section Length	Width	Condition	Urban Nature	Traffic	Drainage Facility
		km	m	PR			
1	Seti Opi Marg	1.2	8	2	1	3	1
2	Sahayogi Marg	1.7	8	2	1	3	1
3	Subidha Marg	0.55	8	2	1	3	1
4	Ganesh Marg	0.35	6	2	1	3	2
5	Simrik Marg	0.09	8	2	1	3	2
6	Shiva Marg	0.3	6	2	1	1	2
7	Kharibot Marg	0.12	6	2	1	1	2
8	Pancheshwor Marg	0.23	6	2	1	2	1
9	Danfe Chari Marg	0.75	6	2	1	1	2
10	Thamel area	2.2	4	3	3	3	2
11	Swayambhu Marg	0.65	8	2	3	3	2
12	Adwait Marg	0.63	6	2	3	3	2
13	Jyatha Marg	0.41	6	3	3	3	1
14	Bina Marg	0.34	6	2	3	1	2
15	Shahid Marg	0.69	4	3	3	2	2
16	Bishnumati Link Road	2.8	14	1	2	3	1
17	Raja Birendra Marg	0.84	4	2	2	1	2
18	Pipa Gaushwara Marg	0.29	8	2	2	3	2
19	Ghattekulo Marg	0.71	6	2	2	3	3
20	Radhe Marg	0.53	6	2	2	3	1
	<b>Total</b>	<b>15.38</b>					

## STEP 4

### Identify Maintenance Activities

Preserving and keeping each type of roadway, roadside, structures as nearly as possible in its original condition as constructed or as subsequently improved and the operation of highway facilities and services to provide satisfactory and safe transportation, is the main objective of road maintenance.

The various maintenance functions include;

- Surface maintenance
- Roadside and drainage maintenance
- Shoulder and approaches maintenance
- Retaining structure maintenance
- Bridges maintenance
- Traffic service

The above functions of maintenance require different maintenance activities which are required for the repair works. Grouping the similar types of activities into a representative maintenance element make easy to carry out the maintenance activities by forming the respective resource units such as

Table 4.9 Maintenance Elements and Resource Units

Maintenance Element	Resource Unit
Road surface /side drain/catch pit clearance	RC
Pavement repair	PR
Drainage/manhole Routine maintenance	DM

### Road surface /side drain/catch pit clearance (RC)

Routine maintenance is carried out by the following maintenance activities are to be carried out by them.

- Cleaning of road surface
- Cleaning of road side drain
- Removal of small slips (up to 1 m<sup>3</sup> of debris)
- Cleaning of road signs

- Temporary repair of potholes on gravel and paved road surface
- Temporary repair of road shoulders
- Regular sweeping on road surface (Paved)

### **Pavement Repair (PR)**

The pavement surface for both paved and unpaved road is carried out by the Pavement Repair gang (PR), and the maintenance activities carried out by them are;

- Potholes patching
- Creak sealing
- Edge repair
- Joint repair (Concrete Pavement)
- Correction of bleeding
- Grading and dragging on gravel surface
- Repair of shoulder

### **Drainage /Manhole Routine Maintenance gang (DM)**

Cleaning and repair of side drain and manhole and they carry out the following maintenance activities;

- Cleaning of side drain/manhole
- Repairing of side drain/manhole
- Raising of manhole

## **STEP 5**

### **Identify Maintenance Elements**

#### **The Road**

The road is the physical construction or resource that has been designed or traditionally used for the movement of people and goods. The road is composed of the following elements:

**Maintenance Element**

Maintenance element is a single type of Road Element or collection of road elements, which could be repaired by the same repair unit gang.

The following maintenance elements were identified for the maintenance of road elements:

**Road surface /side drain/catch pit clearance -RC**

Road sweeping, drain clearance, grass cutting, catch pit clearance.

**Pavement repair - PR**

Road surface crack sealing, pothole repairs, base repairs.

**Drainage /manhole Routine Maintenance – DR**

Minor repairs, maintenance of drainage/manhole

**STEP 6****Determine Resource Units**

The resource requirements are related to the method used in carrying out the maintenance works. The resource requirement is also depends upon productivity levels anticipated from different maintenance activities, and the productivity depends on the formation of team/gang engaged on normal maintenance activities, using manual labour or machinery as appropriate.

The followings are the composition of gangs as Resource Unit for carrying the maintenance activities under the respective maintenance elements.

**Road surface /side drain/catch pit clearance (RC)**

For the road surface/side drain/catch pit clearance the resource unit (RC) consists of following composition of resources.

Table 4.10 Resource Units for RC

Manpower	1 Supervisor
	8 Labour
Plants	1 Tractor

## **Pavement repair (PR)**

The repair gang of resource (PR) for pavement Repair consists of following resources

Table 4.11 Resource Units for PR

Manpower	1 Supervisor
	2 Manson
	8 Labour
Plants	1 Tractor, roller
Material	Bitumen, aggregate, filler material as per standard

## **Drainage/manhole Routine maintenance (DM)**

For the side drain/manhole Routine maintenance the resource unit (DM) consists of following composition of resources

Table 4.12 Resource Units for DM

Manpower	1 Supervisor
	2 Manson
	8 Labour
Plants	1 Tractor
Material	Cement, Sand, Brick, Aggregate, required as per standard

## **STEP 7**

### **Establish Workload & Repair Times**

Determining the amount of work for each resource unit that are expected to be encountered per km per year under “good”, “average”, and “poor” conditions of the road section is termed as workload for particular maintenance activity. Here the maintenance activities are defined as

- Routine maintenance - Road surface /side drain/catch pit clearance
- Pavement repair - Crack and potholes repair
- Drainage/Manhole repair - cleaning, repair of side drain and manhole

And the resource units are defined as

Road surface /side drain/catch pit clearance	RC
Pavement repair Gang	PR
Drainage/manhole Routine Maintenance gang	DM

Workload can be determined:

- From historical records
- From experience of maintenance engineer according to the local condition
- From Standard theoretical/actual data base developed and recorded nationwide in Centre/region.

The unit for the workload is expressed as, in

Volume of works	m <sup>3</sup> /km/year
Area of works	m <sup>2</sup> /km/year
Linear meter of work	m/km/year

The repair time is the ratio of workload and repair resource's productivity

i.e. **Repair Time = Work Load/ Resource's Productivity**

The unit of Repair Time is expressed in days/km/year

### **Estimating element Workloads**

Element Workload may be regarded as a measure of the annual repair requirement for a given element. Taken together with a repair resource productivity, the workload yields the repair time, i.e.:

$$(T)e = (WL)e / (P)r$$

Where;

(WL)e = Element workload

(P)r = Repair resource productivity

(T)e = Repair time

### **Estimation of Productivity**

The productivity is the amount of goods and service that a worker produces in a given amount of time. Hence, it is refer to the qualitative dimensions of labour input The productivity for the maintenance works is lesser to that of mass works, because of its scattered location with less and specific volume of works. Generally for repair of maintenance elements require 1.30 to 1.70 times more cost than that of mass work of same nature. The productivity depends upon the composition of the gang (team), more the number of skilled labour with supporting labourers the higher will the productivity for the work and vice versa.

Gang consists of

- 1 No. Supervisor.
- 2 Nos. Mason,
- 8 Nos. labour,
- 1 No. Tractor

#### **Productivity of a gang for Pavement repair by gang (PR)**

To carry out 0.65 m<sup>3</sup> of patching bituminous surface 6 labour are required, similarly for carrying out repair 0.90 m<sup>3</sup> of base/ sub-base layer of the pavement 7 labour are required. With this data the established productivity for the pavement repair from past record by the gang for 20mm premix patching is 54 m<sup>2</sup> per day and for 20mm premix patching with 10 cm thick base repair 10 m<sup>2</sup> per day. This includes all the required activities that needs for patching works, both for shallow and deep patching respectively; like shaping of pot holes, removing of loose materials packing of base/sub-base compaction by hand rammer/pedestrian roller, watering, prime/tack etc.

#### **Productivity of a gang for drainage/manhole repair (DM)**

For the construction of 1 m<sup>3</sup> of brick masonry in 1:4 cement mortar work require the number of skill manpower (mason) is1.5 man days skilled, with 3.5 unskilled labour for mass work a total of 5 man power i.e. for 1 m<sup>3</sup> of masonry work 5 labour including skilled labour are required. Hence for 10 labour (2 skilled and 8 unskilled) the productivity of masonry work is 2 m<sup>3</sup> per day

Productivity of gang for 0.33 m<sup>3</sup> of masonry

Transportation of materials                      0:20 hrs

Preparation of mortar 0:30 hrs

Repair of masonry 2:25 hrs

Total 3:15 hrs

Productivity time = 6:30 hours per day

Productivity =  $6:30/3:15 = 2$  cum per day

### Work Load Calculation

Work Load was taken from DOR /SRIP/ADB

### PR– Pavement Repair for Double Lane (6-8) m. width

Table 4.13 Workload and Repair Time for double lane

Work Description	Unit	Workload		
		Condition		
		1	2	3
Bituminous Patch Work	m <sup>2</sup> /km/year	5.0	15.0	60.0
Productivity	10 m <sup>2</sup> /day			
Repair Time	days/km/year	0.50	1.50	6.00

### PR– Pavement Repair for Single Lane (3-5) m. width 60% of double lane

Table 4.14 Workload and Repair Time for single lane

Work Description	Unit	Workload		
		Condition		
		1	2	3
Bituminous Patch Work	m <sup>2</sup> /km/year	3.0	9.0	36.0
Productivity	10 m <sup>2</sup> /day			
Repair Time	days/km/year	0.30	0.90	3.60

### PR– Pavement Repair for Four Lane (14-16) m. width adding 100% of double lane

Table 4.15 Workload and Repair Time for four lane

Work Description	Unit	Workload		
		Condition		
		1	2	3
Bituminous Patch Work	m <sup>2</sup> /km/year	10.0	30.00	120.00
Productivity	10 m <sup>2</sup> /day			
Repair Time	days/km/year	1.00	3.00	12.00

## DM – Drainage/manhole Repair

Table 4.16 Workload and Repair Time for DM

Work Description	Unit	Workload		
		Condition		
		1	2	3
Brick Masonry Misc. Items	m <sup>3</sup> /km/year	1.5	3.0	5.0
Productivity	2 m <sup>3</sup> /day			
Repair Time	days/km/year	0.75	1.50	2.50

\*Manhole repair additional

## RC – Road Surface/side drain/catch pit Clearance

Table 4.17 Workload and Repair Time for RC

Work Description	Unit	Workload		
		Condition		
		1	2	3
Road surface ,Side Drain , Catch pit Misc. Items	m <sup>3</sup> /km/year	3.25	6.50	13.00
Productivity	21 m <sup>3</sup> /day			
Repair Time	days/km/year	0.15	0.31	0.62

## STEP 8

### Estimate/Resource unit Productivity & Operation Cost

The resource unit comprises of Labour, Materials and Plants/equipment to carry out the works identified for the respective maintenance elements. Depending upon the nature of the maintenance work that is to be carried out by the respective resource unit, it is required to determine the number and the composition of the each unit's requirement for

- Labour force
- Type and quantity of materials required as per standard and
- Number of equipment, machine and tools with need of transportation.

Once the composition of resource unit/gang is determined with respect to nature of work of the maintenance element, the productivity of the unit can be estimated in terms of measured units/day; i.e.:  $m^3/day$ ;  $m^2/day$ ;  $m/day$ .

From the above data it can be establish the resource unit's operation cost in terms of Rupees/day. The resource unit operation cost must include all the direct expenditure required to enable the unit to work.

Basis of composition:

- Use your experience
- Historical data of civil works construction
- DOR norms

1. Pavement Repair

Productivity and Cost estimation

Resource Identification PR

Resource Specification

- a) Manpower      1 supervisor  
                                 2 Mason  
                                 8 Labour
- b) Plants            1 Tractor, roller
- c) Material         Bitumen, Aggregates, filler material, etc. as per standard

Resource Cost (Composition) (20mm thick premix shallow patching)

Table 4.18 Resource cost for PR

Item	Unit	Quantity	Rate	Total
			(Rs)	(Rs)
Supervisor	no.	1	765.00	765.00
Mason	no.	2	865.00	1730.00
Labour	no.	8	715.00	5720.00
Tractor	no.	1	2100.00	2100.00
Roller	no.	1	2100.00	2100.00

Item	Unit	Quantity	Rate	Total
			(Rs)	(Rs)
MC 30 cutback	lit.	59.4	74.80	4443.12
Bitumen	lit.	135	74.80	10098.00
Filler Material	m <sup>3</sup>	0.027	1270.44	34.30
Aggregate	m <sup>3</sup>	1.52	2858.59	4345.06
Diesel	lit.	10.8	71.00	766.80
		Sub-total		32102.28
		15 % Administrative charge		4815.34
		Total		36917.62
		13 % VAT		4799.29
		Grand-total		41716.91

## 2. Drainage/manhole Routine Maintenance Works

### Resource Identification DM

### Resource Specification

- a) Manpower     1 supervisor  
                           2 Mason  
                           8 Labour
- b) Plants            1 Tractor
- c) Material        Cement, Sand, Brick, Aggregate, required as per standard

Table 4.19 Resource cost for DM

Item	Unit	Quantity	Rate	Total
			(Rs)	(Rs)
Supervisor	no.	1	765.00	765.00
Mason	no.	2	865.00	1730.00
Labour	no.	8	715.00	5720.00
Tractor	no.	1	2100.00	2100.00
Cement	Bag	6.1	797.00	4861.70
Sand	m <sup>3</sup>	0.9	2787.91	2509.12
Brick	no.	1288	14.42	18572.96
Water	lit.	200	0.30	60.00
		Sub-total		36318.78
		15 % Administrative charge		5447.82
		Total		41766.60
		13 % VAT		5429.66
		Grand-total		47196.26

3. Road surface /side drain/catch pit clearance

Resource Identification RC

Resource Specification

a) Manpower 1 supervisor

8 Labour

b) Plants 1 Tractor

Table 4.20 Resource cost for RC

Item	Unit	Quantity	Rate	Total
			(Rs)	(Rs)
Supervisor	no.	1	765.00	765.00
Labour	no.	8	715.00	5720.00
Tractor	no.	1	2100.00	2100.00
		Sub-total		8585.00
		15 % Administrative charge		1287.75
		Total		9872.75
		13 % VAT		1283.46
		Grand-total		11156.21

## STEP 9

### Determine Intervention Frequencies & Cycle Time

After identification of workload, Maintenance elements, Maintenance activities, Resource unit and its productivity, it is required to decide when and where repair are needed and what form of maintenance activity is required. These indicators are termed as “Intervention Level” i.e. they identify the stage or circumstance in which intervention and action is required to stop further deterioration. Ideally intervention levels should be derived as part of the road maintenance policy framework, and will be influenced by level-of-service requirements, engineering issues and available resources for maintenance.

After establishment of the annual rates of deterioration of the selected maintenance elements within the work sections under a range of conditions, the next objective is to provide a Programmed Cycle of repair at regular intervals throughout the year to rectify the anticipated deterioration.

Any engineering parameters between the extreme intervention frequencies could be calculated from the simple linear relationship.

$$F = mP+c$$

F = Intervention Frequency

P = Engineering Parameter

m, c = Constants that can be derived from the solution of the simultaneous equations using the extreme values of F and P chosen.

Table or graph can be drawn-up, where a number of intermediate values of the intervention frequency are required.

