Federal Democratic Republic of Nepal
Ministry of Physical Infrastructure and Transport
(MOPIT)

The Project for Introduction of Urban Transport Management in Kathmandu Valley

Project Completion Report

August 2025

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

NIPPON KOEI CO., LTD.
ALMEC Corporation

IM
JR
25-142

Table of Content

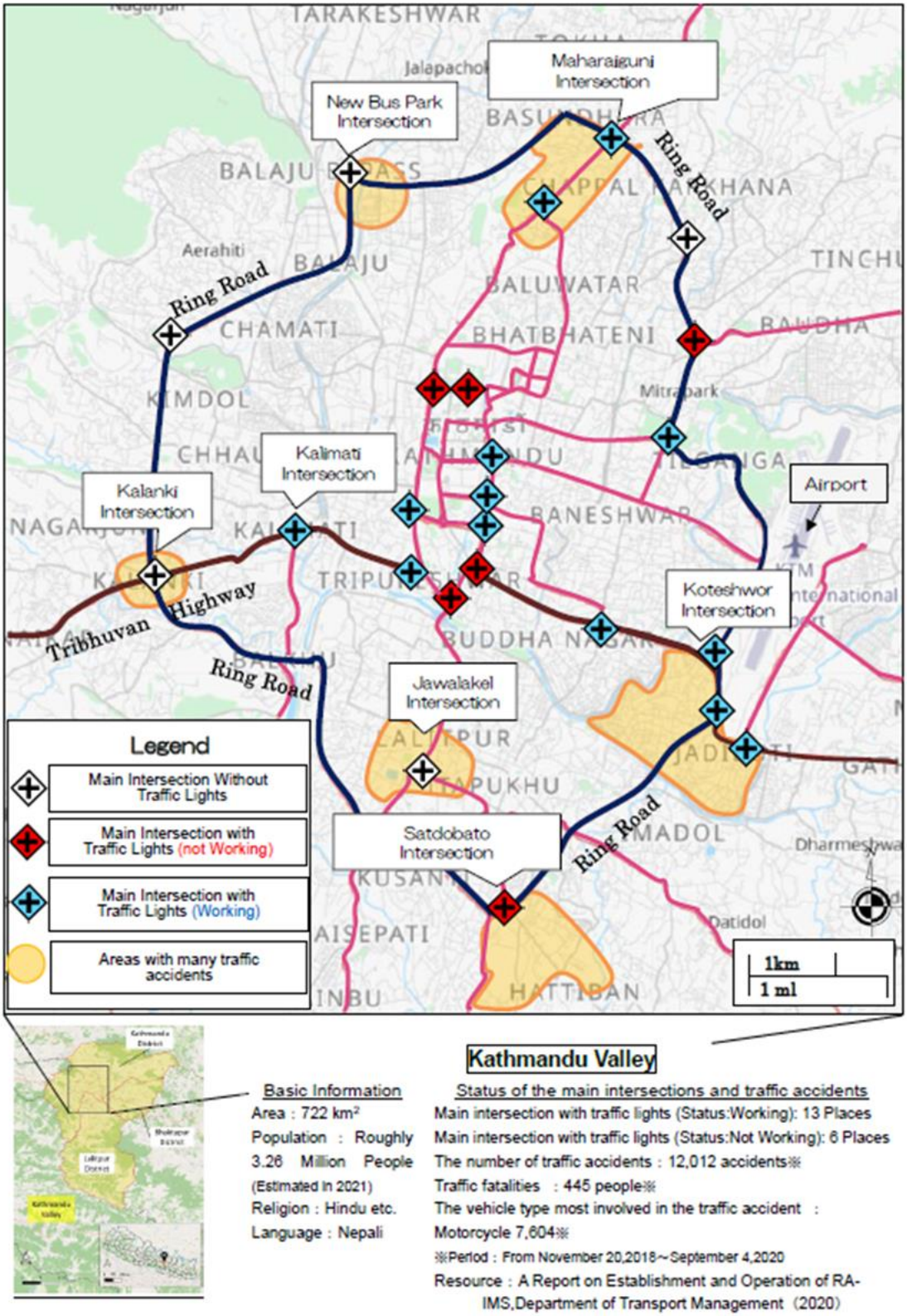
List of Figures

List of Tables

List of Abbreviations

Abbreviation	Official Name
ADB	Asian Development Bank
AGT	Automated Guideway Transit
BD	Baktapur District Bhaktapur
C/P	Counterpart
DCID	Development Cooperation Implementation Division
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DOR	Department of Roads
DOTM	Department of Transport Management
FR	Feeder Road
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
ICT	Information and Communicate Technology
ITECO	ITECO Nepal Ltd.
ITS	Intelligent Transport System
JCC	Joint Coordinating Committee
JET	JICA Expert Team
JICA	Japan International Cooperation Agency
KMC	Kathmandu Metropolitan City
KVDA	Kathmandu Valley Development Authority
KVTPO	Kathmandu Valley Traffic Police Office
LMC	Lalitpur Metropolitan City
MOPIT	Ministry of Physical Infrastructure and Transport
MP	Master Plan
NH	National Highways
NMT	Non-Motorized Transport
NPR	Nepal Rupee
NRS	Nepal Road Standard
OJT	On the Job Training
PDM	Project Design Matrix
RD	Record of Discussions
RSTU	Road Sector Training Unit
SSAGE	Space System Applications and Geospatial Engineering
TDM	Traffic Demand Management
Uj	Urban Road Major
Un	Urban Road Minor
WBS	Work Breakdown Structure
WG	Working Group

Location Map of the Central Area of Kathmandu Valley



1. Introduction

1.1 Background and Purpose

Kathmandu Valley is the capital city of Nepal and the center of population and industry. The area consists of three districts (Kathmandu Metropolitan Area), Kathmandu, Lalitpur and Bhaktapur, with an estimated population of 3.26 million in 2021. It is one of the most developed regions in Nepal (Asian Development Bank, 2018). While the population is estimated to reach 3.84 million in 2031, the area has no track-based transportation system and is heavily dependent on road transportation such as private cars, buses, and motorcycles (Asian Development Bank, 2018). In addition, the number of vehicles in Kathmandu Valley has increased in recent years due to population growth, etc., and the annual number of registered vehicles in Kathmandu Valley has increased 2.8 times from about 24,000 vehicles in 2000 to about 67,000 vehicles in 2014 (Hydro Nepal, 2016). According to an information gathering and confirmation survey conducted by the Japan International Cooperation Agency (JICA), the traffic volume at 19 of the 30 traffic survey points in Kathmandu Valley exceeded capacity from December 2011 to January 2012. Moreover, it was completely saturated at 6 out of 10 intersections. If this situation continues, it is expected that saturation will worsen at multiple intersections in 2030, and serious traffic congestion is expected to occur in the future due to population increase and increase in the number of registered vehicles (JICA, 2012 and 2019). Existing road widening, wide road formation, or large-scale intersection improvements needed to secure traffic capacity are difficult on limited road sites in the already densely populated Kathmandu Valley. Efficient operation of roads and intersections is important. On the other hand, there are problems with traffic management such as the shape of intersections, the lack of dedicated lanes for turning left and right, and the operation of inefficient traffic lights. The plans, guidelines and concrete improvement measures necessary for this have not been formulated and appropriate budget measures have not been taken. In addition, there are a wide variety of agencies involved in the transportation sector of Kathmandu Valley, and in order to properly deal with these issues, Department of Roads (DOR), Ministry of Physical Infrastructure and Transport (MOPIT), Department of Transport Management (DOTM), and local governments (Municipalities) need to improve their transport management capabilities.