**Cycle Time:**

Once intervention frequency is established for each resource unit in each work section, cycle time (in days **T**) for each intervention are derived from total repair time divided by the frequency (F)

Table 4.21 Intervention Frequencies for PR

Road Section No.	Section Name	Length (km)	Traffic Group	Section Condition (Urban nature)	Total Time (Days) (Repair – time x km)	Cycle Frequency (Cycle/year)	Cycle Time (Days/Cycle)	Amount Cost Rs
1	Seti Opi Marg	1.20	3	1	0.6	2	0.30	25030.15
2	Sahayogi Marg	1.70	3	1	0.85	2	0.43	35876.54
3	Subidha Marg	0.55	3	1	0.28	2	0.14	11680.73
4	Ganesh Marg	0.35	3	1	0.18	2	0.09	7509.04
5	Simrik Marg	0.09	3	1	0.05	2	0.03	2503.01
6	Shiva Marg	0.30	1	1	0.15	2	0.08	6674.71
7	Kharibot Marg	0.12	1	1	0.06	2	0.03	2503.01
8	Pancheshwor Marg	0.23	2	1	0.12	2	0.06	5006.03
9	Danfe Chari Marg	0.75	1	1	0.38	2	0.19	15852.43
10	Thamel area	2.20	3	3	7.92	4	1.98	330397.93
11	Swayambhu Marg	0.65	3	3	3.9	4	0.98	163530.29
12	Adwait Marg	0.63	3	3	3.78	4	0.95	158524.26
13	Jyatha Marg	0.41	3	3	2.46	4	0.62	103457.94
14	Bina Marg	0.34	1	3	2.04	4	0.51	85102.5

Road Section No.	Section Name	Length (km)	Traffic Group	Section Condition (Urban nature)	Total Time (Days) (Repair – time x km)	Cycle Frequency (Cycle/year)	Cycle Time (Days/Cycle)	Amount Cost Rs
15	Shahid Marg	0.69	2	3	2.48	4	0.62	103457.94
16	Bishnumati Link Road	2.80	3	2	8.4	3	2.80	350422.04
17	Raja Birendra Marg	0.84	1	2	0.76	3	0.25	31287.68
18	Pipa Gaushwara Marg	0.29	3	2	0.44	3	0.15	18772.61
19	Ghattekulo Marg	0.71	3	2	1.07	3	0.36	45054.26
20	Radhe Marg	0.53	3	2	0.8	3	0.27	33790.7
		15.38			36.72		10.84	1536433.8

Resource Unit Cost

Schedule

Resource Unit PR - Pavement Repair

(Daily Rate Rs. 41716.91 /day)

Urban nature	Frequency Range
Core	4
Semi-core	3
Non-Core	2

Table 4.22 Intervention Frequencies for DM

Road Section No.	Section Name	Length (km)	Traffic Group	Section Condition (Urban nature)	Total Time (Days) (Repair time x km)	Cycle Frequency (Cycle/year)	Cycle Time (Days/Cycle)	Amount Cost Rs
1	Seti Opi Marg	1.20	3	1	0.9	2	0.45	42476.63
2	Sahayogi Marg	1.70	3	1	1.28	2	0.64	60411.21
3	Subidha Marg	0.55	3	1	0.41	2	0.21	19822.43
4	Ganesh Marg	0.35	3	1	0.26	2	0.13	12271.03
5	Simrik Marg	0.09	3	1	0.07	2	0.04	3775.7
6	Shiva Marg	0.30	1	1	0.23	2	0.12	11327.1
7	Kharibot Marg	0.12	1	1	0.09	2	0.05	4719.63
8	Pancheshwor Marg	0.23	2	1	0.17	2	0.09	8495.33
9	Danfe Chari Marg	0.75	1	1	0.56	2	0.28	26429.91
10	Thamel area	2.20	3	3	5.5	4	1.38	260523.36
11	Swayambhu Marg	0.65	3	3	1.63	4	0.41	77401.87
12	Adwait Marg	0.63	3	3	1.58	4	0.40	75514.02
13	Jyatha Marg	0.41	3	3	1.03	4	0.26	49084.11
14	Bina Marg	0.34	1	3	0.85	4	0.21	39644.86

Road Section No.	Section Name	Length (km)	Traffic Group	Section Condition (Urban nature)	Total Time (Days) (Repair time x km)	Cycle Frequency (Cycle/year)	Cycle Time (Days/Cycle)	Amount Cost Rs
15	Shahid Marg	0.69	2	3	1.73	4	0.43	81177.57
16	Bishnumati Link Road	2.80	3	2	4.2	3	1.40	198224.29
17	Raja Birendra Marg	0.84	1	2	1.26	3	0.42	59467.29
18	Pipa Gaushwara Marg	0.29	3	2	0.44	3	0.15	21238.32
19	Ghattekulo Marg	0.71	3	2	1.07	3	0.36	50971.96
20	Radhe Marg	0.53	3	2	0.8	3	0.27	38228.97
		15.38			24.06		7.70	1141205.59

Resource Unit Cost Schedule

Resource Unit DM - Drainage /manhole Repair  
(Daily Rate Rs. 47196.26/day)

Urban nature	Frequency Range
Core	4
Semi-core	3
Non-Core	2

Table 4.23 Intervention Frequencies for RC

Road Section No.	Section Name	Length (km)	Traffic Group	Section Condition (Urban nature)	Total Time (Days) (Repair time x km)	Cycle Frequency (Cycle/year)	Cycle Time (Days/Cycle)	Amount Cost Rs
1	Seti Opi Marg	1.20	3	1	0.18	12	0.02	2677.49
2	Sahayogi Marg	1.70	3	1	0.26	12	0.03	4016.24
3	Subidha Marg	0.55	3	1	0.08	12	0.01	1338.75
4	Ganesh Marg	0.35	3	1	0.05	12	0.01	1338.75
5	Simrik Marg	0.09	3	1	0.01	12	0.01	1338.75
6	Shiva Marg	0.30	1	1	0.05	12	0.01	1338.75
7	Kharibot Marg	0.12	1	1	0.02	12	0.01	1338.75
8	Pancheshwor Marg	0.23	2	1	0.03	12	0.01	1338.75
9	Danfe Chari Marg	0.75	1	1	0.11	12	0.01	1338.75
10	Thamel area	2.20	3	3	1.36	24	0.06	16064.94
11	Swayambhu Marg	0.65	3	3	0.4	24	0.02	5354.98
12	Adwait Marg	0.63	3	3	0.39	24	0.02	5354.98
13	Jyatha Marg	0.41	3	3	0.25	24	0.01	2677.49
14	Bina Marg	0.34	1	3	0.21	24	0.01	2677.49

Road Section No.	Section Name	Length (km)	Traffic Group	Section Condition (Urban nature)	Total Time (Days) (Repair –time x km)	Cycle Frequency (Cycle/year)	Cycle Time (Days/Cycle)	Amount Cost Rs
15	Shahid Marg	0.69	2	3	0.43	24	0.02	5354.98
16	Bishnumati Link Road	2.80	3	2	0.87	12	0.07	9371.22
17	Raja Birendra Marg	0.84	1	2	0.26	12	0.03	4016.24
18	Pipa Gaushwara Marg	0.29	3	2	0.09	12	0.01	1338.75
19	Ghattekulo Marg	0.71	3	2	0.22	12	0.02	2677.49
20	Radhe Marg	0.53	3	2	0.16	12	0.02	2677.49
		15.38			5.43		0.41	73631.03

Resource Unit Cost Schedule

Resource Unit RC- Road surface/side drain/catch pit clearance  
(Daily Rate Rs.11156.21 /day)

Urban nature	Frequency Range
Core	24
Semi-core	12
Non-Core	12

## **Step 10**

### **Prepare Cost Schedules:**

From the preceding steps Maintenance activities, Maintenance Elements, Workload for maintenance activities; Resource Unit, Productivity of resource unit & Operation cost, Intervention Frequency and cycle time in days can be worked out and identified. From the above information it can be establish the daily operation cost of each resource unit and calculate the cycle time in days for each intervention period of each identified resource unit which is presented as the Cost Schedule for each resource unit

## **Step 11**

### **Maintenance Network Cost Matrix:**

The resource unit cost schedules of all the identified resource units combined together to provide the overall cost of maintenance work of a work section is termed as Maintenance Network Cost Matrix .Network cost matrix provides the maintenance engineer with the total estimate of general routine maintenance cost for the maintenance network and the total estimated cost of individual maintenance elements within the network and total estimated costs of maintenance for individual work sections within the road network.

Table 4.24 Network Cost Matrix

Road Section Number	Section Name	Length (km)	Activity Annual Costs theoretical			Total Costs
			PR	DM	RC	
1	Seti Opi Marg	1.20	25030.15	42476.63	2677.49	70184.27
2	Sahayogi Marg	1.70	35876.54	60411.21	4016.24	100303.99
3	Subidha Marg	0.55	11680.73	19822.43	1338.75	32841.91
4	Ganesh Marg	0.35	7509.04	12271.03	1338.75	21118.82
5	Simrik Marg	0.09	2503.01	3775.70	1338.75	7617.46
6	Shiva Marg	0.30	6674.71	11327.10	1338.75	19340.56
7	Kharibot Marg	0.12	2503.01	4719.63	1338.75	8561.39
8	Pancheshwor Marg	0.23	5006.03	8495.33	1338.75	14840.11
9	Danfe Chari Marg	0.75	15852.43	26429.91	1338.75	43621.09
10	Thamel area	2.20	330397.93	260523.36	16064.94	606986.23
11	Swayambhu Marg	0.65	163530.29	77401.87	5354.98	246287.14
12	Adwait Marg	0.63	158524.26	75514.02	5354.98	239393.26
13	Jyatha Marg	0.41	103457.94	49084.11	2677.49	155219.54
14	Bina Marg	0.34	85102.50	39644.86	2677.49	127424.85
15	Shahid Marg	0.69	103457.94	81177.57	5354.98	189990.49
16	Bishnumati Link Road	2.80	350422.04	198224.29	9371.22	558017.55
17	Raja Birendra Marg	0.84	31287.68	59467.29	4016.24	94771.21
18	Pipa gaushwara Marg	0.29	18772.61	21238.32	1338.75	41349.68
19	Ghattekulo Marg	0.71	45054.26	50971.96	2677.49	98703.71
20	Radhe Marg	0.53	33790.70	38228.97	2677.49	74697.16
		15.38	1536433.80	1141205.59	73631.03	2751270.42

## Step 12

### Budgetary Constraints

In most cases, the budget allocation is inadequate to cover all the maintenance requirements. In that case, the maintenance engineer will have to decide the most effective way of applying them and required to distribute his available budget in a predetermined order of maintenance priorities, which will allocate funds to those maintenance activities considered by the maintenance organization to be of the greatest importance. That is working out an order or priority, with the operation that have the strongest claim on resources placed at the head of the list and those that have least claim placed at the end.

## Step 13

### Prioritization

Prioritization of the road network maintenance requirements is normally carried with reference to all categories of maintenance activities, including urgent, routine, recurrent, periodic, and special works, as defined in TRRL ORN No. 1, which assigns priorities to the maintenance activities generally on the basis of order of importance of maintenance activity and traffic loading, as shown in the Table 7.6, Example Matrix of Maintenance Priorities of ORN-1, and the maintenance activities ranked in order of importance.

Table 4.25 Matrix of Maintenance Priorities, (Table 7.6 TRL- ORN-1, 3rd Edition)

Hierarchy of Maintenance activity	Traffic hierarchy (Priority Traffic Category)							
	1	2	3	4	5	6	7	8
Urgent	1	7	8	9	10	11	12	13
Routine Drainage	2	14	15	16	17	18	19	20
Recurrent	3	21	24	27	30	33	36	39
Periodic	4	22	25	28	31	34	37	40
Other Routine	5	23	26	29	32	35	38	41
Renewal	6	42	43	44	45	46	47	48

The above matrix shows that the types of maintenance activities are related to the classification of road with respect to the traffic category. From the above table the highest priority is given for urgent maintenance on Strategic roads, numbered from 1 and lowest priority is given to the renewal works on unpaved road having very low level of traffic with number 48. It is clear from the above table that absolute priority is

given to the Strategic Roads for all maintenance activities. Routine drainage maintenance activity has second priority in all traffic categories of roads. Recurrent, periodic and other maintenance activities gets third priority and the renewal maintenance activity have the last priority in all traffic category roads.

The matrix is designed to ensure that every road in the network receives at least minimum maintenance needed to keep the road operational. The maintenance engineer should develop a master list appropriate to local condition identifying in order of priority to all works that need to be done in his network using the above matrix.

Table 4.26 Maintenance prioritization chart

Matrix No	Road Section Name	Length (km)	Maintenance Unit			Total Amount	Cumulative Amount
			PR	DM	RC	Rs.	Rs.
1	Bishnumati Link Road	2.80	350422	198224.3	9371.22	558017.55	558017.55
2	Thamel area	2.20	330397.9	260523.4	16064.9	606986.23	1165003.78
3	Swayambhu Marg	0.65	163530.3	77401.87	5354.98	246287.14	1411290.92
4	Adwait Marg	0.63	158524.3	75514.02	5354.98	239393.26	1650684.18
5	Radhe Marg	0.53	33790.7	38228.97	2677.49	74697.16	1725381.34
6	Jyatha Marg	0.41	103457.9	49084.11	2677.49	155219.54	1880600.88
7	Ganesh Marg	0.35	7509.04	12271.03	1338.75	21118.82	1901719.70
8	Ghattekulo Marg	0.71	45054.26	50971.96	2677.49	98703.71	2000423.41
9	Pipa Gaushwara Marg	0.29	18772.61	21238.32	1338.75	41349.68	2041773.09
10	Seti Opi Marg	1.20	25030.15	42476.63	2677.49	70184.27	2111957.36
11	Sahayogi Marg	1.70	35876.54	60411.21	4016.24	100303.99	2212261.35
12	Subidha Marg	0.55	11680.73	19822.43	1338.75	32841.91	2245103.26
13	Simrik Marg	0.09	2503.01	3775.7	1338.75	7617.46	2252720.72
14	Shahid Marg	0.69	103457.9	81177.57	5354.98	189990.49	2442711.21
15	Pancheshwor Marg	0.23	5006.03	8495.33	1338.75	14840.11	2457551.32
16	Bina Marg	0.34	85102.5	39644.86	2677.49	127424.85	2584976.17
17	Shiva Marg	0.30	6674.71	11327.1	1338.75	19340.56	2604316.73
18	Raja Birendra Marg	0.84	31287.68	59467.29	4016.24	94771.21	2699087.94
19	Danfe Chari Marg	0.75	15852.43	26429.91	1338.75	43621.09	2742709.03
20	Kharibot Marg	0.12	2503.01	4719.63	1338.75	8561.39	2751270.42
	Total	15.38					

## **Step 14**

### **Programming**

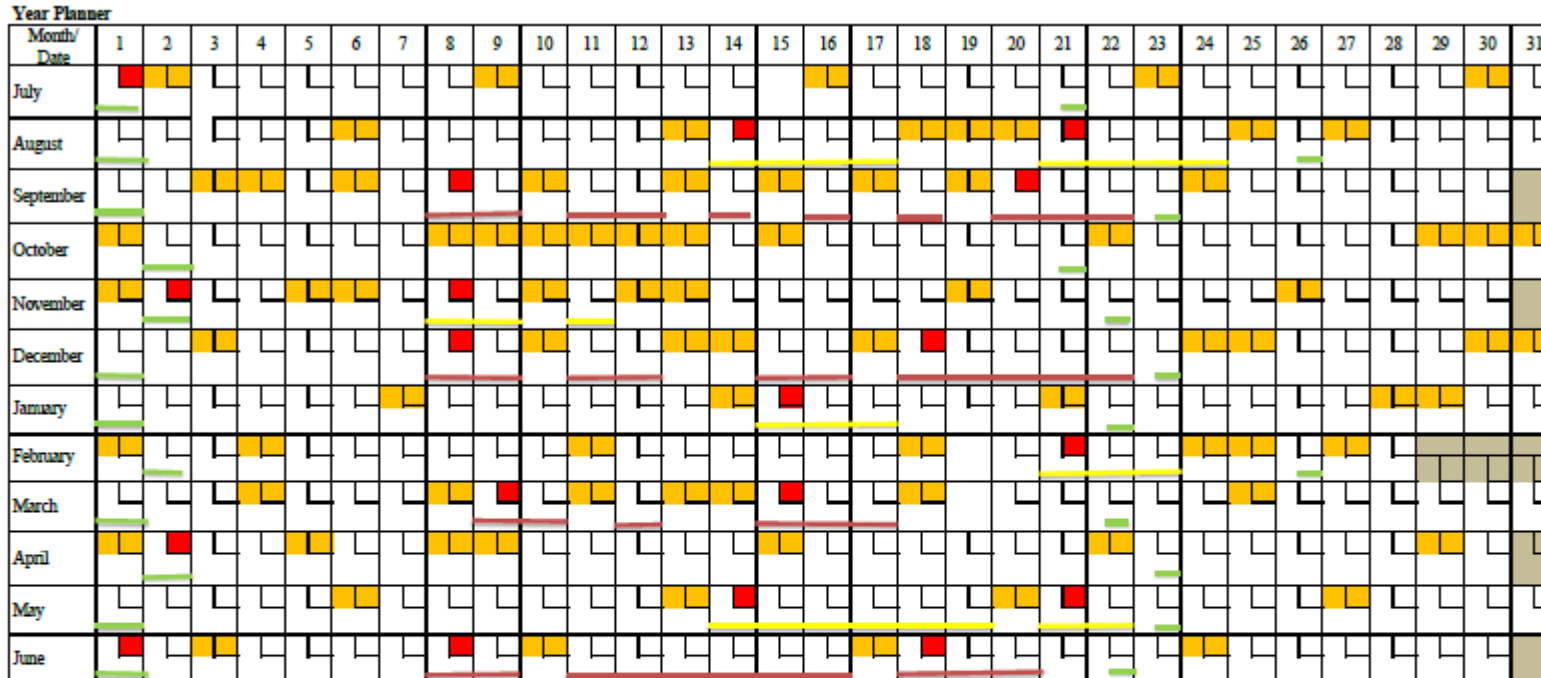
From the preceding chapters, it is clear to establish the cycle frequency (numbers of cycle) and cycle time by determining the intervention frequencies and Cycle time. This cycle frequency and the cycle time are interpreted into a 12 months programme with weakly breakdown. The resource units in bar chart form indicating the work section, cycle and time required for the maintenance activities.

This bar chart data can be presented in the form of Year Planner. This format provides a visual presentation on a 12 months calendar of resource unit annual workload, location by work section and duration at each section.

The Year Planner consists of information on unit's composition in terms of labour, plant and material requirements for the maintenance elements. The mandatory day is provided to ensure that each section of the network receives a maintenance visit at the programmed intervals. The year planner is taken as the basis of supervisor's maintenance programme.



Table 4.28 Year plan chart



Note : Labour / Equipment / Material	Section	Legend :
Combined Unit : PR , DM,RC	1 Seti Opi Marg	█ Saturday/ Public Holidays
1 Checker	2 Sahyogi Nagar Marg	█ Red Letter Day
2 Masons	3 Subidha Marg	█ DM Drainage/Manhole Repair Gang
3 Labour	4 Ganesh Marg	█ RC Road surface/side drain/ catch pit clearance Gang
1 Roller	5 Simrik Marg	█ PR Pavement repair Gang
1 Tractor	6 Shiva Marg	
Sand/ Aggregate	7 Kharibot Marg	
Cement	8 Pancheshwor marg	
Bitumen	9 Danfe Chari Marg	
	10 Thamel Area	
	11 Swayambhu Marg	
	12 Adwait Marg	
	13 Jyatha Marg	
	14 Bina Marg	
	15 Shahid Marg	
	16 Bishmunati Link Road	
	17 Raja Birendra Marg	
	18 Pipa Goushwara Marg	
	19 Ghatkulo Marg	
	20 Radhe Marg	

### 4.3 Comparison with existing Data

Table 4.29 Department of Road (DOR) cost estimate

S.N.	Fiscal year	Total length (km)	Total Cost Rs	Inflation Rate %	Present Value of Cost(PVC)
1	2011-2012	316.89	34330000	9.57	54216579.13
2	2012-2013	303.95	62105700	8.31	85468421.76
3	2013-2014	295.01	54144000	9.87	71810460.31
4	2014-2015	318.00	72871000	9.04	86641590.27
5	2015-2016	305.59	62687000	7.21	67206732.7
6	2016-2017	315.00	83130000	10.24	83130000
		1854.44			448473784.17

From DOR data the cost per km. = Rs. 241837.85

Table 4.30 KMC Cost estimate

Fiscal year	Total length	Total Cost Rs	Inflation Rate	Present Value of Cost(PVC)
2069/070	8.78	31907435.74	8.31	43910271.93
2070/071	7.55	56596025.95	9.87	75062549.4
2071/072	8.09	59445746.13	9.04	70679337.18
	24.42			189652158.5

From KMC data the cost per km. = Rs. 7766263.66

Table 4.31 Comparing with DOR Data

Per km.	Using Programming	DOR
Cost Rs.	178886.24	241837.85

## CHAPTER 5: RESULT AND DISCUSSION

From the study, the cost per km is found to be Rs. 178886.24. From the DOR data the cost per km is found to be Rs.241837.85. The system is 26.03% economical than the DOR existing process. From the KMC data the periodic cost per km is found to be Rs. 7766263.66.

Table 5.1 Annual maintenance Budget of KMC for 5 years

Year	Road Board Nepal (70%) Rs.	KMC (30%) Rs.	Total budget (100%) Rs.
1	30000000	12857142.86	42857143
2	30000000	12857142.86	42857143
3	30000000	12857142.86	42857143
4	30000000	12857142.86	42857143
5	30000000	12857142.86	42857143
		64285714.3	214285714

Table 5.2 Future Scenario cost for maintenance

**Annual Budget 42857143**

Year	Present Cost Rs.	Road Board Nepal RBN (70%)		Kathmandu Metropolitan City (KMC) (30%)		Public Participation (PP)		Saving Amount of KMC+RBN	
		%	Rs.	%	Rs.	%	Rs.	%	Rs.
1	42857143	70	30000000	30	12857143	0	0	0	0
2	42857143	70	30000000	20	8571429	10	4285714	10	4285714
3	42857143	70	30000000	10	4285714	20	8571429	20	8571429
4	42857143	70	30000000	0	0	30	12857143	30	12857143
5	42857143	60	25714286	0	0	40	17142857	10	4285714
	214285714		145714286		25714286		42857143		30000000

Annual budget of KMC is Rs. 42857143. Using the programming system, it maintain 240 km of roads annually. If public participation is assume to be 0% to 40 %, in 5 years Rs. 30000000 will be saving. From this budget, KMC do periodic maintenance and it covers 3.86 km of roads. Gradually KMC reduces the rehabilitation and reconstruction works and increases routine and recurrent maintenance. Finally KMC maintain the whole roads, it requires Rs. 185326144.60 annually. In this time, there will be minimum periodic maintenance and KMC saves huge amount of money.

## **CHAPTER 6: CONCLUSION AND RECOMMENDATION**

### **Conclusion:**

The main aim of the study was to develop a road maintenance management system to serve as a decision support tool to improve the efficiency making decision, provide feedback as to the consequences of these decision, ensure consistency of decisions made at different levels and improve the effectiveness of all decisions in terms of efficiency of results. The specific objectives were to identify the main contributory factors in the deterioration of the road, use these factors to develop best implementation applications and develop an effective road maintenance management system to be used as a decision support tool. From the study, following conclusion are drawn:

1. This study provides a systematic approach to network level budget distribution.
2. This study provides the cost of individual maintenance elements of work section.
3. This system provides a visual presentation on 12 months of resource unit, annual work load, location by work section and duration at each section.

### **Recommendation:**

The recommendation that have emerged from this study are as follows:

1. The road maintenance should be carried at right time as delay in may lead to need of reconstruction and rehabilitation an expensive option.
2. KMC shall incorporate the routine and recurrent maintenance rather than reconstruction and rehabilitation.
3. Municipalities and other road agencies should use the easy to use developed road maintenance system as a decision support tool in their maintenance programme.
4. KMC should use an economic assessment to determine the relative priorities or roads maintenance projects.
5. KMC should prepare detained maintenance budgets with provision for regular monitoring throughout the year.

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## **APPENDIX 1: Observed field data**

**Location: Seti Opi Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-01	6:00-7:00			5	18	23
2073-04-01	7:00-8:00			10	150	160
2073-04-01	8:00-9:00		3	15	250	268
2073-04-01	9:00-10:00		7	23	179	209
2073-04-01	10:00-11:00		4	25	95	124
2073-04-01	11:00-12:00	3	4	11	67	85
2073-04-01	12:00-13:00		6	20	44	70
2073-04-01	13:00-14:00		4	32	95	131
2073-04-01	14:00-15:00	2	7	10	200	219
2073-04-01	15:00-16:00	1	6	22	52	81
2073-04-01	16:00-17:00		2	12	75	89
2073-04-01	17:00-18:00			23	102	125
2073-04-01	18:00-19:00			17	56	73
2073-04-01	19:00-20:00			10	26	36
2073-04-01	20:00-21:00			7	15	22
2073-04-01	21:00-22:00			5	10	15
2073-04-01	22:00-23:00					
2073-04-01	23:00-24:00					
2073-04-01	24:00-1:00					
2073-04-01	1:00-2:00					
2073-04-01	2:00-3:00					
2073-04-01	3:00-4:00					
2073-04-01	4:00-5:00			2		2
2073-04-01	5:00-6:00			3	7	10
<b>Day 1 Sub-total</b>		<b>6</b>	<b>43</b>	<b>252</b>	<b>1441</b>	<b>1742</b>
2073-04-02	6:00-7:00			10	12	22
2073-04-02	7:00-8:00			5	22	27
2073-04-02	8:00-9:00		3	15	95	113
2073-04-02	9:00-10:00		7	20	110	137
2073-04-02	10:00-11:00		4	31	50	85
2073-04-02	11:00-12:00		4	15	200	219
2073-04-02	12:00-13:00	1	2	17	75	95
2073-04-02	13:00-14:00	4	4	22	120	150
2073-04-02	14:00-15:00		7	10	51	68
2073-04-02	15:00-16:00	1	6	11	137	155
2073-04-02	16:00-17:00	1	2	12	197	212
2073-04-02	17:00-18:00			16	43	59
2073-04-02	18:00-19:00			13	35	48
2073-04-02	19:00-20:00			9	29	38
2073-04-02	20:00-21:00				20	20
2073-04-02	21:00-22:00				7	7

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-02	22:00-23:00					
2073-04-02	23:00-24:00					
2073-04-02	24:00-1:00					
2073-04-02	1:00-2:00					
2073-04-02	2:00-3:00					
2073-04-02	3:00-4:00					
2073-04-02	4:00-5:00					
2073-04-02	5:00-6:00			2	8	10
<b>Day 2 Sub-total</b>		<b>7</b>	<b>39</b>	<b>208</b>	<b>1211</b>	<b>1465</b>
2073-04-03	6:00-7:00			2	21	23
2073-04-03	7:00-8:00			15	35	50
2073-04-03	8:00-9:00		3	21	97	121
2073-04-03	9:00-10:00		7	31	120	158
2073-04-03	10:00-11:00		4	10	75	89
2073-04-03	11:00-12:00		4	7	102	113
2073-04-03	12:00-13:00	1		15	47	63
2073-04-03	13:00-14:00		4	35	99	138
2073-04-03	14:00-15:00		7	9	81	97
2073-04-03	15:00-16:00	1	6	27	33	67
2073-04-03	16:00-17:00		2	29	207	238
2073-04-03	17:00-18:00			16	35	51
2073-04-03	18:00-19:00			7	23	30
2073-04-03	19:00-20:00			12	26	38
2073-04-03	20:00-21:00				15	15
2073-04-03	21:00-22:00			1	5	6
2073-04-03	22:00-23:00					
2073-04-03	23:00-24:00					
2073-04-03	24:00-1:00					
2073-04-03	1:00-2:00					
2073-04-03	2:00-3:00					
2073-04-03	3:00-4:00					
2073-04-03	4:00-5:00					
2073-04-03	5:00-6:00			3	10	13
<b>Day 3 Sub-total</b>		<b>2</b>	<b>37</b>	<b>240</b>	<b>1031</b>	<b>1310</b>

<b>Day 1 Sub-total</b>	6	43	252	1441	1742
<b>Day 2 Sub-total</b>	7	39	208	1211	1465
<b>Day 3 Sub-total</b>	2	37	240	1031	1310
<b>Total</b>	<b>15</b>	<b>119</b>	<b>700</b>	<b>3683</b>	<b>4517</b>
<b>Avg Daily Traffic (ADT)</b>	<b>5</b>	<b>40</b>	<b>233</b>	<b>1228</b>	<b>1506</b>

**Location: Sahayogi nagar Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-04	6:00-7:00			1	5	6
2073-04-04	7:00-8:00			7	15	22
2073-04-04	8:00-9:00		4	25	115	144
2073-04-04	9:00-10:00		6	23	75	104
2073-04-04	10:00-11:00		4	22	62	88
2073-04-04	11:00-12:00		4	15	67	86
2073-04-04	12:00-13:00	1	2	19	44	66
2073-04-04	13:00-14:00		4	25	53	82
2073-04-04	14:00-15:00	2	6	29	20	57
2073-04-04	15:00-16:00	1	6	11	50	68
2073-04-04	16:00-17:00			23	55	78
2073-04-04	17:00-18:00			19	43	62
2073-04-04	18:00-19:00			5	59	64
2073-04-04	19:00-20:00			6	26	32
2073-04-04	20:00-21:00				15	15
2073-04-04	21:00-22:00				6	6
2073-04-04	22:00-23:00					
2073-04-04	23:00-24:00					
2073-04-04	24:00-1:00					
2073-04-04	1:00-2:00					
2073-04-04	2:00-3:00					
2073-04-04	3:00-4:00					
2073-04-04	4:00-5:00			1		1
2073-04-04	5:00-6:00			3	17	20
<b>Day 1 Sub-total</b>		<b>4</b>	<b>36</b>	<b>234</b>	<b>727</b>	<b>1001</b>
2073-04-05	6:00-7:00			10	45	55
2073-04-05	7:00-8:00			17	96	113
2073-04-05	8:00-9:00		4	24	201	229
2073-04-05	9:00-10:00		6	23	295	324
2073-04-05	10:00-11:00		2	22	97	121
2073-04-05	11:00-12:00		3	29	76	108
2073-04-05	12:00-13:00		2	12	102	116
2073-04-05	13:00-14:00		4	22	84	110
2073-04-05	14:00-15:00		4	15	98	117
2073-04-05	15:00-16:00		5	28	176	209
2073-04-05	16:00-17:00		4	27	89	120
2073-04-05	17:00-18:00			5	85	90
2073-04-05	18:00-19:00			2	73	75
2073-04-05	19:00-20:00				25	25
2073-04-05	20:00-21:00				1	1
2073-04-05	21:00-22:00					

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-05	22:00-23:00					
2073-04-05	23:00-24:00					
2073-04-05	24:00-1:00					
2073-04-05	1:00-2:00					
2073-04-05	2:00-3:00					
2073-04-05	3:00-4:00					
2073-04-05	4:00-5:00					0
2073-04-05	5:00-6:00			4	10	14
<b>Day 2 Sub-total</b>			<b>34</b>	<b>240</b>	<b>1553</b>	<b>1827</b>
2073-04-06	6:00-7:00			5	17	22
2073-04-06	7:00-8:00			25	75	100
2073-04-06	8:00-9:00		3	35	79	117
2073-04-06	9:00-10:00		3	45	103	151
2073-04-06	10:00-11:00		4	21	95	120
2073-04-06	11:00-12:00		4	24	46	74
2073-04-06	12:00-13:00			42	55	97
2073-04-06	13:00-14:00	2	4	32	53	91
2073-04-06	14:00-15:00		6	20	65	91
2073-04-06	15:00-16:00		5	17	178	200
2073-04-06	16:00-17:00		2	4	99	105
2073-04-06	17:00-18:00			19	30	49
2073-04-06	18:00-19:00			15	75	90
2073-04-06	19:00-20:00			9	12	21
2073-04-06	20:00-21:00					
2073-04-06	21:00-22:00					
2073-04-06	22:00-23:00					
2073-04-06	23:00-24:00					
2073-04-06	24:00-1:00					
2073-04-06	1:00-2:00					
2073-04-06	2:00-3:00					
2073-04-06	3:00-4:00					
2073-04-06	4:00-5:00					
2073-04-06	5:00-6:00				15	15
<b>Day 3 Sub-total</b>		<b>2</b>	<b>31</b>	<b>313</b>	<b>997</b>	<b>1343</b>

<b>Day 1 Sub-total</b>	4	36	234	727	1001
<b>Day 2 Sub-total</b>	0	34	240	1553	1827
<b>Day 3 Sub-total</b>	2	31	313	997	1343
<b>Total</b>	<b>6</b>	<b>101</b>	<b>787</b>	<b>3277</b>	<b>4171</b>
<b>Avg Daily Traffic (ADT)</b>	<b>2</b>	<b>34</b>	<b>262</b>	<b>1092</b>	<b>1390</b>