So far, “The project on urban transport improvement for Kathmandu valley (Development Master Plan survey type technical cooperation, 2014-2017)” and “Data collection survey on urban transport in Kathmandu valley (2019)” have been conducted in Kathmandu Valley. Measures for improving urban transport from short-term, medium-term, and long-term perspectives have been proposed. As medium-to long-term efforts, it has been proposed to implement plans for the purpose of improving track-based transportation and large-scale improvement of intersection shapes (overpasses, etc.). On the other hand, these medium to long-term efforts require a large expenditure and long time to complete the project. Hence, the above-mentioned project and survey have been recommended to be used as the basis for facilitating road traffic in Kathmandu Metropolitan Area. It is an urgent task to formulate a plan for transport management including improvement of intersections and traffic signal operation that can be implemented in a short period of time, implement appropriate transport management measures, and strengthen cooperation with related agencies.

In response to these issues, the Nepalese government formulated the National Development Plan “The Fifteenth Plan (2019/20-2023/24)” in 2020 to realize smooth transportation flow. One of the priority area is to improve urban transportation and traffic conditions.

The Project will strengthen the capacity necessary for formulating a transport management plan focusing on facilitating road traffic in Kathmandu Valley, improving intersections, improving the operation and maintenance of traffic lights, and raising awareness of traffic safety. The aim is to strengthen these capacities, implement appropriate transport management measures and to contribute to the reduction of traffic congestion and the promotion of traffic safety in the Valley.

1.2 Project Goals and Outputs

The objective of this project is to achieve the project goal by implementing activities based on the Record of Discussions (RD) signed on March 23, 2020, and by realizing the expected outputs outlined below.

Table 1-1：Project Goals and Outputs

Overall Goal	Improvements in traffic congestion and the promotion of traffic safety will be implemented at intersections in the Kathmandu Valley.
Project Goal	Appropriate traffic management measures will be implemented to reduce traffic congestion and traffic safety.
Expected Outputs	As shown in Table 1-2.
Project Period	February 2022 – August 2025 (3 years and 6 months).

Source：JICA Expert Team

Table 1-2：Expected Outputs and Overview of Activities

Expected Outputs	Overview of Activities	
【Output-1】 Urban transport management plan is developed and there will be opportunities to coordinate with relevant authorities	1-1	Sorting out issues related to urban transport management
	1-2	Review of existing plans related to urban transport management
	1-3	Confirmation & development of traffic-related data, such as traffic congestion, traffic volume, and traffic accident
	1-4	Development of urban transport management plan, including the possibility to install ITS
	1-5	Coordination meetings with related organizations
【Output-2】 Intersection improvement capacity is enhanced	2-1	Recognition & identification of current situation and issues of road network and intersections in Kathmandu Valley
	2-2	Development of guideline for intersection improvement
	2-3	Implementation of pilot project for improvement of an existing intersection
	2-4	Local seminar & training on the guideline for improvement of intersection
	2-5	Development of intersection improvement plan by utilizing the guideline for intersection improvement
【Output-3】 The manual for improvement of operation and management of traffic lights is developed and the plan for installation and improvement of traffic lights are formulated	3-1	Clarification of issue & solution related to operation of traffic lights which have already installed
	3-2	Development of the manual for improvement of operation and management of traffic lights
	3-3	Local seminar & training on the manual for improvement of operation and management of traffic lights
	3-4	Development of a plan for installation and improvement of traffic lights
【Output-4】 Capacity to plan and implement traffic safety awareness will be strengthened	4-1	Campaign activities for compliance with traffic laws and road safety at intersections to be improved in activity 2-3
	4-2	Local seminar & training related to activity 4-1
	4-3	Expansion of campaign activities to other intersections

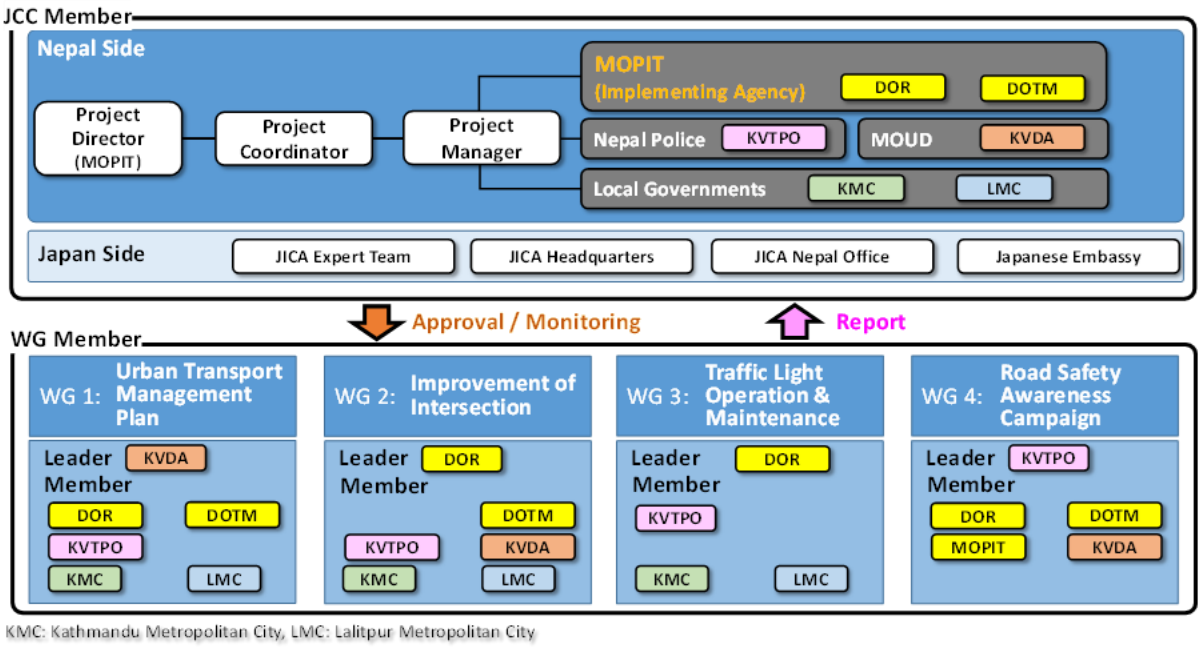
Source：JICA Expert Team

1.3 Project Area

The target area of this project is the Kathmandu Valley (Kathmandu Metropolitan Area: Kathmandu District, Lalitpur District, and Bhaktapur District).