**Location: Subidha Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-07	6:00-7:00				10	10
2073-04-07	7:00-8:00			9	91	100
2073-04-07	8:00-9:00		11	31	139	181
2073-04-07	9:00-10:00		8	23	201	232
2073-04-07	10:00-11:00			33	55	88
2073-04-07	11:00-12:00			35	67	102
2073-04-07	12:00-13:00			31	81	112
2073-04-07	13:00-14:00			25	53	78
2073-04-07	14:00-15:00			17	75	92
2073-04-07	15:00-16:00		10	11	91	112
2073-04-07	16:00-17:00		7	23	165	195
2073-04-07	17:00-18:00				71	71
2073-04-07	18:00-19:00				45	45
2073-04-07	19:00-20:00				10	10
2073-04-07	20:00-21:00				3	3
2073-04-07	21:00-22:00					
2073-04-07	22:00-23:00					
2073-04-07	23:00-24:00					
2073-04-07	24:00-1:00					
2073-04-07	1:00-2:00					
2073-04-07	2:00-3:00					
2073-04-07	3:00-4:00					
2073-04-07	4:00-5:00			2		2
2073-04-07	5:00-6:00		4	10	7	21
<b>Day 1 Sub-total</b>			<b>40</b>	<b>250</b>	<b>1164</b>	<b>1454</b>
2073-04-08	6:00-7:00			5	6	11
2073-04-08	7:00-8:00			17	163	180
2073-04-08	8:00-9:00		6	20	98	124
2073-04-08	9:00-10:00			21	112	133
2073-04-08	10:00-11:00		2	22	65	89
2073-04-08	11:00-12:00		3	30	75	108
2073-04-08	12:00-13:00		7	22	58	87
2073-04-08	13:00-14:00		4	17	69	90
2073-04-08	14:00-15:00		5	21	112	138
2073-04-08	15:00-16:00		8	17	75	100
2073-04-08	16:00-17:00		4	31	88	123
2073-04-08	17:00-18:00			7	64	71
2073-04-08	18:00-19:00			1	45	46
2073-04-08	19:00-20:00				9	9
2073-04-08	20:00-21:00					
2073-04-08	21:00-22:00					

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-08	22:00-23:00					
2073-04-08	23:00-24:00					
2073-04-08	24:00-1:00					
2073-04-08	1:00-2:00					
2073-04-08	2:00-3:00					
2073-04-08	3:00-4:00					
2073-04-08	4:00-5:00					
2073-04-08	5:00-6:00				5	5
<b>Day 2 Sub-total</b>			<b>39</b>	<b>231</b>	<b>1044</b>	<b>1314</b>
2073-04-09	6:00-7:00			3	5	8
2073-04-09	7:00-8:00			15	34	49
2073-04-09	8:00-9:00		5	45	96	146
2073-04-09	9:00-10:00		2	40	201	243
2073-04-09	10:00-11:00			15	108	123
2073-04-09	11:00-12:00	1		31	64	96
2073-04-09	12:00-13:00			38	59	97
2073-04-09	13:00-14:00	2		45	86	133
2073-04-09	14:00-15:00		2	12	60	74
2073-04-09	15:00-16:00	1	3	9	95	108
2073-04-09	16:00-17:00		5	4	69	78
2073-04-09	17:00-18:00			3	79	82
2073-04-09	18:00-19:00			1	41	42
2073-04-09	19:00-20:00				2	2
2073-04-09	20:00-21:00					
2073-04-09	21:00-22:00					
2073-04-09	22:00-23:00					
2073-04-09	23:00-24:00					
2073-04-09	24:00-1:00					
2073-04-09	1:00-2:00					
2073-04-09	2:00-3:00					
2073-04-09	3:00-4:00					
2073-04-09	4:00-5:00					
2073-04-09	5:00-6:00				3	3
<b>Day 3 Sub-total</b>		<b>4</b>	<b>17</b>	<b>261</b>	<b>1002</b>	<b>1284</b>

<b>Day 1 Sub-total</b>	0	40	250	1164	1454
<b>Day 2 Sub-total</b>	0	39	231	1044	1314
<b>Day 3 Sub-total</b>	4	17	261	1002	1284
<b>Total</b>	<b>4</b>	<b>96</b>	<b>742</b>	<b>3210</b>	<b>4052</b>
<b>Avg Daily Traffic (ADT)</b>	<b>1</b>	<b>32</b>	<b>247</b>	<b>1070</b>	<b>1351</b>

**Location: Ganesh Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-11	6:00-7:00				18	18
2073-04-11	7:00-8:00			3	97	100
2073-04-11	8:00-9:00		3	15	120	138
2073-04-11	9:00-10:00		2	23	201	226
2073-04-11	10:00-11:00		4	25	98	127
2073-04-11	11:00-12:00			11	67	78
2073-04-11	12:00-13:00			3	44	47
2073-04-11	13:00-14:00			32	78	110
2073-04-11	14:00-15:00		3	10	130	143
2073-04-11	15:00-16:00		6	22	201	229
2073-04-11	16:00-17:00		2	12	102	116
2073-04-11	17:00-18:00			21	99	120
2073-04-11	18:00-19:00			17	110	127
2073-04-11	19:00-20:00			8	75	83
2073-04-11	20:00-21:00			7	15	22
2073-04-11	21:00-22:00			5	10	15
2073-04-11	22:00-23:00					
2073-04-11	23:00-24:00					
2073-04-11	24:00-1:00					
2073-04-11	1:00-2:00					
2073-04-11	2:00-3:00					
2073-04-11	3:00-4:00					
2073-04-11	4:00-5:00			2		2
2073-04-11	5:00-6:00			1	13	14
<b>Day 1 Sub-total</b>			<b>20</b>	<b>217</b>	<b>1478</b>	<b>1715</b>
2073-04-12	6:00-7:00			10	102	112
2073-04-12	7:00-8:00			15	81	96
2073-04-12	8:00-9:00		3	65	95	163
2073-04-12	9:00-10:00		2	40	110	152
2073-04-12	10:00-11:00		4	35	76	115
2073-04-12	11:00-12:00		4	61	159	224
2073-04-12	12:00-13:00		2	95	164	261
2073-04-12	13:00-14:00		4	22	201	227
2073-04-12	14:00-15:00		7	50	139	196
2073-04-12	15:00-16:00		3	31	197	231
2073-04-12	16:00-17:00		2	75	213	290
2073-04-12	17:00-18:00			38	214	252
2073-04-12	18:00-19:00			13	78	91
2073-04-12	19:00-20:00			19	29	48
2073-04-12	20:00-21:00			22	20	42
2073-04-12	21:00-22:00			4	61	65

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-12	22:00-23:00				3	3
2073-04-12	23:00-24:00					
2073-04-12	24:00-1:00					
2073-04-12	1:00-2:00					
2073-04-12	2:00-3:00					
2073-04-12	3:00-4:00					
2073-04-12	4:00-5:00					
2073-04-12	5:00-6:00			2	19	21
<b>Day 2 Sub-total</b>			<b>31</b>	<b>597</b>	<b>1961</b>	<b>2589</b>
2073-04-13	6:00-7:00			32	78	110
2073-04-13	7:00-8:00			21	123	144
2073-04-13	8:00-9:00		3	45	207	255
2073-04-13	9:00-10:00		7	31	120	158
2073-04-13	10:00-11:00		4	32	87	123
2073-04-13	11:00-12:00		4	45	65	114
2073-04-13	12:00-13:00			55	97	152
2073-04-13	13:00-14:00		4	19	51	74
2073-04-13	14:00-15:00		7	71	214	292
2073-04-13	15:00-16:00		6	27	178	211
2073-04-13	16:00-17:00		2	60	304	366
2073-04-13	17:00-18:00			16	64	80
2073-04-13	18:00-19:00			7	67	74
2073-04-13	19:00-20:00			12	87	99
2073-04-13	20:00-21:00			27	25	52
2073-04-13	21:00-22:00			1	9	10
2073-04-13	22:00-23:00				12	12
2073-04-13	23:00-24:00					
2073-04-13	24:00-1:00					
2073-04-13	1:00-2:00					
2073-04-13	2:00-3:00					
2073-04-13	3:00-4:00					
2073-04-13	4:00-5:00					
2073-04-13	5:00-6:00				12	12
<b>Day 3 Sub-total</b>			<b>37</b>	<b>501</b>	<b>1800</b>	<b>2338</b>

<b>Day 1 Sub-total</b>	0	20	217	1478	1715
<b>Day 2 Sub-total</b>	0	31	597	1961	2589
<b>Day 3 Sub-total</b>	0	37	501	1800	2338
<b>Total</b>	<b>0</b>	<b>88</b>	<b>1315</b>	<b>5239</b>	<b>6642</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>29</b>	<b>438</b>	<b>1746</b>	<b>2214</b>

**Location: Simrik Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-14	6:00-7:00			12	10	22
2073-04-14	7:00-8:00			25	30	55
2073-04-14	8:00-9:00		1	61	75	137
2073-04-14	9:00-10:00		2	43	65	110
2073-04-14	10:00-11:00		4	25	55	84
2073-04-14	11:00-12:00			32	67	99
2073-04-14	12:00-13:00			19	32	51
2073-04-14	13:00-14:00			30	30	60
2073-04-14	14:00-15:00		2	45	57	104
2073-04-14	15:00-16:00		4	49	75	128
2073-04-14	16:00-17:00		2	22	95	119
2073-04-14	17:00-18:00			23	58	81
2073-04-14	18:00-19:00			16	56	72
2073-04-14	19:00-20:00			10	26	36
2073-04-14	20:00-21:00			7	17	24
2073-04-14	21:00-22:00			2		2
2073-04-14	22:00-23:00					
2073-04-14	23:00-24:00					
2073-04-14	24:00-1:00					
2073-04-14	1:00-2:00					
2073-04-14	2:00-3:00					
2073-04-14	3:00-4:00					
2073-04-14	4:00-5:00					
2073-04-14	5:00-6:00				2	2
<b>Day 1 Sub-total</b>			<b>15</b>	<b>421</b>	<b>750</b>	<b>1186</b>
2073-04-15	6:00-7:00			3	35	38
2073-04-15	7:00-8:00			15	31	46
2073-04-15	8:00-9:00		3	21	106	130
2073-04-15	9:00-10:00		5	17	78	100
2073-04-15	10:00-11:00		3	14	30	47
2073-04-15	11:00-12:00		4	8	43	55
2073-04-15	12:00-13:00	1	6	17	40	64
2073-04-15	13:00-14:00		4	6	12	22
2073-04-15	14:00-15:00		7	10	31	48
2073-04-15	15:00-16:00		6	25	59	90
2073-04-15	16:00-17:00	1	1	7	75	84
2073-04-15	17:00-18:00			3	39	42
2073-04-15	18:00-19:00			2	35	37
2073-04-15	19:00-20:00			1	19	20
2073-04-15	20:00-21:00				7	7
2073-04-15	21:00-22:00				3	3

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-15	22:00-23:00					
2073-04-15	23:00-24:00					
2073-04-15	24:00-1:00					
2073-04-15	1:00-2:00					
2073-04-15	2:00-3:00					
2073-04-15	3:00-4:00					
2073-04-15	4:00-5:00					
2073-04-15	5:00-6:00				7	7
<b>Day 2 Sub-total</b>		<b>2</b>	<b>39</b>	<b>149</b>	<b>650</b>	<b>840</b>
2073-04-16	6:00-7:00			12	25	37
2073-04-16	7:00-8:00			15	45	60
2073-04-16	8:00-9:00		2	32	89	123
2073-04-16	9:00-10:00		5	31	107	143
2073-04-16	10:00-11:00		4	10	45	59
2073-04-16	11:00-12:00		6	17	23	46
2073-04-16	12:00-13:00			15	37	52
2073-04-16	13:00-14:00	3	4	30	39	76
2073-04-16	14:00-15:00	1	9	9	21	40
2073-04-16	15:00-16:00		6	27	95	128
2073-04-16	16:00-17:00		2	31	75	108
2073-04-16	17:00-18:00			16	31	47
2073-04-16	18:00-19:00			7	19	26
2073-04-16	19:00-20:00			7	25	32
2073-04-16	20:00-21:00			2	7	9
2073-04-16	21:00-22:00				1	1
2073-04-16	22:00-23:00					
2073-04-16	23:00-24:00					
2073-04-16	24:00-1:00					
2073-04-16	1:00-2:00					
2073-04-16	2:00-3:00					
2073-04-16	3:00-4:00					
2073-04-16	4:00-5:00					
2073-04-16	5:00-6:00				8	8
<b>Day 3 Sub-total</b>		<b>4</b>	<b>38</b>	<b>261</b>	<b>692</b>	<b>995</b>

<b>Day 1 Sub-total</b>	0	15	421	750	1186
<b>Day 2 Sub-total</b>	2	39	149	650	840
<b>Day 3 Sub-total</b>	4	38	261	692	995
<b>Total</b>	<b>6</b>	<b>92</b>	<b>831</b>	<b>2092</b>	<b>3021</b>
<b>Avg Daily Traffic (ADT)</b>	<b>2</b>	<b>31</b>	<b>277</b>	<b>697</b>	<b>1007</b>

**Location: Shiva Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jep/tempo	Motor Cycle	Total
2073-04-17	6:00-7:00			2	6	8
2073-04-17	7:00-8:00			8	12	20
2073-04-17	8:00-9:00			6	19	25
2073-04-17	9:00-10:00		4	8	27	39
2073-04-17	10:00-11:00				7	7
2073-04-17	11:00-12:00				9	9
2073-04-17	12:00-13:00				11	11
2073-04-17	13:00-14:00				22	22
2073-04-17	14:00-15:00				10	10
2073-04-17	15:00-16:00			18	14	32
2073-04-17	16:00-17:00		4		16	20
2073-04-17	17:00-18:00				18	18
2073-04-17	18:00-19:00				7	7
2073-04-17	19:00-20:00			6	1	7
2073-04-17	20:00-21:00				2	2
2073-04-17	21:00-22:00				3	3
2073-04-17	22:00-23:00					
2073-04-17	23:00-24:00					
2073-04-17	24:00-1:00					
2073-04-17	1:00-2:00					
2073-04-17	2:00-3:00					
2073-04-17	3:00-4:00					
2073-04-17	4:00-5:00					
2073-04-17	5:00-6:00				1	1
<b>Day 1 Sub-total</b>			<b>8</b>	<b>48</b>	<b>185</b>	<b>241</b>
2073-04-18	6:00-7:00				3	3
2073-04-18	7:00-8:00			1	9	10
2073-04-18	8:00-9:00			8	21	29
2073-04-18	9:00-10:00		5	6	20	31
2073-04-18	10:00-11:00				9	9
2073-04-18	11:00-12:00				11	11
2073-04-18	12:00-13:00				8	8
2073-04-18	13:00-14:00				12	12
2073-04-18	14:00-15:00				13	13
2073-04-18	15:00-16:00			3	24	27
2073-04-18	16:00-17:00		5	7	9	21
2073-04-18	17:00-18:00			2	16	18
2073-04-18	18:00-19:00			4	14	18
2073-04-18	19:00-20:00				24	24
2073-04-18	20:00-21:00				5	5
2073-04-18	21:00-22:00					0

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-18	22:00-23:00					
2073-04-18	23:00-24:00					
2073-04-18	24:00-1:00					
2073-04-18	1:00-2:00					
2073-04-18	2:00-3:00					
2073-04-18	3:00-4:00					
2073-04-18	4:00-5:00					
2073-04-18	5:00-6:00				4	4
<b>Day 2 Sub-total</b>			<b>10</b>	<b>31</b>	<b>202</b>	<b>243</b>
2073-04-19	6:00-7:00			2	11	13
2073-04-19	7:00-8:00			6	6	12
2073-04-19	8:00-9:00		4	8	17	29
2073-04-19	9:00-10:00			3	25	28
2073-04-19	10:00-11:00				19	19
2073-04-19	11:00-12:00				7	7
2073-04-19	12:00-13:00				9	9
2073-04-19	13:00-14:00				17	17
2073-04-19	14:00-15:00			9	15	24
2073-04-19	15:00-16:00		4	7	10	21
2073-04-19	16:00-17:00			11	11	22
2073-04-19	17:00-18:00			6	7	13
2073-04-19	18:00-19:00			4	9	13
2073-04-19	19:00-20:00			1	5	6
2073-04-19	20:00-21:00				7	7
2073-04-19	21:00-22:00				3	3
2073-04-19	22:00-23:00					
2073-04-19	23:00-24:00					
2073-04-19	24:00-1:00					
2073-04-19	1:00-2:00					
2073-04-19	2:00-3:00					
2073-04-19	3:00-4:00					
2073-04-19	4:00-5:00					
2073-04-19	5:00-6:00				8	8
<b>Day 3 Sub-total</b>			<b>8</b>	<b>57</b>	<b>186</b>	<b>251</b>

<b>Day 1 Sub-total</b>	0	8	48	185	241
<b>Day 2 Sub-total</b>	0	10	31	202	243
<b>Day 3 Sub-total</b>	0	8	57	186	251
<b>Total</b>	<b>0</b>	<b>26</b>	<b>136</b>	<b>573</b>	<b>735</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>9</b>	<b>45</b>	<b>191</b>	<b>245</b>

**Location: Kharibot Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-21	6:00-7:00				6	6
2073-04-21	7:00-8:00			2	7	9
2073-04-21	8:00-9:00		5	4	11	20
2073-04-21	9:00-10:00		2	5	9	16
2073-04-21	10:00-11:00				7	7
2073-04-21	11:00-12:00	1			9	10
2073-04-21	12:00-13:00			5	11	16
2073-04-21	13:00-14:00	1			15	16
2073-04-21	14:00-15:00			4	10	14
2073-04-21	15:00-16:00		3	7	14	24
2073-04-21	16:00-17:00		4		7	11
2073-04-21	17:00-18:00				9	9
2073-04-21	18:00-19:00				7	7
2073-04-21	19:00-20:00				1	1
2073-04-21	20:00-21:00				2	2
2073-04-21	21:00-22:00				5	5
2073-04-21	22:00-23:00					
2073-04-21	23:00-24:00					
2073-04-21	24:00-1:00					
2073-04-21	1:00-2:00					
2073-04-21	2:00-3:00					
2073-04-21	3:00-4:00					
2073-04-21	4:00-5:00					
2073-04-21	5:00-6:00				4	4
<b>Day 1 Sub-total</b>		<b>2</b>	<b>14</b>	<b>27</b>	<b>134</b>	<b>177</b>
2073-04-22	6:00-7:00				2	2
2073-04-22	7:00-8:00			5	6	11
2073-04-22	8:00-9:00		2	11	11	24
2073-04-22	9:00-10:00		3	7	20	30
2073-04-22	10:00-11:00			8	12	20
2073-04-22	11:00-12:00			12	10	22
2073-04-22	12:00-13:00			21	15	36
2073-04-22	13:00-14:00			2	7	9
2073-04-22	14:00-15:00			7	13	20
2073-04-22	15:00-16:00		2	12	11	25
2073-04-22	16:00-17:00		3	6	9	18
2073-04-22	17:00-18:00			7	9	16
2073-04-22	18:00-19:00			4	10	14
2073-04-22	19:00-20:00			2	15	17
2073-04-22	20:00-21:00				2	2
2073-04-22	21:00-22:00				1	1

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-22	22:00-23:00					
2073-04-22	23:00-24:00					
2073-04-22	24:00-1:00					
2073-04-22	1:00-2:00					
2073-04-22	2:00-3:00					
2073-04-22	3:00-4:00					
2073-04-22	4:00-5:00					
2073-04-22	5:00-6:00					0
<b>Day 2 Sub-total</b>			<b>10</b>	<b>104</b>	<b>153</b>	<b>267</b>
2073-04-23	6:00-7:00			2	3	5
2073-04-23	7:00-8:00			5	6	11
2073-04-23	8:00-9:00		3	6	10	19
2073-04-23	9:00-10:00			1	11	12
2073-04-23	10:00-11:00			3	9	12
2073-04-23	11:00-12:00			3	7	10
2073-04-23	12:00-13:00		2	2	9	13
2073-04-23	13:00-14:00			4	7	11
2073-04-23	14:00-15:00			3	9	12
2073-04-23	15:00-16:00		3	4	10	17
2073-04-23	16:00-17:00			4	11	15
2073-04-23	17:00-18:00			6	15	21
2073-04-23	18:00-19:00			4	9	13
2073-04-23	19:00-20:00			1	11	12
2073-04-23	20:00-21:00				9	9
2073-04-23	21:00-22:00					0
2073-04-23	22:00-23:00					
2073-04-23	23:00-24:00					
2073-04-23	24:00-1:00					
2073-04-23	1:00-2:00					
2073-04-23	2:00-3:00					
2073-04-23	3:00-4:00					
2073-04-23	4:00-5:00					
2073-04-23	5:00-6:00				8	8
<b>Day 3 Sub-total</b>		<b>0</b>	<b>8</b>	<b>48</b>	<b>144</b>	<b>200</b>

<b>Day 1 Sub-total</b>	2	14	27	134	177
<b>Day 2 Sub-total</b>	0	10	104	153	267
<b>Day 3 Sub-total</b>	0	8	48	144	200
<b>Total</b>	<b>2</b>	<b>32</b>	<b>179</b>	<b>431</b>	<b>644</b>
<b>Avg Daily Traffic (ADT)</b>	<b>1</b>	<b>11</b>	<b>60</b>	<b>144</b>	<b>215</b>

**Location: Pancheshwor Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-24	6:00-7:00			2	15	17
2073-04-24	7:00-8:00			5	38	43
2073-04-24	8:00-9:00		8	7	50	65
2073-04-24	9:00-10:00		11	5	75	91
2073-04-24	10:00-11:00		3	4	35	42
2073-04-24	11:00-12:00			3	29	32
2073-04-24	12:00-13:00			5	11	16
2073-04-24	13:00-14:00			3	15	18
2073-04-24	14:00-15:00			4	31	35
2073-04-24	15:00-16:00		6	7	65	78
2073-04-24	16:00-17:00		14	11	57	82
2073-04-24	17:00-18:00			7	34	41
2073-04-24	18:00-19:00			1	21	22
2073-04-24	19:00-20:00				9	9
2073-04-24	20:00-21:00				2	2
2073-04-24	21:00-22:00					0
2073-04-24	22:00-23:00					
2073-04-24	23:00-24:00					
2073-04-24	24:00-1:00					
2073-04-24	1:00-2:00					
2073-04-24	2:00-3:00					
2073-04-24	3:00-4:00					
2073-04-24	4:00-5:00					
2073-04-24	5:00-6:00				3	3
<b>Day 1 Sub-total</b>			<b>42</b>	<b>64</b>	<b>490</b>	<b>596</b>
2073-04-25	6:00-7:00			2	25	27
2073-04-25	7:00-8:00			5	36	41
2073-04-25	8:00-9:00		4	12	61	77
2073-04-25	9:00-10:00		3	7	64	74
2073-04-25	10:00-11:00			15	35	50
2073-04-25	11:00-12:00			12	43	55
2073-04-25	12:00-13:00			17	15	32
2073-04-25	13:00-14:00			8	51	59
2073-04-25	14:00-15:00			27	13	40
2073-04-25	15:00-16:00		3	12	31	46
2073-04-25	16:00-17:00		4	18	25	47
2073-04-25	17:00-18:00			7	18	25
2073-04-25	18:00-19:00			4	10	14
2073-04-25	19:00-20:00			3	15	18
2073-04-25	20:00-21:00					0
2073-04-25	21:00-22:00					0

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-25	22:00-23:00					
2073-04-25	23:00-24:00					
2073-04-25	24:00-1:00					
2073-04-25	1:00-2:00					
2073-04-25	2:00-3:00					
2073-04-25	3:00-4:00					
2073-04-25	4:00-5:00					
2073-04-25	5:00-6:00					0
<b>Day 2 Sub-total</b>			<b>14</b>	<b>149</b>	<b>442</b>	<b>605</b>
2073-04-26	6:00-7:00			2	12	14
2073-04-26	7:00-8:00			5	31	36
2073-04-26	8:00-9:00			6	20	26
2073-04-26	9:00-10:00		2	9	35	46
2073-04-26	10:00-11:00			4	22	26
2073-04-26	11:00-12:00			7	17	24
2073-04-26	12:00-13:00		4	7	35	46
2073-04-26	13:00-14:00			11	25	36
2073-04-26	14:00-15:00		3	3	19	25
2073-04-26	15:00-16:00		3	21	61	85
2073-04-26	16:00-17:00			13	34	47
2073-04-26	17:00-18:00			9	15	24
2073-04-26	18:00-19:00			4	19	23
2073-04-26	19:00-20:00			5	11	16
2073-04-26	20:00-21:00				2	2
2073-04-26	21:00-22:00					0
2073-04-26	22:00-23:00					
2073-04-26	23:00-24:00					
2073-04-26	24:00-1:00					
2073-04-26	1:00-2:00					
2073-04-26	2:00-3:00					
2073-04-26	3:00-4:00					
2073-04-26	4:00-5:00					
2073-04-26	5:00-6:00				2	2
<b>Day 3 Sub-total</b>		<b>0</b>	<b>12</b>	<b>106</b>	<b>360</b>	<b>478</b>

<b>Day 1 Sub-total</b>	<b>0</b>	<b>42</b>	<b>64</b>	<b>490</b>	<b>596</b>
<b>Day 2 Sub-total</b>	<b>0</b>	<b>14</b>	<b>149</b>	<b>442</b>	<b>605</b>
<b>Day 3 Sub-total</b>	<b>0</b>	<b>12</b>	<b>106</b>	<b>360</b>	<b>478</b>
<b>Total</b>	<b>0</b>	<b>68</b>	<b>319</b>	<b>1292</b>	<b>1679</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>23</b>	<b>106</b>	<b>431</b>	<b>560</b>

**Location: Danfe Chari Marg Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-27	6:00-7:00			1	5	6
2073-04-27	7:00-8:00			2	6	8
2073-04-27	8:00-9:00			1	11	12
2073-04-27	9:00-10:00			3	9	12
2073-04-27	10:00-11:00			2	7	9
2073-04-27	11:00-12:00			1	9	10
2073-04-27	12:00-13:00			3	8	11
2073-04-27	13:00-14:00			2	19	21
2073-04-27	14:00-15:00			4	10	14
2073-04-27	15:00-16:00			1	13	14
2073-04-27	16:00-17:00			2	17	19
2073-04-27	17:00-18:00			1	8	9
2073-04-27	18:00-19:00			2	9	11
2073-04-27	19:00-20:00				7	7
2073-04-27	20:00-21:00					0
2073-04-27	21:00-22:00					0
2073-04-27	22:00-23:00					
2073-04-27	23:00-24:00					
2073-04-27	24:00-1:00					
2073-04-27	1:00-2:00					
2073-04-27	2:00-3:00					
2073-04-27	3:00-4:00					
2073-04-27	4:00-5:00					
2073-04-27	5:00-6:00				1	1
<b>Day 1 Sub-total</b>				<b>25</b>	<b>139</b>	<b>164</b>
2073-04-28	6:00-7:00				6	6
2073-04-28	7:00-8:00			1	7	8
2073-04-28	8:00-9:00			5	11	16
2073-04-28	9:00-10:00			7	14	21
2073-04-28	10:00-11:00			8	12	20
2073-04-28	11:00-12:00			4	11	15
2073-04-28	12:00-13:00			6	15	21
2073-04-28	13:00-14:00			2	17	19
2073-04-28	14:00-15:00			7	13	20
2073-04-28	15:00-16:00			9	7	16
2073-04-28	16:00-17:00			6	17	23
2073-04-28	17:00-18:00			7	14	21
2073-04-28	18:00-19:00			5	10	15
2073-04-28	19:00-20:00			2	11	13
2073-04-28	20:00-21:00			1	5	6
2073-04-28	21:00-22:00					0

Date	Start Time (Hrs)	Truck	Bus	Car/van/jep/tempo	Motor Cycle	Total
2073-04-28	22:00-23:00					
2073-04-28	23:00-24:00					
2073-04-28	24:00-1:00					
2073-04-28	1:00-2:00					
2073-04-28	2:00-3:00					
2073-04-28	3:00-4:00					
2073-04-28	4:00-5:00					
2073-04-28	5:00-6:00					0
<b>Day 2 Sub-total</b>				<b>70</b>	<b>170</b>	<b>240</b>
2073-04-29	6:00-7:00			3	7	10
2073-04-29	7:00-8:00			9	9	18
2073-04-29	8:00-9:00			6	15	21
2073-04-29	9:00-10:00			7	14	21
2073-04-29	10:00-11:00			3	19	22
2073-04-29	11:00-12:00			4	7	11
2073-04-29	12:00-13:00			2	21	23
2073-04-29	13:00-14:00			6	12	18
2073-04-29	14:00-15:00			3	11	14
2073-04-29	15:00-16:00			8	15	23
2073-04-29	16:00-17:00			4	17	21
2073-04-29	17:00-18:00			6	13	19
2073-04-29	18:00-19:00			4	9	13
2073-04-29	19:00-20:00			5	7	12
2073-04-29	20:00-21:00				2	2
2073-04-29	21:00-22:00					0
2073-04-29	22:00-23:00					
2073-04-29	23:00-24:00					
2073-04-29	24:00-1:00					
2073-04-29	1:00-2:00					
2073-04-29	2:00-3:00					
2073-04-29	3:00-4:00					
2073-04-29	4:00-5:00					
2073-04-29	5:00-6:00				8	8
<b>Day 3 Sub-total</b>		<b>0</b>	<b>0</b>	<b>70</b>	<b>186</b>	<b>256</b>

<b>Day 1 Sub-total</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>139</b>	<b>164</b>
<b>Day 2 Sub-total</b>	<b>0</b>	<b>0</b>	<b>70</b>	<b>170</b>	<b>240</b>
<b>Day 3 Sub-total</b>	<b>0</b>	<b>0</b>	<b>70</b>	<b>186</b>	<b>256</b>
<b>Total</b>	<b>0</b>	<b>0</b>	<b>165</b>	<b>495</b>	<b>660</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>165</b>	<b>220</b>

**Location: Thamel Area**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-01	6:00-7:00			348	579	927
2073-04-01	7:00-8:00			438	612	1050
2073-04-01	8:00-9:00			594	731	1325
2073-04-01	9:00-10:00			636	871	1507
2073-04-01	10:00-11:00			629	934	1563
2073-04-01	11:00-12:00			720	751	1471
2073-04-01	12:00-13:00			579	879	1458
2073-04-01	13:00-14:00			578	943	1521
2073-04-01	14:00-15:00			438	714	1152
2073-04-01	15:00-16:00			497	638	1135
2073-04-01	16:00-17:00			697	578	1275
2073-04-01	17:00-18:00			547	867	1414
2073-04-01	18:00-19:00			683	786	1469
2073-04-01	19:00-20:00			571	864	1435
2073-04-01	20:00-21:00			419	423	842
2073-04-01	21:00-22:00			230	234	464
2073-04-01	22:00-23:00			169	135	304
2073-04-01	23:00-24:00			120	45	165
2073-04-01	24:00-1:00			2		
2073-04-01	1:00-2:00					
2073-04-01	2:00-3:00					
2073-04-01	3:00-4:00			5		
2073-04-01	4:00-5:00			19	15	34
2073-04-01	5:00-6:00			45	27	72
<b>Day 1 Sub-total</b>				<b>8964</b>	<b>11626</b>	<b>20583</b>
2073-04-02	6:00-7:00			238	458	696
2073-04-02	7:00-8:00			458	597	1055
2073-04-02	8:00-9:00			564	768	1332
2073-04-02	9:00-10:00			864	813	1677
2073-04-02	10:00-11:00			756	943	1699
2073-04-02	11:00-12:00			697	846	1543
2073-04-02	12:00-13:00			763	754	1517
2073-04-02	13:00-14:00			874	864	1738
2073-04-02	14:00-15:00			756	956	1712
2073-04-02	15:00-16:00			636	864	1500
2073-04-02	16:00-17:00			874	746	1620
2073-04-02	17:00-18:00			748	654	1402
2073-04-02	18:00-19:00			687	578	1265
2073-04-02	19:00-20:00			531	634	1165
2073-04-02	20:00-21:00			543	542	1085
2073-04-02	21:00-22:00			245	432	677