1.4 Implementation Structure

In this project, the Department of Roads (DOR) and the Department of Transport Management (DOTM) under the Ministry of Physical Infrastructure and Transport, as shown on the Nepalese side of the JCC members in Figure 1-1, serve as implementing agencies. The Kathmandu Valley Traffic Police Office (KVTPO), the Kathmandu Valley Development Authority (KVDA), and local municipalities Kathmandu Metropolitan City (KMC) and Lalitpur Metropolitan City (LMC) serve as cooperating agencies. Working Groups (WGs) have been established for each activity under the expected outcomes, as shown in Table 1-2.



Source：JICA Expert Team

Figure 1-1：Implementation Structure

Table 1-3：JCC and WG Members of Nepalese Side

Organization	Name	Position	Remarks
MOPIT	Mr. Keshab Kumar Sharma	Project Director	Participated until May 2022
MOPIT	Mr. Shiva Prasad Nepal	Project Director	Participated from May 2022 to September 2022
MOPIT	Mr. Arjun Jung Thapa	Project Director	Participated from September 2022 to March 2024
MOPIT	Mr. Bimarjun Adhikari	Project Director	Participated from March 2024 to March 2025
MOPIT	Mr. Sushil Babu Dhakal	Project Director	Participated from March 2025
DCID	Mr. Bijaya Jaishi Hadkhale	Project Coordinator	Participated from March 2023 to July 2025

DOTM	Mr. Uddhav Prasad Rijal	Project Coordinator	Participated from March 2024 to March 2025
DOTM	Mr. Rajeev Pokharel	Project Coordinator	Participated from March 2025
DCID	Mr. Arjun Prasad Aryal	Project Coordinator	Participated from July 2025
DOR	Mr. Bel Bahadhur Bhujel	Project Manager, WG1, WG2, WG3, WG4	Participated until September 2022
DOR	Mr. Prakash Chandra Bhandari	Project Manager, WG1, WG2, WG3, WG4	Participated from September 2022 to March 2025
DOR	Mr. Rakesh Maharjan	Project Manager, WG1, WG2, WG3, WG4	Participated from March 2025
KVDA	Mr. Sourab Dhakal	WG1, WG2, WG4	Participated from September 2022
DOTM	Mr. Ram Chandra Poudel	WG1, WG2, WG4	Participated until August 2024
DOTM	Mr. Srikanth Yadav	WG1, WG2, WG4	Participated from August 2024
KVTPO	Mr. Rajendra Prasad Bhatta	WG1, WG2, WG3, WG4	Participated until March 2024
KVTPO	Mr. Jeevan Kumar Shrestha	WG1, WG2, WG3, WG4	Participated from March 2024 to March 2025
KVTPO	Mr. Dipak Giri	WG1, WG2, WG3, WG4	Participated from July 2025
KMC	Mr. Ram Bahadur Thapa	WG1, WG2, WG3	Participated until March 2024
KMC	Mr. Suraj Shakya	WG1, WG2, WG3	Participated from March 2024
LMC	Mr. Shreekumar Maharjan	WG1, WG2, WG3	Participated until August 2024
LMC	Mr. Shree Kumar Maharjan	WG1, WG2, WG3	Participated from July 2025
MOPIT	Mr. Sunil Babu Pant	WG4	Participated until March 2024
MOPIT	Mr. Arjun Suwal	WG4	Participated from March 2024

Source：JICA Expert Team

Table 1-4：JICA Expert Team Members

Organization	Name	Position	Remarks
Nippon Koei Co., Ltd.	Mr. Hideo Tsuji	Team Leader / Urban Transport Management 1	
Nippon Koei Co., Ltd.	Mr. Hisanari Ushirooka	Deputy Team Leader / Urban Transport Management 2	
Nippon Koei Co., Ltd.	Mr. Yuki Sugiyama	Transportation Planning	
ALMEC Corporation	Mr. Takeshi Saito	Intersection Improvement 1 （Planning）	
Nippon Koei Co., Ltd.	Mr. Takayasu Nagai	Intersection Improvement 1 （Operation）	

Nippon Koei Co., Ltd.	Mr. Naresh Sthapit	Intersection Improvement 2	
Nippon Koei Co., Ltd.（Japan Traffic Management Technology Association）	Mr. Susumu Miyata	Traffic Lights Operation 1	Participated until March 2024
Nippon Koei Co., Ltd.（Japan Traffic Management Technology Association）	Mr. Kazuhide Takizawa	Traffic Lights Operation 1	Participated from April 2024
Nippon Koei Co., Ltd.（Nissin Electronic Service Co., Ltd.）	Mr. Ichiro Hayashi	Traffic Lights Operation 2	Participated from December 2022
ALMEC Corporation	Mr. Osamu Abe	Road Safety 1 / Behavior Transformation	
ALMEC Corporation	Ms. Ananya Roy	Road Safety 2 / Gender	Participated until January 2023
ALMEC Corporation	Mr. Kenta Ohono	Road Safety 2 / Gender	Participated from February 2023 to January 2024
ALMEC Corporation	Mr. Chen-Wei Li	Road Safety 2 / Gender	Participated from February 2024
Nippon Koei Co., Ltd.	Mr. Keita Hirayanagi	Monitoring, Evaluation, & Training for Capacity Development	Participated until June 2023
Nippon Koei Co., Ltd.	Mr. Shogo Iso	Monitoring, Evaluation, & Training for Capacity Development	Participated from July 2023 to January 2025
Nippon Koei Co., Ltd.	Mr. Yuki Sasaki	Monitoring, Evaluation, & Training for Capacity Development	Participated from February 2025
Nippon Koei Co., Ltd.（SSAGE）	Mr. Akhilesh Kumar Karna	Digital Transformation / Seminar & Training	