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-02	22:00-23:00			65	15	80
2073-04-02	23:00-24:00					
2073-04-02	24:00-1:00					
2073-04-02	1:00-2:00					
2073-04-02	2:00-3:00					
2073-04-02	3:00-4:00					
2073-04-02	4:00-5:00					
2073-04-02	5:00-6:00			12	15	27
<b>Day 2 Sub-total</b>				<b>10311</b>	<b>11479</b>	<b>21790</b>
2073-04-03	6:00-7:00			348	423	771
2073-04-03	7:00-8:00			457	459	916
2073-04-03	8:00-9:00			578	579	1157
2073-04-03	9:00-10:00			638	871	1509
2073-04-03	10:00-11:00			648	759	1407
2073-04-03	11:00-12:00			564	739	1303
2073-04-03	12:00-13:00			654	849	1503
2073-04-03	13:00-14:00			698	678	1376
2073-04-03	14:00-15:00			579	843	1422
2073-04-03	15:00-16:00			681	756	1437
2073-04-03	16:00-17:00			546	674	1220
2073-04-03	17:00-18:00			459	647	1106
2073-04-03	18:00-19:00			549	578	1127
2073-04-03	19:00-20:00			512	579	1091
2073-04-03	20:00-21:00			546	452	998
2073-04-03	21:00-22:00			432	159	591
2073-04-03	22:00-23:00			124		
2073-04-03	23:00-24:00					
2073-04-03	24:00-1:00					
2073-04-03	1:00-2:00					
2073-04-03	2:00-3:00					
2073-04-03	3:00-4:00					
2073-04-03	4:00-5:00					
2073-04-03	5:00-6:00			3	35	38
<b>Day 3 Sub-total</b>		<b>0</b>	<b>0</b>	<b>9016</b>	<b>10080</b>	<b>18972</b>

<b>Day 1 Sub-total</b>	<b>0</b>	<b>0</b>	<b>8964</b>	<b>11626</b>	<b>20590</b>
<b>Day 2 Sub-total</b>	<b>0</b>	<b>0</b>	<b>10311</b>	<b>11479</b>	<b>21790</b>
<b>Day 3 Sub-total</b>	<b>0</b>	<b>0</b>	<b>9016</b>	<b>10080</b>	<b>19096</b>
<b>Total</b>	<b>0</b>	<b>0</b>	<b>28291</b>	<b>33185</b>	<b>61476</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>0</b>	<b>9430</b>	<b>11062</b>	<b>20492</b>

**Location: Swayambhu Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-04	6:00-7:00			45	195	240
2073-04-04	7:00-8:00			65	325	390
2073-04-04	8:00-9:00		4	150	509	663
2073-04-04	9:00-10:00		6	197	641	844
2073-04-04	10:00-11:00		3	152	523	678
2073-04-04	11:00-12:00		2	164	645	811
2073-04-04	12:00-13:00		3	201	741	945
2073-04-04	13:00-14:00		4	112	657	773
2073-04-04	14:00-15:00		7	193	729	929
2073-04-04	15:00-16:00		9	243	597	849
2073-04-04	16:00-17:00		5	192	657	854
2073-04-04	17:00-18:00			142	435	577
2073-04-04	18:00-19:00			95	324	419
2073-04-04	19:00-20:00			43	241	284
2073-04-04	20:00-21:00			12	123	135
2073-04-04	21:00-22:00			3	47	50
2073-04-04	22:00-23:00					
2073-04-04	23:00-24:00					
2073-04-04	24:00-1:00					
2073-04-04	1:00-2:00					
2073-04-04	2:00-3:00					
2073-04-04	3:00-4:00					
2073-04-04	4:00-5:00			1	2	3
2073-04-04	5:00-6:00			3	17	20
<b>Day 1 Sub-total</b>			<b>43</b>	<b>2013</b>	<b>7408</b>	<b>9464</b>
2073-04-05	6:00-7:00			21	159	180
2073-04-05	7:00-8:00			75	231	306
2073-04-05	8:00-9:00		1	175	354	530
2073-04-05	9:00-10:00		7	150	457	614
2073-04-05	10:00-11:00		2	164	574	740
2073-04-05	11:00-12:00		5	95	654	754
2073-04-05	12:00-13:00		2	87	456	545
2073-04-05	13:00-14:00		5	120	573	698
2073-04-05	14:00-15:00		3	183	641	827
2073-04-05	15:00-16:00		2	192	741	935
2073-04-05	16:00-17:00		5	157	524	686
2073-04-05	17:00-18:00			89	354	443
2073-04-05	18:00-19:00			45	157	202
2073-04-05	19:00-20:00			21	191	212
2073-04-05	20:00-21:00			3	41	44
2073-04-05	21:00-22:00					

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-05	22:00-23:00					
2073-04-05	23:00-24:00					
2073-04-05	24:00-1:00					
2073-04-05	1:00-2:00					
2073-04-05	2:00-3:00					
2073-04-05	3:00-4:00					
2073-04-05	4:00-5:00					0
2073-04-05	5:00-6:00			4	27	31
<b>Day 2 Sub-total</b>			<b>32</b>	<b>1581</b>	<b>6134</b>	<b>7747</b>
2073-04-06	6:00-7:00			35	98	133
2073-04-06	7:00-8:00			95	257	352
2073-04-06	8:00-9:00		1	179	631	811
2073-04-06	9:00-10:00		3	137	479	619
2073-04-06	10:00-11:00		6	157	459	622
2073-04-06	11:00-12:00		4	99	579	682
2073-04-06	12:00-13:00		1	89	647	737
2073-04-06	13:00-14:00		2	154	654	810
2073-04-06	14:00-15:00		6	113	756	875
2073-04-06	15:00-16:00		3	173	456	632
2073-04-06	16:00-17:00		1	73	354	428
2073-04-06	17:00-18:00			65	384	449
2073-04-06	18:00-19:00			45	246	291
2073-04-06	19:00-20:00			25	150	175
2073-04-06	20:00-21:00			3	44	47
2073-04-06	21:00-22:00			1	23	24
2073-04-06	22:00-23:00				11	11
2073-04-06	23:00-24:00					
2073-04-06	24:00-1:00					
2073-04-06	1:00-2:00					
2073-04-06	2:00-3:00					
2073-04-06	3:00-4:00					
2073-04-06	4:00-5:00					
2073-04-06	5:00-6:00				15	15
<b>Day 3 Sub-total</b>		<b>0</b>	<b>27</b>	<b>1443</b>	<b>6243</b>	<b>7713</b>

<b>Day 1 Sub-total</b>	<b>0</b>	<b>43</b>	<b>2013</b>	<b>7408</b>	<b>9464</b>
<b>Day 2 Sub-total</b>	<b>0</b>	<b>32</b>	<b>1581</b>	<b>6134</b>	<b>7747</b>
<b>Day 3 Sub-total</b>	<b>0</b>	<b>27</b>	<b>1443</b>	<b>6243</b>	<b>7713</b>
<b>Total</b>	<b>0</b>	<b>102</b>	<b>5037</b>	<b>19785</b>	<b>24924</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>34</b>	<b>1679</b>	<b>6595</b>	<b>8308</b>

**Location: Adwait Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-07	6:00-7:00		2	12	154	168
2073-04-07	7:00-8:00		5	32	235	272
2073-04-07	8:00-9:00		11	45	345	401
2073-04-07	9:00-10:00		8	51	457	516
2073-04-07	10:00-11:00		9	33	541	583
2073-04-07	11:00-12:00		15	35	579	629
2073-04-07	12:00-13:00		7	31	644	682
2073-04-07	13:00-14:00		3	25	574	602
2073-04-07	14:00-15:00		4	17	654	675
2073-04-07	15:00-16:00		10	11	631	652
2073-04-07	16:00-17:00		7	23	534	564
2073-04-07	17:00-18:00		8	15	425	448
2073-04-07	18:00-19:00		3	4	341	348
2073-04-07	19:00-20:00			6	140	146
2073-04-07	20:00-21:00			3	45	48
2073-04-07	21:00-22:00				2	2
2073-04-07	22:00-23:00					
2073-04-07	23:00-24:00					
2073-04-07	24:00-1:00					
2073-04-07	1:00-2:00					
2073-04-07	2:00-3:00					
2073-04-07	3:00-4:00					
2073-04-07	4:00-5:00					0
2073-04-07	5:00-6:00		4	10	17	31
<b>Day 1 Sub-total</b>			<b>96</b>	<b>353</b>	<b>6318</b>	<b>6767</b>
2073-04-08	6:00-7:00		5	15	150	170
2073-04-08	7:00-8:00		11	24	352	387
2073-04-08	8:00-9:00		6	31	345	382
2073-04-08	9:00-10:00		9	26	457	492
2073-04-08	10:00-11:00		2	45	541	588
2073-04-08	11:00-12:00		3	30	579	612
2073-04-08	12:00-13:00		7	32	644	683
2073-04-08	13:00-14:00		4	29	574	607
2073-04-08	14:00-15:00		5	21	654	680
2073-04-08	15:00-16:00		9	47	631	687
2073-04-08	16:00-17:00		5	31	534	570
2073-04-08	17:00-18:00		4	17	325	346
2073-04-08	18:00-19:00		3	11	227	241
2073-04-08	19:00-20:00		1	6	129	136
2073-04-08	20:00-21:00				25	
2073-04-08	21:00-22:00				12	

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-08	22:00-23:00					
2073-04-08	23:00-24:00					
2073-04-08	24:00-1:00					
2073-04-08	1:00-2:00					
2073-04-08	2:00-3:00					
2073-04-08	3:00-4:00					
2073-04-08	4:00-5:00					
2073-04-08	5:00-6:00			3	15	18
<b>Day 2 Sub-total</b>			<b>74</b>	<b>368</b>	<b>6194</b>	<b>6599</b>
2073-04-09	6:00-7:00		2	11	179	192
2073-04-09	7:00-8:00		5	23	245	273
2073-04-09	8:00-9:00		9	34	345	388
2073-04-09	9:00-10:00		8	43	457	508
2073-04-09	10:00-11:00		9	64	541	614
2073-04-09	11:00-12:00		12	35	579	626
2073-04-09	12:00-13:00		7	31	644	682
2073-04-09	13:00-14:00		13	25	574	612
2073-04-09	14:00-15:00		4	17	597	618
2073-04-09	15:00-16:00		7	21	571	599
2073-04-09	16:00-17:00		9	19	534	562
2073-04-09	17:00-18:00		3	15	425	443
2073-04-09	18:00-19:00			14	341	355
2073-04-09	19:00-20:00			6	140	146
2073-04-09	20:00-21:00			1	31	32
2073-04-09	21:00-22:00				5	5
2073-04-09	22:00-23:00					
2073-04-09	23:00-24:00					
2073-04-09	24:00-1:00					
2073-04-09	1:00-2:00					
2073-04-09	2:00-3:00					
2073-04-09	3:00-4:00					
2073-04-09	4:00-5:00					
2073-04-09	5:00-6:00				3	3
<b>Day 3 Sub-total</b>		<b>0</b>	<b>88</b>	<b>359</b>	<b>6211</b>	<b>6658</b>

<b>Day 1 Sub-total</b>	<b>0</b>	<b>96</b>	<b>353</b>	<b>6318</b>	<b>6767</b>
<b>Day 2 Sub-total</b>	<b>0</b>	<b>74</b>	<b>368</b>	<b>6194</b>	<b>6636</b>
<b>Day 3 Sub-total</b>	<b>0</b>	<b>88</b>	<b>359</b>	<b>6211</b>	<b>6658</b>
<b>Total</b>	<b>0</b>	<b>258</b>	<b>1080</b>	<b>18723</b>	<b>20061</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>86</b>	<b>360</b>	<b>6241</b>	<b>6687</b>

**Location: Jyatha Marg**

<b>Date</b>	<b>Start Time (Hrs)</b>	<b>Truck</b>	<b>Bus</b>	<b>Car/van/je ep/tempo</b>	<b>Motor Cycle</b>	<b>Total</b>
2073-04-11	6:00-7:00			15	78	93
2073-04-11	7:00-8:00			85	86	171
2073-04-11	8:00-9:00			115	120	235
2073-04-11	9:00-10:00			120	201	321
2073-04-11	10:00-11:00			253	194	447
2073-04-11	11:00-12:00			197	179	376
2073-04-11	12:00-13:00			189	163	352
2073-04-11	13:00-14:00			175	201	376
2073-04-11	14:00-15:00			210	198	408
2073-04-11	15:00-16:00			117	201	318
2073-04-11	16:00-17:00			195	212	407
2073-04-11	17:00-18:00			164	159	323
2073-04-11	18:00-19:00			151	110	261
2073-04-11	19:00-20:00			75	75	150
2073-04-11	20:00-21:00			45	43	88
2073-04-11	21:00-22:00			5	10	15
2073-04-11	22:00-23:00					
2073-04-11	23:00-24:00					
2073-04-11	24:00-1:00					
2073-04-11	1:00-2:00					
2073-04-11	2:00-3:00					
2073-04-11	3:00-4:00					
2073-04-11	4:00-5:00					0
2073-04-11	5:00-6:00			7	25	32
<b>Day 1 Sub-total</b>				<b>2118</b>	<b>2255</b>	<b>4373</b>
2073-04-12	6:00-7:00			10	60	70
2073-04-12	7:00-8:00			15	81	96
2073-04-12	8:00-9:00			65	95	160
2073-04-12	9:00-10:00			95	110	205
2073-04-12	10:00-11:00			152	115	267
2073-04-12	11:00-12:00			162	159	321
2073-04-12	12:00-13:00			179	164	343
2073-04-12	13:00-14:00			135	201	336
2073-04-12	14:00-15:00			178	139	317
2073-04-12	15:00-16:00			190	197	387
2073-04-12	16:00-17:00			211	213	424
2073-04-12	17:00-18:00			142	214	356
2073-04-12	18:00-19:00			106	179	285
2073-04-12	19:00-20:00			75	139	214
2073-04-12	20:00-21:00			22	62	84
2073-04-12	21:00-22:00			3	34	37

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-12	22:00-23:00					0
2073-04-12	23:00-24:00					
2073-04-12	24:00-1:00					
2073-04-12	1:00-2:00					
2073-04-12	2:00-3:00					
2073-04-12	3:00-4:00					
2073-04-12	4:00-5:00					
2073-04-12	5:00-6:00			2	19	21
<b>Day 2 Sub-total</b>				<b>1742</b>	<b>2181</b>	<b>3923</b>
2073-04-13	6:00-7:00			13	65	78
2073-04-13	7:00-8:00			90	94	184
2073-04-13	8:00-9:00			157	162	319
2073-04-13	9:00-10:00			195	199	394
2073-04-13	10:00-11:00			253	178	431
2073-04-13	11:00-12:00			197	169	366
2073-04-13	12:00-13:00			189	163	352
2073-04-13	13:00-14:00			175	201	376
2073-04-13	14:00-15:00			210	198	408
2073-04-13	15:00-16:00			117	201	318
2073-04-13	16:00-17:00			195	217	412
2073-04-13	17:00-18:00			164	159	323
2073-04-13	18:00-19:00			151	110	261
2073-04-13	19:00-20:00			72	60	132
2073-04-13	20:00-21:00			39	43	82
2073-04-13	21:00-22:00			9	21	30
2073-04-13	22:00-23:00					0
2073-04-13	23:00-24:00					
2073-04-13	24:00-1:00					
2073-04-13	1:00-2:00					
2073-04-13	2:00-3:00					
2073-04-13	3:00-4:00					
2073-04-13	4:00-5:00					
2073-04-13	5:00-6:00				12	12
<b>Day 3 Sub-total</b>				<b>2226</b>	<b>2252</b>	<b>4478</b>

<b>Day 1 Sub-total</b>	0	0	2118	2255	4373
<b>Day 2 Sub-total</b>	0	0	1742	2181	3923
<b>Day 3 Sub-total</b>	0	0	2226	2252	4478
<b>Total</b>	<b>0</b>	<b>0</b>	<b>6086</b>	<b>6688</b>	<b>12774</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>0</b>	<b>2029</b>	<b>2229</b>	<b>4258</b>