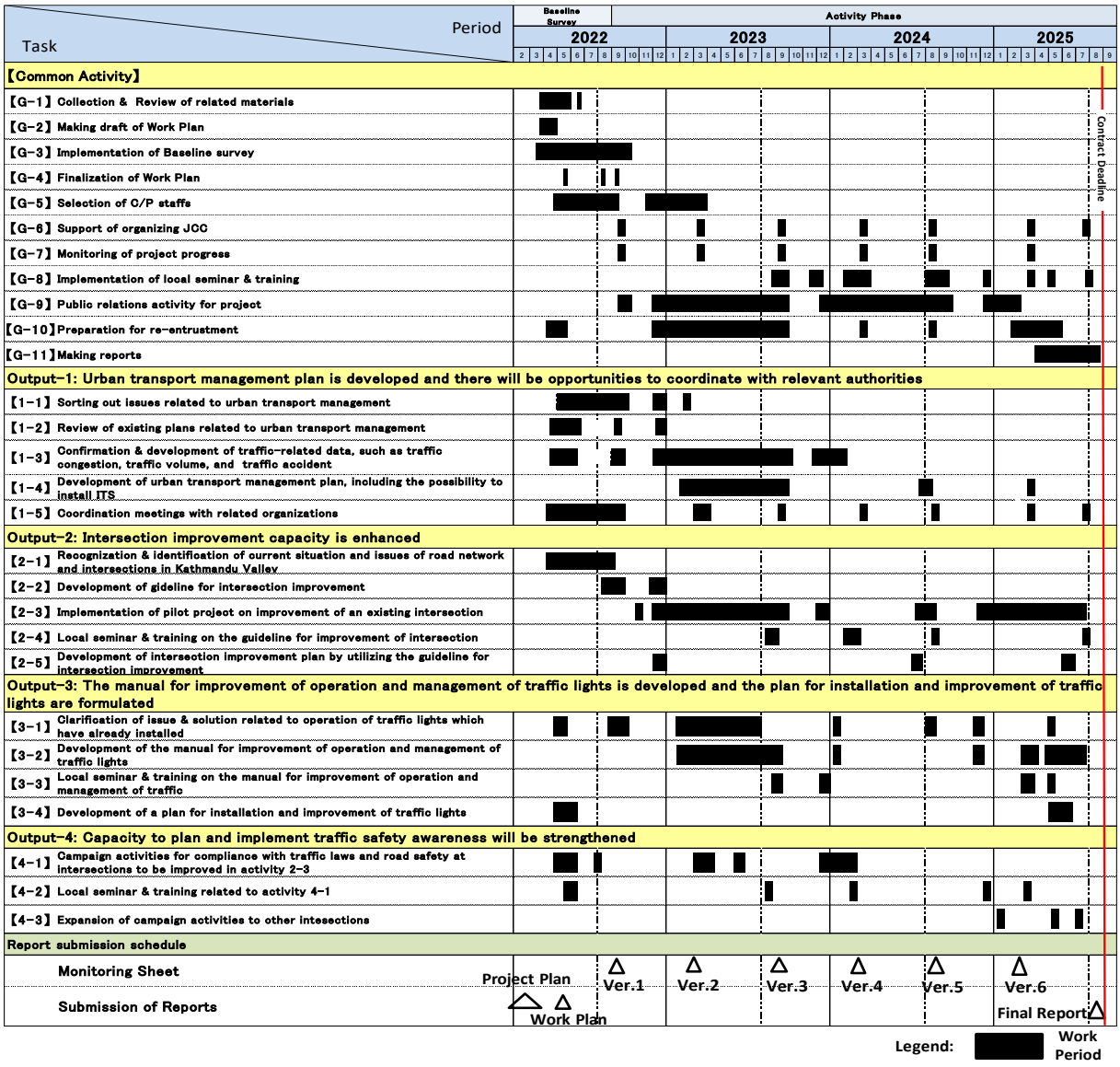
Source：JICA Expert Team

2. Project Implementation

2.1 Project Schedule

The implementation schedule of the project is shown in Table 2-1. This project commenced in February 2022 and will be completed in August 2025.

Table 2-1 : Project Schedule

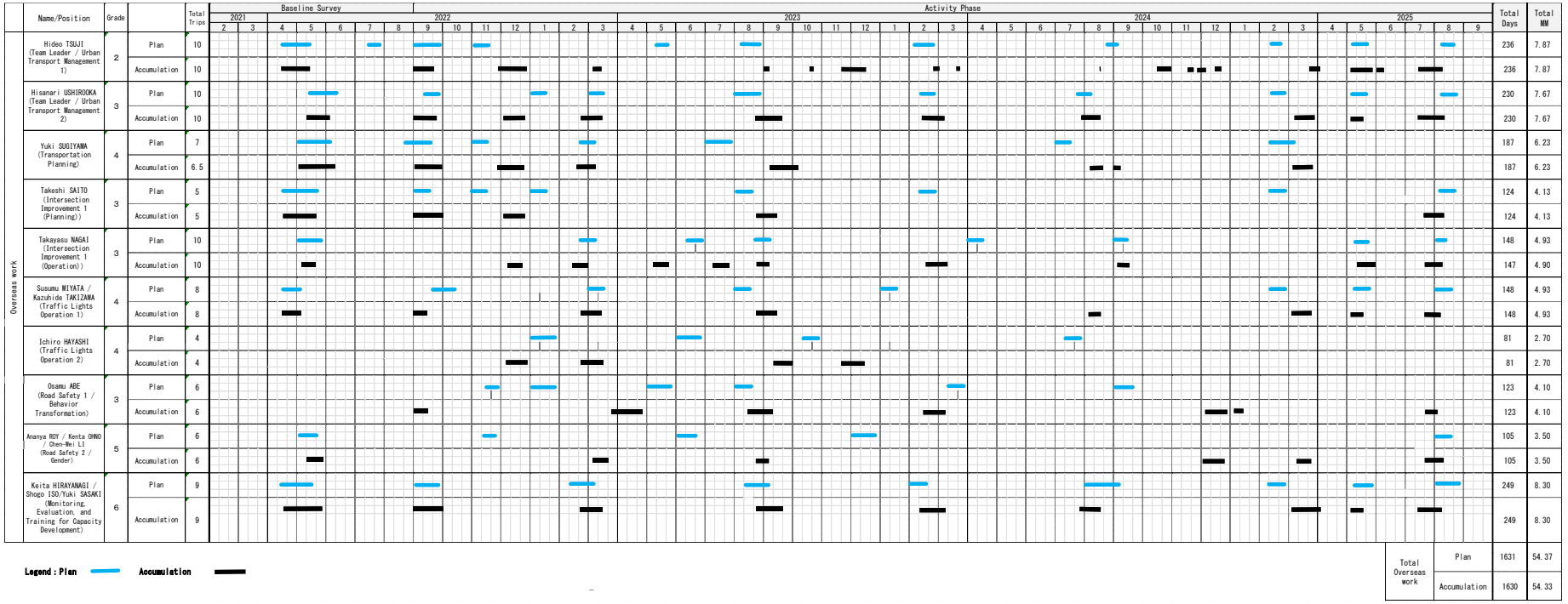


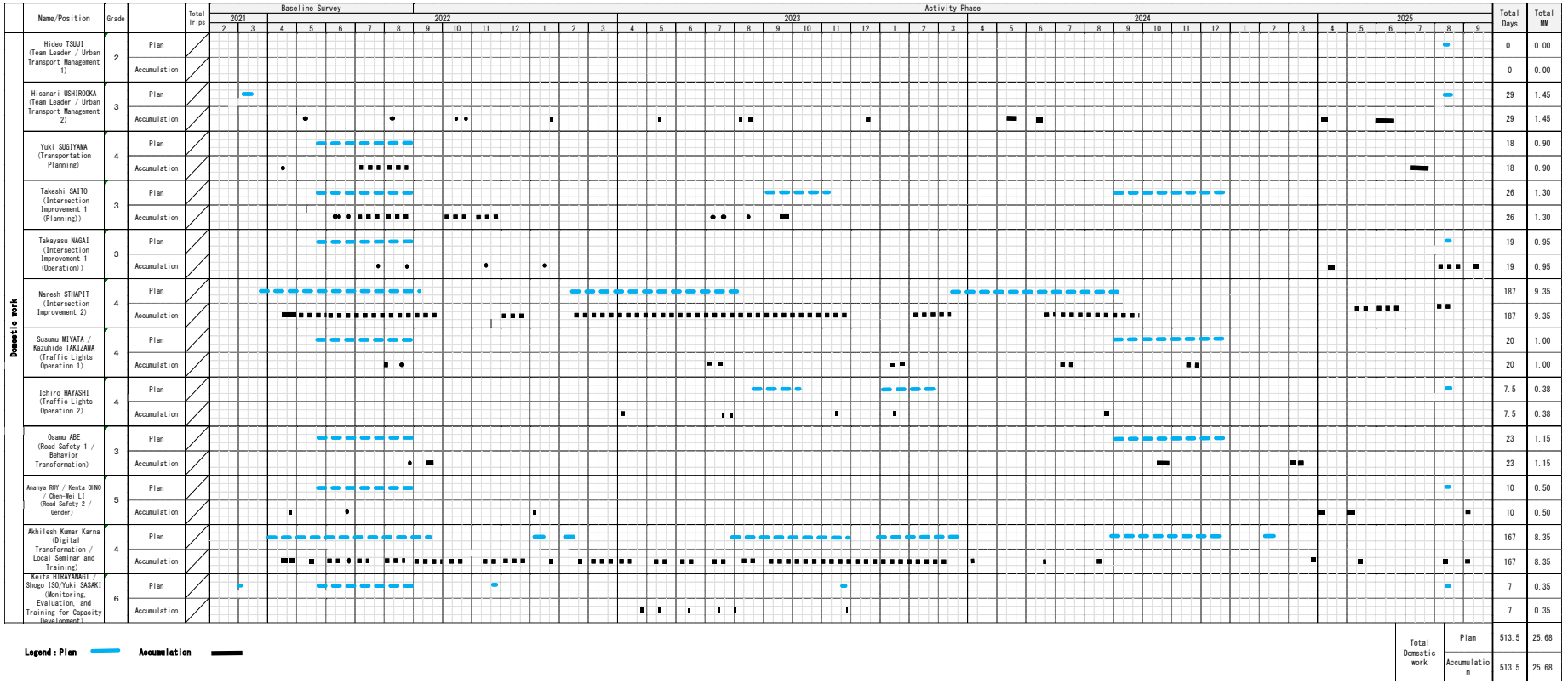
Source : JICA Expert Team

2.2 Assignment Schedule

The assignment schedule is shown in Table 2-2.

Table 2-2 : Assignment Schedule





Name/Position	Grade		Total Days	Total MM
Hideo TSUJI (Team Leader / Urban Transport Management 1)	2	Plan	0	0.00
		Accumulation	0	0.00
Hisanari USHIROOKA (Team Leader / Urban Transport Management 2)	3	Plan	29	1.45
		Accumulation	29	1.45
Yuki SUGIYAMA (Transportation Planning)	4	Plan	18	0.90
		Accumulation	18	0.90
Takeshi SAITO (Intersection Improvement 1 (Planning))	3	Plan	26	1.30
		Accumulation	26	1.30
Takayasu NAGAI (Intersection Improvement 1 (Operation))	3	Plan	19	0.95
		Accumulation	19	0.95
Naresh STHAPIT (Intersection Improvement 2)	4	Plan	187	9.35
		Accumulation	187	9.35
Susumu MIYATA / Kazuhide TAKIZAWA (Traffic Lights Operation 1)	4	Plan	20	1.00
		Accumulation	20	1.00
Ichiro HAYASHI (Traffic Lights Operation 2)	4	Plan	7.5	0.38
		Accumulation	7.5	0.38
Osamu ABE (Road Safety 1 / Behavior Transformation)	3	Plan	23	1.15
		Accumulation	23	1.15
Ananya ROY / Kenta OHNO / Chen-Wei LI (Road Safety 2 / Gender)	5	Plan	10	0.50
		Accumulation	10	0.50
Akhilesh Kumar Karna (Digital Transformation / Local Seminar and Training)	4	Plan	167	8.35
		Accumulation	167	8.35
Keita HIRAYANAGI / Shogo ISO/Yuki SASAKI (Monitoring, Evaluation, and Training for Capacity Development)	6	Plan	7	0.35
		Accumulation	7	0.35
Total Domestic work		Plan	513.5	25.68
		Accumulation	513.5	25.68

Source: JICA Expert Team

3. General Activities

The activities related to the entire project are shown below. This project began in February 2022 and will be completed in August 2025.

3.1 Preparation of the Draft Work Plan

After reviewing and analyzing the RD, relevant laws and regulations, previously disclosed documents, request forms, and other related materials, and understanding the current situation, issues, and needs of the Nepalese side, as well as the overall picture of the project, a work plan (draft) were prepared. The work plan was shared with JICA before the first trip.

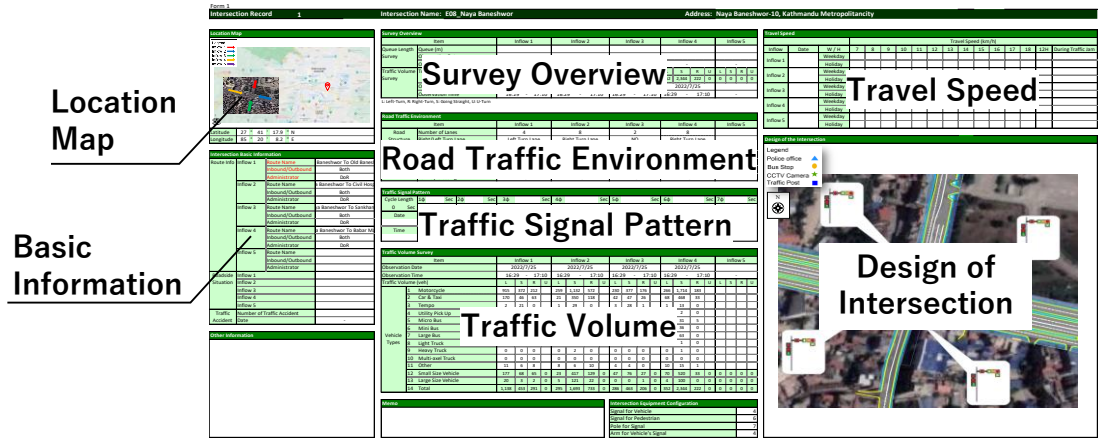
3.2 Implementation of the Baseline Survey

A baseline survey was conducted during the first six months of operations. Specifically, traffic volume surveys were conducted at 107 intersections shown in Table 3-1 and organized as shown in Figure 3-1. In addition, a GPS tracker survey, shown in Table 3-2, was conducted to collect travel speed data of major roads in the Kathmandu Valley by time of day, and the results were reported at the first meeting of the Joint Coordinating Committee (JCC) held on September 21, 2022, and were also updated to a cloud database (Google Drive) and shared with relevant agencies (MOPIT, DOR, DOTM, KVTPO, KVDA, KMC, and LMC).