**Location: Bina Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-14	6:00-7:00	1		2	6	9
2073-04-14	7:00-8:00			8	12	20
2073-04-14	8:00-9:00		3	6	19	28
2073-04-14	9:00-10:00			8	13	21
2073-04-14	10:00-11:00			2	7	9
2073-04-14	11:00-12:00	1		8	9	18
2073-04-14	12:00-13:00			5	11	16
2073-04-14	13:00-14:00			2	19	21
2073-04-14	14:00-15:00		2	4	10	16
2073-04-14	15:00-16:00			8	14	22
2073-04-14	16:00-17:00	1		3	12	16
2073-04-14	17:00-18:00		4	5	9	18
2073-04-14	18:00-19:00			7	7	14
2073-04-14	19:00-20:00			6	1	7
2073-04-14	20:00-21:00		3	2	2	7
2073-04-14	21:00-22:00			3	3	6
2073-04-14	22:00-23:00					
2073-04-14	23:00-24:00					
2073-04-14	24:00-1:00					
2073-04-14	1:00-2:00					
2073-04-14	2:00-3:00					
2073-04-14	3:00-4:00					
2073-04-14	4:00-5:00					
2073-04-14	5:00-6:00				1	1
<b>Day 1 Sub-total</b>		<b>3</b>	<b>12</b>	<b>79</b>	<b>155</b>	<b>249</b>
2073-04-15	6:00-7:00			1	3	4
2073-04-15	7:00-8:00	2		5	9	16
2073-04-15	8:00-9:00			8	12	20
2073-04-15	9:00-10:00		5	6	9	20
2073-04-15	10:00-11:00			6	9	15
2073-04-15	11:00-12:00		2	7	11	20
2073-04-15	12:00-13:00			4	8	12
2073-04-15	13:00-14:00	1	3	6	12	22
2073-04-15	14:00-15:00		1	8	13	22
2073-04-15	15:00-16:00			3	11	14
2073-04-15	16:00-17:00	3	5	7	9	24
2073-04-15	17:00-18:00			2	13	15
2073-04-15	18:00-19:00			4	14	18
2073-04-15	19:00-20:00			2	9	11
2073-04-15	20:00-21:00			3	5	8
2073-04-15	21:00-22:00			4		4

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-15	22:00-23:00					
2073-04-15	23:00-24:00					
2073-04-15	24:00-1:00					
2073-04-15	1:00-2:00					
2073-04-15	2:00-3:00					
2073-04-15	3:00-4:00					
2073-04-15	4:00-5:00					
2073-04-15	5:00-6:00			1	4	5
<b>Day 2 Sub-total</b>		<b>6</b>	<b>16</b>	<b>77</b>	<b>151</b>	<b>250</b>
2073-04-16	6:00-7:00			2	6	8
2073-04-16	7:00-8:00		2	6	8	16
2073-04-16	8:00-9:00	1	1	8	11	21
2073-04-16	9:00-10:00			3	7	10
2073-04-16	10:00-11:00			6	8	14
2073-04-16	11:00-12:00		2	4	9	15
2073-04-16	12:00-13:00	2		8	13	23
2073-04-16	13:00-14:00		4	6	11	21
2073-04-16	14:00-15:00			9	9	18
2073-04-16	15:00-16:00		3	7	8	18
2073-04-16	16:00-17:00	1		8	8	17
2073-04-16	17:00-18:00		1	6	7	14
2073-04-16	18:00-19:00		1	4	9	14
2073-04-16	19:00-20:00			6	5	11
2073-04-16	20:00-21:00			7	7	14
2073-04-16	21:00-22:00			2	3	5
2073-04-16	22:00-23:00					
2073-04-16	23:00-24:00					
2073-04-16	24:00-1:00					
2073-04-16	1:00-2:00					
2073-04-16	2:00-3:00					
2073-04-16	3:00-4:00					
2073-04-16	4:00-5:00					
2073-04-16	5:00-6:00				8	8
<b>Day 3 Sub-total</b>		<b>4</b>	<b>14</b>	<b>92</b>	<b>137</b>	<b>247</b>

<b>Day 1 Sub-total</b>	3	12	79	155	249
<b>Day 2 Sub-total</b>	6	16	77	151	250
<b>Day 3 Sub-total</b>	4	14	92	137	247
<b>Total</b>	<b>13</b>	<b>42</b>	<b>248</b>	<b>443</b>	<b>746</b>
<b>Avg Daily Traffic (ADT)</b>	<b>4</b>	<b>14</b>	<b>83</b>	<b>148</b>	<b>249</b>

**Location: Shahid Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-17	6:00-7:00			7	15	22
2073-04-17	7:00-8:00			15	38	53
2073-04-17	8:00-9:00	1	2	17	50	70
2073-04-17	9:00-10:00		5	27	75	107
2073-04-17	10:00-11:00		3	20	59	82
2073-04-17	11:00-12:00	2	2	19	62	85
2073-04-17	12:00-13:00		3	31	45	79
2073-04-17	13:00-14:00		4	24	61	89
2073-04-17	14:00-15:00		6	21	55	82
2073-04-17	15:00-16:00	1	6	28	65	100
2073-04-17	16:00-17:00		3	12	57	72
2073-04-17	17:00-18:00			11	34	45
2073-04-17	18:00-19:00			6	21	27
2073-04-17	19:00-20:00			2	9	11
2073-04-17	20:00-21:00				5	5
2073-04-17	21:00-22:00					0
2073-04-17	22:00-23:00					
2073-04-17	23:00-24:00					
2073-04-17	24:00-1:00					
2073-04-17	1:00-2:00					
2073-04-17	2:00-3:00					
2073-04-17	3:00-4:00					
2073-04-17	4:00-5:00					
2073-04-17	5:00-6:00				7	7
<b>Day 1 Sub-total</b>		<b>4</b>	<b>34</b>	<b>240</b>	<b>658</b>	<b>936</b>
2073-04-18	6:00-7:00			19	25	44
2073-04-18	7:00-8:00	4	2	24	36	66
2073-04-18	8:00-9:00		4	32	61	97
2073-04-18	9:00-10:00		3	19	64	86
2073-04-18	10:00-11:00		7	15	74	96
2073-04-18	11:00-12:00		4	12	43	59
2073-04-18	12:00-13:00		6	17	55	78
2073-04-18	13:00-14:00		2	28	51	81
2073-04-18	14:00-15:00	3	2	27	47	79
2073-04-18	15:00-16:00		3	29	71	103
2073-04-18	16:00-17:00		4	18	51	73
2073-04-18	17:00-18:00		3	14	18	35
2073-04-18	18:00-19:00			9	20	29
2073-04-18	19:00-20:00			3	15	18
2073-04-18	20:00-21:00			1	7	8
2073-04-18	21:00-22:00					0

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-18	22:00-23:00					
2073-04-18	23:00-24:00					
2073-04-18	24:00-1:00					
2073-04-18	1:00-2:00					
2073-04-18	2:00-3:00					
2073-04-18	3:00-4:00					
2073-04-18	4:00-5:00					
2073-04-18	5:00-6:00					0
<b>Day 2 Sub-total</b>		<b>7</b>	<b>40</b>	<b>267</b>	<b>638</b>	<b>952</b>
2073-04-19	6:00-7:00			9	12	21
2073-04-19	7:00-8:00			15	40	55
2073-04-19	8:00-9:00	1	2	27	49	79
2073-04-19	9:00-10:00	1	6	27	75	109
2073-04-19	10:00-11:00		3	20	65	88
2073-04-19	11:00-12:00	2	3	24	62	91
2073-04-19	12:00-13:00		3	31	49	83
2073-04-19	13:00-14:00	1	4	24	61	90
2073-04-19	14:00-15:00		4	21	55	80
2073-04-19	15:00-16:00	1	5	28	65	99
2073-04-19	16:00-17:00		3	12	45	60
2073-04-19	17:00-18:00			11	34	45
2073-04-19	18:00-19:00			7	24	31
2073-04-19	19:00-20:00			3	9	12
2073-04-19	20:00-21:00				3	3
2073-04-19	21:00-22:00					0
2073-04-19	22:00-23:00					
2073-04-19	23:00-24:00					
2073-04-19	24:00-1:00					
2073-04-19	1:00-2:00					
2073-04-19	2:00-3:00					
2073-04-19	3:00-4:00					
2073-04-19	4:00-5:00					
2073-04-19	5:00-6:00				2	2
<b>Day 3 Sub-total</b>		<b>6</b>	<b>33</b>	<b>259</b>	<b>650</b>	<b>948</b>

<b>Day 1 Sub-total</b>	4	34	240	658	936
<b>Day 2 Sub-total</b>	7	40	267	638	952
<b>Day 3 Sub-total</b>	6	33	259	650	948
<b>Total</b>	<b>17</b>	<b>107</b>	<b>766</b>	<b>1946</b>	<b>2836</b>
<b>Avg Daily Traffic (ADT)</b>	<b>6</b>	<b>36</b>	<b>255</b>	<b>649</b>	<b>945</b>

**Location: Bishnumati Link Road**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-21	6:00-7:00	1	2	653	579	1235
2073-04-21	7:00-8:00	6	14	769	879	1668
2073-04-21	8:00-9:00	7	15	874	978	1874
2073-04-21	9:00-10:00	3	25	839	1049	1916
2073-04-21	10:00-11:00	4	35	1036	1125	2200
2073-04-21	11:00-12:00	8	42	964	1293	2307
2073-04-21	12:00-13:00	4	46	847	1570	2467
2073-04-21	13:00-14:00	6	51	789	1643	2489
2073-04-21	14:00-15:00	9	32	892	1476	2409
2073-04-21	15:00-16:00	7	45	976	1649	2677
2073-04-21	16:00-17:00	10	42	1094	1509	2655
2073-04-21	17:00-18:00	4	15	674	1463	2156
2073-04-21	18:00-19:00		7	683	1347	2037
2073-04-21	19:00-20:00			571	864	1435
2073-04-21	20:00-21:00			419	423	842
2073-04-21	21:00-22:00			230	234	464
2073-04-21	22:00-23:00			45	135	180
2073-04-21	23:00-24:00				45	45
2073-04-21	24:00-1:00					
2073-04-21	1:00-2:00					
2073-04-21	2:00-3:00					
2073-04-21	3:00-4:00					
2073-04-21	4:00-5:00			15	35	50
2073-04-21	5:00-6:00			42	39	81
<b>Day 1 Sub-total</b>		<b>69</b>	<b>371</b>	<b>12412</b>	<b>18335</b>	<b>31187</b>
2073-04-22	6:00-7:00	2	1	759	678	1440
2073-04-22	7:00-8:00	3	10	879	768	1660
2073-04-22	8:00-9:00	6	14	943	892	1855
2073-04-22	9:00-10:00	7	21	861	963	1852
2073-04-22	10:00-11:00	4	36	936	1028	2004
2073-04-22	11:00-12:00	8	42	978	1146	2174
2073-04-22	12:00-13:00	4	26	834	1376	2240
2073-04-22	13:00-14:00	6	39	986	1574	2605
2073-04-22	14:00-15:00	5	29	892	1476	2402
2073-04-22	15:00-16:00	7	34	1024	1754	2819
2073-04-22	16:00-17:00	5	42	989	1548	2584
2073-04-22	17:00-18:00	1	11	674	1538	2224
2073-04-22	18:00-19:00		6	683	1347	2036
2073-04-22	19:00-20:00			571	864	1435
2073-04-22	20:00-21:00			419	423	842
2073-04-22	21:00-22:00			230	275	505

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-22	22:00-23:00			45	75	120
2073-04-22	23:00-24:00					
2073-04-22	24:00-1:00					
2073-04-22	1:00-2:00					
2073-04-22	2:00-3:00					
2073-04-22	3:00-4:00					
2073-04-22	4:00-5:00					
2073-04-22	5:00-6:00			12	15	27
<b>Day 2 Sub-total</b>		<b>58</b>	<b>311</b>	<b>12715</b>	<b>17740</b>	<b>30824</b>
2073-04-23	6:00-7:00	1	2	553	683	1239
2073-04-23	7:00-8:00	5	12	679	789	1485
2073-04-23	8:00-9:00	7	15	789	864	1675
2073-04-23	9:00-10:00	3	25	839	948	1815
2073-04-23	10:00-11:00	4	25	974	1045	2048
2073-04-23	11:00-12:00	9	42	1025	1129	2205
2073-04-23	12:00-13:00	4	35	984	1436	2459
2073-04-23	13:00-14:00	6	31	789	1593	2419
2073-04-23	14:00-15:00	7	32	892	1756	2687
2073-04-23	15:00-16:00	7	51	976	1643	2677
2073-04-23	16:00-17:00	1	50	1120	1546	2717
2073-04-23	17:00-18:00	2	12	689	1448	2151
2073-04-23	18:00-19:00		2	683	1478	2163
2073-04-23	19:00-20:00			571	874	1445
2073-04-23	20:00-21:00			421	416	837
2073-04-23	21:00-22:00			246	245	491
2073-04-23	22:00-23:00					
2073-04-23	23:00-24:00					
2073-04-23	24:00-1:00					
2073-04-23	1:00-2:00					
2073-04-23	2:00-3:00					
2073-04-23	3:00-4:00					
2073-04-23	4:00-5:00					
2073-04-23	5:00-6:00			12	24	36
<b>Day 3 Sub-total</b>		<b>56</b>	<b>334</b>	<b>12242</b>	<b>17917</b>	<b>30549</b>

<b>Day 1 Sub-total</b>	69	371	12412	18335	31187
<b>Day 2 Sub-total</b>	58	311	12715	17740	30824
<b>Day 3 Sub-total</b>	56	334	12242	17917	30549
<b>Total</b>	<b>183</b>	<b>1016</b>	<b>37369</b>	<b>53992</b>	<b>92560</b>
<b>Avg Daily Traffic (ADT)</b>	<b>61</b>	<b>339</b>	<b>12456</b>	<b>17997</b>	<b>30853</b>

**Location: Raja Birendra Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-24	6:00-7:00			2	7	9
2073-04-24	7:00-8:00			8	13	21
2073-04-24	8:00-9:00			6	19	25
2073-04-24	9:00-10:00			8	27	35
2073-04-24	10:00-11:00			2	19	21
2073-04-24	11:00-12:00			4	13	17
2073-04-24	12:00-13:00			5	11	16
2073-04-24	13:00-14:00			6	10	16
2073-04-24	14:00-15:00			1	10	11
2073-04-24	15:00-16:00			9	14	23
2073-04-24	16:00-17:00			3	15	18
2073-04-24	17:00-18:00			4	7	11
2073-04-24	18:00-19:00			1	7	8
2073-04-24	19:00-20:00			6	1	7
2073-04-24	20:00-21:00				2	2
2073-04-24	21:00-22:00				3	3
2073-04-24	22:00-23:00					
2073-04-24	23:00-24:00					
2073-04-24	24:00-1:00					
2073-04-24	1:00-2:00					
2073-04-24	2:00-3:00					
2073-04-24	3:00-4:00					
2073-04-24	4:00-5:00					
2073-04-24	5:00-6:00				1	1
<b>Day 1 Sub-total</b>				<b>65</b>	<b>179</b>	<b>244</b>
2073-04-25	6:00-7:00				3	3
2073-04-25	7:00-8:00			1	9	10
2073-04-25	8:00-9:00			2	11	13
2073-04-25	9:00-10:00			6	17	23
2073-04-25	10:00-11:00			3	16	19
2073-04-25	11:00-12:00			2	11	13
2073-04-25	12:00-13:00			1	16	17
2073-04-25	13:00-14:00			4	12	16
2073-04-25	14:00-15:00			3	13	16
2073-04-25	15:00-16:00			3	14	17
2073-04-25	16:00-17:00			5	25	30
2073-04-25	17:00-18:00			2	16	18
2073-04-25	18:00-19:00			4	14	18
2073-04-25	19:00-20:00				24	24
2073-04-25	20:00-21:00				5	5
2073-04-25	21:00-22:00					0

Date	Start Time (Hrs)	Truck	Bus	Car/van/jep/tempo	Motor Cycle	Total
2073-04-25	22:00-23:00					
2073-04-25	23:00-24:00					
2073-04-25	24:00-1:00					
2073-04-25	1:00-2:00					
2073-04-25	2:00-3:00					
2073-04-25	3:00-4:00					
2073-04-25	4:00-5:00					
2073-04-25	5:00-6:00				3	3
<b>Day 2 Sub-total</b>				<b>36</b>	<b>209</b>	<b>245</b>
2073-04-26	6:00-7:00				2	2
2073-04-26	7:00-8:00			2	6	8
2073-04-26	8:00-9:00			7	11	18
2073-04-26	9:00-10:00			3	19	22
2073-04-26	10:00-11:00			4	21	25
2073-04-26	11:00-12:00			6	16	22
2073-04-26	12:00-13:00			4	11	15
2073-04-26	13:00-14:00			1	17	18
2073-04-26	14:00-15:00			9	15	24
2073-04-26	15:00-16:00			7	10	17
2073-04-26	16:00-17:00			6	11	17
2073-04-26	17:00-18:00			5	7	12
2073-04-26	18:00-19:00			4	9	13
2073-04-26	19:00-20:00			1	5	6
2073-04-26	20:00-21:00					0
2073-04-26	21:00-22:00					0
2073-04-26	22:00-23:00					
2073-04-26	23:00-24:00					
2073-04-26	24:00-1:00					
2073-04-26	1:00-2:00					
2073-04-26	2:00-3:00					
2073-04-26	3:00-4:00					
2073-04-26	4:00-5:00					
2073-04-26	5:00-6:00				7	7
<b>Day 3 Sub-total</b>				<b>59</b>	<b>167</b>	<b>226</b>