Table 3-1：Intersections Covered in the Baseline Survey (107 intersections)

SN	Name	Location	SN	Name	Location	SN	Name	Location	SN	Name	Location	SN	Name	Location	SN	Name	Location
1	R01	Kalanki	19	E03	Kalimati-1	37	E21	Sallaghari Tinkune	55	N14	Kupandole	73	U11	Nagpokhari	91	U29	Naxal Bhagwati
2	R02	Balkhu1	20	E04	Kalimati-2	38	E22	Sallaghari East	56	N15	Chakupat	74	U12	Jaya Nepal	92	U30	Kamal Pokhari
3	R03	Balkhu2	21	E05	Teku	39	E23	Ghalate Tol	57	N16	Mantri Qtr/Harihar Bhawan	75	U13	Hattisar	93	U31	Charkhal
4	R04	Ekantakuna2	22	E06	Maitighar	40	E24	Pandu Bazaar	58	N17	Pulchok1	76	U14	Hattisar/Kamal Pokhari	94	U32	Kalikasthan
5	R05	Chapagau Dobato	23	E07	Babar Mahal DOR Chowk	41	E25	Suryabinayak	59	N18	Pulchok2	77	U15	Kathmandu Plaza	95	U33	Anamnagar
6	R06	Satdobat	24	E08	Naya Baneshwor	42	N01	Galfutar	60	N19	Pulchok3	78	U16	Kamaladi	96	U34	Sano Gaucharan
7	R07	Gwarko	25	E09	Civil Hospital Mid Block	43	N02	Teaching/Kanti Hospital	61	N20	Jawalakhel	79	U17	Dilli Bazar/Putali Sadak	97	U35	Gyaneshwor
8	R08	Koteshwor	26	E10	Tinkune1	44	N03	Shital Niwas	62	N21	Ekantakuna1	80	U18	Padmodaya1	98	U36	Maitidevi1
9	R09	Tinkune2	27	E11	Jadibuti	45	N04	Lainchaur North/Lazimpat	63	U01	Sorakhutte North	81	U19	Padmodaya2/Anamnagar North	99	U37	Maitidevi2
10	R10	Tinkune3	28	E12	Manohara	46	N05	Lainchaur	64	U02	Sorakhutte	82	U20	Singha Durbar	100	U38	Siphal
11	R11	Sinamangal	29	E13	Lokanthali	47	N06	Keshar Mahal	65	U03	Galkopakha Chowk	83	U21	Gairidhara	101	U39	Purano Baneshwor
12	R12	Airport	30	E14	Kaushaltar	48	N07	Jamal	66	U04	Royal Palace South Gate	84	U22	Naxal	102	U40	Jorpati
13	R13	Gaushala	31	E15	Gathaghar	49	N08	Bhotahiti	67	U05	Mahendra Statue/Tindhara	85	U23	Narayanchaur	103	U41	Sanepa
14	R14	Mitrapark	32	E16	Sanothimi	50	N09	Bir Hospital	68	U06	Trichandara/Kamaladi	86	U24	Baluwatar1	104	U42	Summit Hotel
15	R15	Guheshwori	33	E17	Thimi	51	N10	New Road	69	U07	Ratnapark	87	U25	Baluwatar2	105	U43	Jhamshikehl Chowk
16	R16	Chabahil	34	E18	Thimi Bypass	52	N11	Sundhara	70	U08	Exhibition Road	88	U26	Naxal Bhatbhateni	106	U44	Jhamshikhel
17	E01	Chandragiri	35	E19	Shyamadham	53	N12	Tripureshwor	71	U09	Bhadrakali	89	U27	Tangal	107	U45	Dhobighat
18	E02	Soalteemod	36	E20	Sallaghar West	54	N13	Thapathali	72	U10	Tukucha Chowk	90	U28	Police HQ			

Source: JICA Expert Team



Source: JICA Expert Team

Figure 3-1：Intersection Inventory Survey Contents

Table 3-2：GPS Tracker Survey Overview

	Contents	Remark
Target	21 buses 84 taxis	Total: 105 vehicles
Period	3 weeks	2022/7/18 - 8/9
Data acquisition interval	Every 5 minutes	

Source: JICA Expert Team

3.3 Finalization of the Work Plan

During the first trip, the draft work plan was explained to the relevant organizations and the contents of the project were agreed upon. At the first JCC meeting, the purpose and objectives of the technical cooperation project and the Project Design Matrix (PDM) were also explained and approved.

3.4 Selection and Finalization of Counterpart Personnel

After the start of project activities, MOPIT was requested to select a project manager, coordinator, and counterpart (C/P) as the project implementation structure, and the staff of relevant organizations to be members of the WG were requested to be appointed from appropriate departments of relevant organizations at the first JCC meeting. The WG members were appointed after the 1st JCC.

3.5 Organization of the JCC Meeting

The JICA expert team supported the JCC to be held every 6 months under the hosting of MOPIT. The team also assisted the Nepalese side in preparing materials and minutes and coordinating the meetings so that the Nepalese side could grasp and share the results of each WG and appropriately coordinate with related organizations and build consensus for the project implementation. The outline of the JCC meetings is shown in Table 3-3.

Table 3-3：JCC Meeting Overview

	Date	Agenda
1st	Sep 21, 2022	・Working Groups and Baseline Survey Results
2nd	Mar 9, 2023	・Pilot Project Plan at New Baneshwor Intersection and Baseline Survey Results
3rd	Sep 4, 2023	・Progress Report on the Pilot Project at Naya Baneshwor ・Report on Plans and Activities Related to the Technical Working Groups (TWG)
4th	Mar 1, 2024	・Implementation Status and Evaluation Report of the Pilot Project at Naya Baneshwor Intersection ・Sharing of the Pilot Project Plan at Lainchaur Intersection ・Report on Other Activities and Plans
5th	Aug 15, 2024	・Information Sharing and Discussion on the Progress of Various Project-Related Tasks
6th	Mar 25, 2025	・Progress Report on the Pilot Project at Lainchaur Intersection ・Traffic Signal Synchronisation at Lainchaur and Adjacent Intersections ・Sharing of Drafts of the Three Deliverables (Urban Transport Management Plan, Intersection Improvement Guideline, and Traffic Signal Operation & Maintenance Manual) and Collection of Feedback

		・Progress Report and Discussion on Other Project Tasks
7th	Aug 30, 2025	・Report on Lainchaur Intersection Pilot Project Results ・Introduction and approval of the Urban Transport Management Plan, Intersection Improvement Guidelines, and Traffic Light Operation and Maintenance Manual ・Report on project achievement

Source: JICA Expert Team

3.6 Implementation of Project Monitoring

A monitoring sheet and Work Breakdown Structure (WBS) were prepared. Monitoring Sheets were prepared every six months after the start of the project to monitor and organize the progress of activities and achievement of results, and were submitted to the JICA Nepal Office after discussion and approval by the JCC.

Table 3-4：Project Monitoring Overview

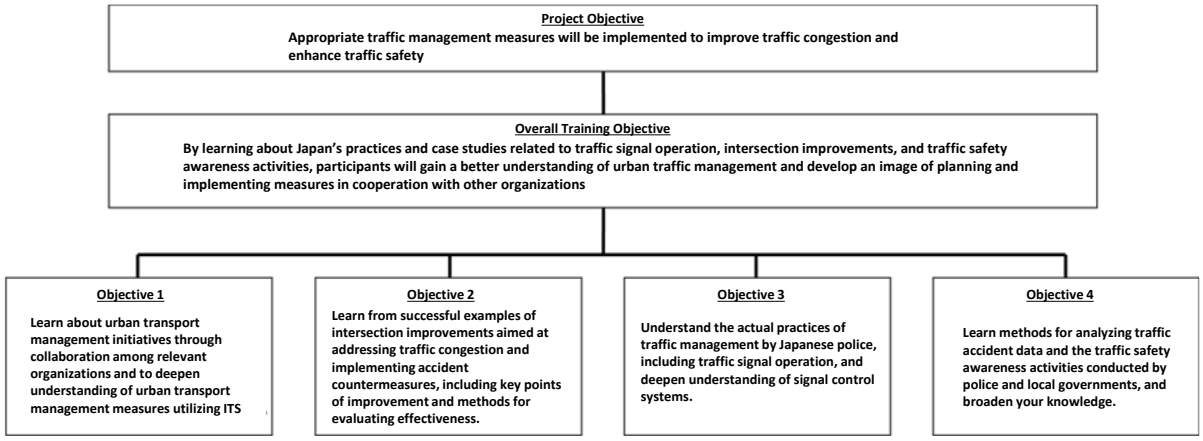
	Date	Approval
Ver.1	Sep 21, 2022	1st JCC
Ver.2	Mar 9, 2023	2nd JCC
Ver.3	Sep 4, 2023	3rd JCC
Ver.4	Mar 1, 2024	4th JCC
Ver.5	Aug 15, 2024	5th JCC
Ver.6	Mar 25, 2025	6th JCC

Source: JICA Expert Team

3.7 Implementation of Training and Seminars

3.7.1 Training in Japan

A total of two trainings in Japan were conducted to achieve the project goals as shown in Figure 3-2 with four objectives matched to each activity. A summary of each training session is shown below.



Source: JICA Expert Team

Figure 3-2：Goals of Training in Japan

(1) Overview of First Training in Japan

The first training in Japan was held from January 17 to January 27, 2023, for 10 nights and 11 days, with the training program shown in Table 3-5. The eight participants are shown in Table 3-6.

Table 3-5 : Training Program

Date	Program
Jan 17, 2023 (Tue)	[Transfer] Kathmandu → Singapore
Jan 18, 2023 (Wed)	[Transfer] Singapore → Narita, Narita Airport → Yokohama City Hotel
Jan 19, 2023 (Thu)	[Briefing Session] Briefing by JICA Training Management Staff [Observation] Cooperation with other related organizations in traffic management, observation of traffic control system in the capital city [Observation] Test ride of AGT and Linear Metro
Jan 20, 2023 (Fri)	[Lecture] Lecture on ITS-related Projects and Case Studies in Developing Countries [Lecture] Case studies of urban transportation projects in developing countries [Lecture] Lectures on urban transportation policies of local governments (urban transportation planning, cooperation with other organizations, etc.)
Jan 21, 2023 (Sat)	[Observation] Observation of road conditions in the Tokyo Bay area
Jan 22, 2023 (Sun)	[Transfer] Shin-Yokohama → Kyoto (Shinkansen)
Jan 23, 2023 (Mon)	[Observation/Lecture] Observation of an expressway control center [Lecture/observation] Lecture on intersection improvement for countermeasures against traffic congestion and traffic safety, and observation of intersection improvement sites [Transfer] Shin-Osaka → Tokyo (Shinkansen)
Jan 24, 2023 (Tue)	[Lecture] Lecture on traffic accident data analysis [Lecture] Lecture on Japanese traffic safety policy and traffic safety education [Meeting] Meeting with members of JICA Headquarters
Jan 25, 2023 (Wed)	[Lecture] Lecture on operation and maintenance of traffic signals in developing countries, factory observation [Lecture] Lecture on traffic safety awareness activities by police [Observation] Traffic control system in a medium-sized city, observation of traffic light operation by police
Jan 26, 2023 (Thu)	[Presentation] Report on the results of the training
Jan 27, 2023 (Fri)	[Transfer] Tokyo hotel → Narita Airport, Narita → Singapore → Kathmandu

Source: JICA Expert Team

Table 3-6 : Training Participants

Name	Position	Belong to
Mr. Thapa Ram Bahadur	Department Chief	Public Work Department, Kathmandu Metropolitan City Office
Mr. Dhakal Saurab	Engineer	Planning Department, Kathmandu Valley Development Authority
Mr. Pokhrel Ram Hari	Deputy Director General	Department of Roads, Ministry of Physical Infrastructure and Transport, Department of Roads
Mr. Maharjan Shreekumar	Senior Engineer	Urban Development and Planning Department, Lalitpur Metropolitan City

Mr. Gautam Tulsi Nath	Joint Secretary	Department of Administration, Ministry of Physical Infrastructure and Transport
Mr. Bista Kshetry Abadesh	Superintendent of Police	Kathmandu Valley Traffic Polie Office, Nepal Police
Mr. Nepal Shiva Prasad	Joint Secretary	Development Assistance Coordination and Quality Control, Ministry of Physical Infrastructure and Transport
Mr. Pandey Toka Raj	Director General	Department of Transport Management

Source: JICA Expert Team

(2) Overview of Second Training in Japan

The second training in Japan was held from May 21 to May 31, 2024, for 10 nights and 11 days, with the training program shown in Table 3-7. The eight participants are shown in Table 3-8.

Table 3-7：Training Program

Date	Program
May 21, 2024 (Tue)	[Transfer] Kathmandu → Haneda
May 22, 2024 (Wed)	[Transfer] Kathmandu → Haneda, Haneda Airport→JICA Tokyo Center
May 23, 2024 (Thu)	[Briefing Session] Briefing by JICA Training Management Staff [Observation] Observation of the capital's traffic control system [Observation] Test ride of AGT and Linear Metro
May 24, 2024 (Fri)	[Observation] Observation of traffic control systems on inter-city expressways [Lecture] Lecture on ITS-related projects and case studies in developing countries [Discussion:]Visit to JICA headquarters to exchange opinions
May 25, 2024 (Sat)	[Holiday] Visits to Tokyo
May 26, 2024 (Sun)	[Transfer] Tokyo → Kyoto (Shinkansen) [Holiday] Tour of Kyoto City
May 27, 2024 (Mon)	[Observation/Lecture] Observation of an expressway control center [Lecture/observation] Lecture on intersection improvement for countermeasures against traffic congestion and traffic safety, and observation of intersection improvement sites [Transfer] Shin-Osaka→Tokyo (Shinkansen)
May 28, 2024 (Tue)	[Lecture] Lecture on traffic accident data analysis [Observation] Lecture on traffic signal operation, observation
May 29, 2024 (Wed)	[Observation] Observation of the traffic system of the expressway in the city [Lecture] Lecture on traffic safety awareness activities by the police [Observation] Observation of traffic control system in a medium-sized city and operation of traffic lights by the police
May 30, 2024 (Thu)	[Presentation] Report on the results of the training
May 31, 2024 (Fri)	[Transfer] JICA Tokyo Center → Haneda Airport, Haneda → Kathmandu