<b>Day 1 Sub-total</b>	0	0	65	179	244
<b>Day 2 Sub-total</b>	0	0	36	209	245
<b>Day 3 Sub-total</b>	0	0	59	167	226
<b>Total</b>	<b>0</b>	<b>0</b>	<b>160</b>	<b>555</b>	<b>715</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>0</b>	<b>53</b>	<b>185</b>	<b>238</b>

**Location: Pipa Gaushwara Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-04-27	6:00-7:00			4	15	19
2073-04-27	7:00-8:00			9	97	106
2073-04-27	8:00-9:00		3	35	124	162
2073-04-27	9:00-10:00		2	23	126	151
2073-04-27	10:00-11:00		4	25	198	227
2073-04-27	11:00-12:00		4	45	157	206
2073-04-27	12:00-13:00		3	53	150	206
2073-04-27	13:00-14:00		2	32	167	201
2073-04-27	14:00-15:00		3	49	179	231
2073-04-27	15:00-16:00		6	57	145	208
2073-04-27	16:00-17:00		2	49	102	153
2073-04-27	17:00-18:00			21	75	96
2073-04-27	18:00-19:00			17	55	72
2073-04-27	19:00-20:00			8	14	22
2073-04-27	20:00-21:00			7	9	16
2073-04-27	21:00-22:00					0
2073-04-27	22:00-23:00					
2073-04-27	23:00-24:00					
2073-04-27	24:00-1:00					
2073-04-27	1:00-2:00					
2073-04-27	2:00-3:00					
2073-04-27	3:00-4:00					
2073-04-27	4:00-5:00					0
2073-04-27	5:00-6:00			1	4	5
<b>Day 1 Sub-total</b>			<b>29</b>	<b>435</b>	<b>1617</b>	<b>2081</b>
2073-04-28	6:00-7:00			3	9	12
2073-04-28	7:00-8:00			12	50	62
2073-04-28	8:00-9:00		1	17	95	113
2073-04-28	9:00-10:00		3	32	126	161
2073-04-28	10:00-11:00		2	21	156	179
2073-04-28	11:00-12:00		5	39	134	178
2073-04-28	12:00-13:00		6	35	142	183
2073-04-28	13:00-14:00		2	29	176	207
2073-04-28	14:00-15:00		1	31	146	178
2073-04-28	15:00-16:00		3	45	137	185
2073-04-28	16:00-17:00		2	37	102	141
2073-04-28	17:00-18:00			24	85	109
2073-04-28	18:00-19:00			16	55	71
2073-04-28	19:00-20:00			9	14	23
2073-04-28	20:00-21:00			6	9	15
2073-04-28	21:00-22:00					0

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-04-28	22:00-23:00					0
2073-04-28	23:00-24:00					
2073-04-28	24:00-1:00					
2073-04-28	1:00-2:00					
2073-04-28	2:00-3:00					
2073-04-28	3:00-4:00					
2073-04-28	4:00-5:00					
2073-04-28	5:00-6:00				3	3
<b>Day 2 Sub-total</b>			<b>25</b>	<b>356</b>	<b>1439</b>	<b>1820</b>
2073-04-29	6:00-7:00			6	12	18
2073-04-29	7:00-8:00			9	64	73
2073-04-29	8:00-9:00		1	25	96	122
2073-04-29	9:00-10:00		2	29	126	157
2073-04-29	10:00-11:00		4	31	174	209
2073-04-29	11:00-12:00		5	45	157	207
2073-04-29	12:00-13:00		1	32	150	183
2073-04-29	13:00-14:00		2	22	167	191
2073-04-29	14:00-15:00		3	53	179	235
2073-04-29	15:00-16:00		4	57	142	203
2073-04-29	16:00-17:00		2	42	102	146
2073-04-29	17:00-18:00			19	82	101
2073-04-29	18:00-19:00			13	55	68
2073-04-29	19:00-20:00			8	14	22
2073-04-29	20:00-21:00			7	9	16
2073-04-29	21:00-22:00			1	2	3
2073-04-29	22:00-23:00					0
2073-04-29	23:00-24:00					
2073-04-29	24:00-1:00					
2073-04-29	1:00-2:00					
2073-04-29	2:00-3:00					
2073-04-29	3:00-4:00					
2073-04-29	4:00-5:00					
2073-04-29	5:00-6:00				12	12
<b>Day 3 Sub-total</b>			<b>24</b>	<b>399</b>	<b>1543</b>	<b>1966</b>

<b>Day 1 Sub-total</b>	0	29	435	1617	2081
<b>Day 2 Sub-total</b>	0	25	356	1439	1820
<b>Day 3 Sub-total</b>	0	24	399	1543	1966
<b>Total</b>	<b>0</b>	<b>78</b>	<b>1190</b>	<b>4599</b>	<b>5867</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>26</b>	<b>397</b>	<b>1533</b>	<b>1956</b>

**Location: Ghattekulo Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/jeep/tempo	Motor Cycle	Total
2073-05-01	6:00-7:00			5	45	50
2073-05-01	7:00-8:00		9	9	91	109
2073-05-01	8:00-9:00		11	31	139	181
2073-05-01	9:00-10:00		8	23	145	176
2073-05-01	10:00-11:00		3	33	145	181
2073-05-01	11:00-12:00		2	35	164	201
2073-05-01	12:00-13:00			31	195	226
2073-05-01	13:00-14:00		2	25	153	180
2073-05-01	14:00-15:00		6	17	146	169
2073-05-01	15:00-16:00		10	11	126	147
2073-05-01	16:00-17:00		7	23	102	132
2073-05-01	17:00-18:00			12	94	106
2073-05-01	18:00-19:00			3	63	66
2073-05-01	19:00-20:00				36	36
2073-05-01	20:00-21:00				15	15
2073-05-01	21:00-22:00				1	1
2073-05-01	22:00-23:00					
2073-05-01	23:00-24:00					
2073-05-01	24:00-1:00					
2073-05-01	1:00-2:00					
2073-05-01	2:00-3:00					
2073-05-01	3:00-4:00					
2073-05-01	4:00-5:00					0
2073-05-01	5:00-6:00				7	7
<b>Day 1 Sub-total</b>		<b>0</b>	<b>58</b>	<b>258</b>	<b>1667</b>	<b>1983</b>
2073-05-02	6:00-7:00			6	54	60
2073-05-02	7:00-8:00		4	11	95	110
2073-05-02	8:00-9:00		7	29	140	176
2073-05-02	9:00-10:00		8	33	120	161
2073-05-02	10:00-11:00		3	24	145	172
2073-05-02	11:00-12:00		2	35	111	148
2073-05-02	12:00-13:00			31	195	226
2073-05-02	13:00-14:00		2	25	153	180
2073-05-02	14:00-15:00		6	17	146	169
2073-05-02	15:00-16:00		6	21	126	153
2073-05-02	16:00-17:00		7	19	165	191
2073-05-02	17:00-18:00			12	69	81
2073-05-02	18:00-19:00			8	63	71
2073-05-02	19:00-20:00				36	36
2073-05-02	20:00-21:00				15	15
2073-05-02	21:00-22:00				1	1
2073-05-02	22:00-23:00					

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-05-02	23:00-24:00					
2073-05-02	24:00-1:00					
2073-05-02	1:00-2:00					
2073-05-02	2:00-3:00					
2073-05-02	3:00-4:00					
2073-05-02	4:00-5:00					
2073-05-02	5:00-6:00				6	6
<b>Day 2 Sub-total</b>			<b>45</b>	<b>271</b>	<b>1640</b>	<b>1956</b>
2073-05-03	6:00-7:00			6	45	51
2073-05-03	7:00-8:00		2	11	95	108
2073-05-03	8:00-9:00		3	29	140	172
2073-05-03	9:00-10:00		5	33	120	158
2073-05-03	10:00-11:00		3	24	145	172
2073-05-03	11:00-12:00	1	2	35	111	149
2073-05-03	12:00-13:00			31	195	226
2073-05-03	13:00-14:00	2	2	25	153	182
2073-05-03	14:00-15:00		4	17	146	167
2073-05-03	15:00-16:00	1	6	21	169	197
2073-05-03	16:00-17:00		4	19	135	158
2073-05-03	17:00-18:00			12	69	81
2073-05-03	18:00-19:00			8	63	71
2073-05-03	19:00-20:00				36	36
2073-05-03	20:00-21:00				15	
2073-05-03	21:00-22:00				1	
2073-05-03	22:00-23:00					
2073-05-03	23:00-24:00					
2073-05-03	24:00-1:00					
2073-05-03	1:00-2:00					
2073-05-03	2:00-3:00					
2073-05-03	3:00-4:00					
2073-05-03	4:00-5:00					
2073-05-03	5:00-6:00				4	4
<b>Day 3 Sub-total</b>		<b>4</b>	<b>31</b>	<b>271</b>	<b>1642</b>	<b>1932</b>
<b>Day 1 Sub-total</b>		<b>0</b>	<b>58</b>	<b>258</b>	<b>1667</b>	<b>1983</b>
<b>Day 2 Sub-total</b>		<b>0</b>	<b>45</b>	<b>271</b>	<b>1640</b>	<b>1956</b>
<b>Day 3 Sub-total</b>		<b>4</b>	<b>31</b>	<b>271</b>	<b>1642</b>	<b>1948</b>
<b>Total</b>		<b>4</b>	<b>134</b>	<b>800</b>	<b>4949</b>	<b>5887</b>
<b>Avg Daily Traffic (ADT)</b>		<b>1</b>	<b>45</b>	<b>267</b>	<b>1650</b>	<b>1962</b>

**Location: Radhe Marg**

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-05-04	6:00-7:00			12	150	162
2073-05-04	7:00-8:00		7	45	179	231
2073-05-04	8:00-9:00		11	52	249	312
2073-05-04	9:00-10:00		15	51	457	523
2073-05-04	10:00-11:00		16	65	541	622
2073-05-04	11:00-12:00		15	75	579	669
2073-05-04	12:00-13:00		19	62	644	725
2073-05-04	13:00-14:00		9	45	574	628
2073-05-04	14:00-15:00		11	37	654	702
2073-05-04	15:00-16:00		10	49	631	690
2073-05-04	16:00-17:00		17	23	534	574
2073-05-04	17:00-18:00		8	15	425	448
2073-05-04	18:00-19:00			4	254	258
2073-05-04	19:00-20:00			6	140	146
2073-05-04	20:00-21:00					0
2073-05-04	21:00-22:00					0
2073-05-04	22:00-23:00					
2073-05-04	23:00-24:00					
2073-05-04	24:00-1:00					
2073-05-04	1:00-2:00					
2073-05-04	2:00-3:00					
2073-05-04	3:00-4:00					
2073-05-04	4:00-5:00					0
2073-05-04	5:00-6:00			7	12	19
<b>Day 1 Sub-total</b>		<b>0</b>	<b>138</b>	<b>548</b>	<b>6023</b>	<b>6709</b>
2073-05-05	6:00-7:00			15	95	110
2073-05-05	7:00-8:00		5	24	175	204
2073-05-05	8:00-9:00		6	31	345	382
2073-05-05	9:00-10:00		9	26	457	492
2073-05-05	10:00-11:00		2	45	541	588
2073-05-05	11:00-12:00		3	30	579	612
2073-05-05	12:00-13:00		7	32	644	683
2073-05-05	13:00-14:00		4	29	574	607
2073-05-05	14:00-15:00		5	21	654	680
2073-05-05	15:00-16:00		9	47	631	687
2073-05-05	16:00-17:00		5	31	534	570
2073-05-05	17:00-18:00		4	17	325	346
2073-05-05	18:00-19:00			11	227	238
2073-05-05	19:00-20:00			6	129	135
2073-05-05	20:00-21:00				25	
2073-05-05	21:00-22:00				9	

Date	Start Time (Hrs)	Truck	Bus	Car/van/je ep/tempo	Motor Cycle	Total
2073-05-05	22:00-23:00					
2073-05-05	23:00-24:00					
2073-05-05	24:00-1:00					
2073-05-05	1:00-2:00					
2073-05-05	2:00-3:00					
2073-05-05	3:00-4:00					
2073-05-05	4:00-5:00					
2073-05-05	5:00-6:00			3	15	18
<b>Day 2 Sub-total</b>			<b>59</b>	<b>368</b>	<b>5959</b>	<b>6352</b>
2073-05-06	6:00-7:00			9	180	189
2073-05-06	7:00-8:00		3	31	245	279
2073-05-06	8:00-9:00		9	34	345	388
2073-05-06	9:00-10:00		8	43	457	508
2073-05-06	10:00-11:00		9	64	541	614
2073-05-06	11:00-12:00		8	35	579	622
2073-05-06	12:00-13:00		7	31	644	682
2073-05-06	13:00-14:00		9	25	574	608
2073-05-06	14:00-15:00		4	17	597	618
2073-05-06	15:00-16:00		7	21	571	599
2073-05-06	16:00-17:00		9	19	534	562
2073-05-06	17:00-18:00		3	15	425	443
2073-05-06	18:00-19:00			14	341	355
2073-05-06	19:00-20:00			7	140	147
2073-05-06	20:00-21:00			2	22	24
2073-05-06	21:00-22:00				3	3
2073-05-06	22:00-23:00					
2073-05-06	23:00-24:00					
2073-05-06	24:00-1:00					
2073-05-06	1:00-2:00					
2073-05-06	2:00-3:00					
2073-05-06	3:00-4:00					
2073-05-06	4:00-5:00					
2073-05-06	5:00-6:00				10	10
<b>Day 3 Sub-total</b>		<b>0</b>	<b>76</b>	<b>367</b>	<b>6208</b>	<b>6651</b>

<b>Day 1 Sub-total</b>	0	138	548	6023	6709
<b>Day 2 Sub-total</b>	0	59	368	5959	6386
<b>Day 3 Sub-total</b>	0	76	367	6208	6651
<b>Total</b>	<b>0</b>	<b>273</b>	<b>1283</b>	<b>18190</b>	<b>19746</b>
<b>Avg Daily Traffic (ADT)</b>	<b>0</b>	<b>91</b>	<b>428</b>	<b>6063</b>	<b>6582</b>

Summary of Traffic Survey

<b>Road Section No.</b>	<b>Section Name</b>	<b>ADT</b>
1	Seti Opi Marg	1506
2	Sahayogi Marg	1390
3	Subidha Marg	1351
4	Ganesh Marg	2214
5	Simrik Marg	1007
6	Shiva Marg	245
7	Kharibot Marg	215
8	Pancheshwor Marg	560
9	Danfe Chari Marg	220
10	Thamel area (Amrit Marg, Thamel Marg, J.P. Marg)	20492
11	Swayambhu Marg	8308
12	Adwait Marg	6687
13	Jyatha Marg	4258
14	Bina Marg	249
15	Shahid Marg	945
16	Bishnumati Link Road	30853
17	Raja Birendra Marg	238
18	Pipa Gaushwara Marg	1956
19	Ghattekulo Marg	1962
20	Radhe Marg	6582

## **APPENDIX 2: Summary of ARMP**

Summary of RBN Maintenance Budget of DOR

S.N.	Fiscal Year	Total length (km)	Routine Cost	Recurrent Cost	Total Cost Rs
1	2011-2012	316.89	17741000	16589000	34330000
2	2012-2013	303.95	25655520	36450180	62105700
3	2013-2014	295.01	24747000	29397000	54144000
4	2014-2015	318.00	37395000	35476000	72871000
5	2015-2016	305.59	36126000	26561000	62687000
6	2016-2017	315.00	41270000	41860000	83130000
		1854.44			369267700

Summary of RBN Maintenance Budget of KMC

S.N.	Fiscal Year	Total length (km)	Total Cost Rs
1	2069/070	8.78	31907435.74
2	2070/071	7.55	56596025.95
3	2071/072	8.09	59445746.13
		24.42	147949207.8