Source: JICA Expert Team

Table 3-8：Training Participants

Name	Position	Belong to
Mr. Bimarjun Adhikari	Joint Secretary	Ministry of Physical Infrastructure and Transport (MOPIT)
Mr. Arjun Prasad Aryal	Superintending Engineer	Department of Roads (DOR), Ministry of Physical Infrastructure and Transport (MOPIT)
Mr. Bel Bahadur Bhujel	Joint Secretary	Department of Roads (DOR), Ministry of Physical Infrastructure and Transport (MOPIT)

Mr. Govinda Dumaru	Senior Divisional Engineer	Department of Roads (DOR), Ministry of Physical Infrastructure and Transport (MOPIT)
Mr. Narhari Tiwari	Director	Department of Transport Management (DOTM), Ministry of Physical Infrastructure and Transport (MOPIT)
Mr. Sunil Jung Shah	Deputy Superintendent of Police	Kathmandu Valley Traffic Police Office (KVTPO), Nepal Police
Ms. Januka Dhakal	Development Commissioner	Kathmandu Valley Development Authority (KVDA)
Mr. Pratik Shrestha	Engineer	Kathmandu Metropolitan City (KMC)

Source: JICA Expert Team

3.7.2 Implementation of Seminars and Training in Nepal

Seminars and training were held to promote the guidelines and manuals developed by the project and to conduct traffic safety awareness activities. A summary of the seminars and training sessions is shown in Table 3-9.

The seminar was targeted for high-ranking officers of the relevant organizations, with the aim of disseminating the guidelines, manuals, and traffic safety awareness programs widely within the concerned organizations, ensuring their official status and their continuous use. On the other hand, the training is intended to deepen the understanding of those in charge of practical work and encourage them to apply the guidelines in their actual work.

Table 3-9：Overview of Seminars and Training in Nepal

SN	Date	WG	Contents	Participants
1	August 30, 2023	4	【Seminar】 ・Introduction of the Urban Transport Management Project in Kathmandu Valley ・Introduction of Road Safety Awareness Activities in the Pilot Project ・Overview of Road Safety Awareness Activities by KVTPO in Nepal ・Global Examples of Road Safety Awareness Activities (including Japan) ・Road Safety Awareness Activities from a Gender Perspective	KVTPO, KMC, JET
2	September 7, 2023	2	【Seminar】 ・Introduction of the Intersection Improvement Guideline ・Identification of Issues at the Pilot Intersection ・Presentation of Solutions	DOR, RSTU, KVTPO KMC, JET
3	September 8, 2023	2	【Training】 ・Lecture on Issues at the Pilot Intersection ・Presentation of Solutions ・Field Observation at the Pilot Intersection	MOPIT, DOR, RSTU, KMC, JET
4	September 19, 2023	3	【Seminar】 ・Identification of Traffic Signal Issues ・Basics of Signal Control ・Suggestions for Signal Operation Improvement ・Signal Operation Methods at the Pilot Intersection ・Simulation of Signal Cycle	DOR, RSTU, LMC, KVTPO, JET
5	September 26, 2023	3	【Training】 ・Objectives and Overview of Signal Operation at the Pilot Intersection ・Introduction to Signal Operation Methods ・Practical Training Using CCTV for Signal Operation	KVTPO, JET
6	November 29, 2023	3	【Training】 ・Objectives and Overview of Signal Operation at the Pilot Intersection	KVTPO, JET

			・Introduction to Signal Operation Methods ・Practical Training Using CCTV for Signal Operation	
7	February 26, 2024	4	【Training】 ・Overview of Road Safety Awareness in the Pilot Project ・Results of Behavior Change Survey ・Road Safety Awareness Based on National Action Plan ・How to Plan Awareness Activities ・Group Work and Presentations ・Future Activity Planning	KVTPO, JET
8	March 5, 2024	2	【Seminar】 ・Purpose and contents of the guideline ・Introduction of the intersection improvement procedures in the pilot project (preparation phase, basic design, detailed design, traffic safety awareness activities, and impact assessment)	RSTU, KMC, LMC, ITECO Nepal, JET
9	March 5, 2024	2	【Training】 ・Purpose and contents of the guideline ・Basics of geometric design (lane modification, introduction of right-turn lanes, channelization, stop line positioning, etc.) ・Field visit to the pilot intersection	RSTU, KMC, LMC, ITECO Nepal, JET
10	August 13, 2024	1	【Seminar】 ・Analysis of traffic issues in the Kathmandu Valley ・Setting goals for urban transport management ・Introduction of the draft Urban Transport Management Plan	KVDA, KVTPO, DOR, RSTU, KMC, LMC, JET
11	September 12, 2024	2	【Training】 ・Purpose and contents of the guideline ・Basic principles of design (intersection design standards, traffic volume parameters, etc.) ・Individual design elements (right-turn lanes, channelization, pedestrian crossings, traffic control, and safety)	DOR, RSTU, DOTM, ITECO, LMC, JET
12	December 19, 2024	4	【Seminar】 ・Overview of urban transport management ・Latest activities of KVTPO related to policies and the pilot project ・Case studies of effective traffic safety awareness campaigns ・Planning of traffic safety awareness activities ・Comprehension quiz	KVTPO, MOPIT, DOR, KVDA, JICA Nepal Office, JET
13	March 21, 2025	3	【Training】 ・Overview and operation of traffic signal control ・Explanation of traffic signal operation by traffic police officers	KVTPO, RSTU, JET

14	March 24, 2025	4	【Training】 ・Explanation of pilot project preparation status ・Lecture on law enforcement and accident reduction ・Importance of gender mainstreaming and introduction of international case studies	KVTPO, RSTU, JICA Volunteer, JET
15	May 9, 2025	3	【Seminar】 ・Explanation of traffic signal synchronization at the pilot intersections ・Introduction to traffic signal operation methods at the pilot intersections	KVTPO, Paaila Technology, JET
16	July 28, 2025	2	【Seminar】 ・Finalize intersection improvement guidelines	DOR, JET
17	July 31, 2025	4	【Seminar】 ・Observation of road safety awareness activities and changes after the Lainchaur intersection improvement project ・Questionnaire survey results and implications for road safety awareness activities in Kathmandu Valley	KVTPO, JICA Volunteer, JET
18	August 4, 2025	1, 2, 3, 4	【Seminar】 ・Outline of project ・Pilot Project at Naya Baneshwor Intersection ・Pilot Project at Lainchaur Intersection ・Introduction to Plan, Guidelines and Manual	MOPIT, DOR, DOTM, KVDA, LMC, ADB, World Bank, Bhaktapur Road Division, ITECO, Aviyaan, KVTPO , JICA Nepal office, JICA Volunteer, JET, JET among others.

Source: JICA Expert Team

3.7.3 Implementation of OJT in Nepal

On-the-job training for intensive collaborative work was conducted for WG members in order to provide them with the skills and experience necessary to study urban transportation management plans, guidelines, and manuals, as well as to plan, design, construct, and operate the pilot project (Table 3-10).

Table 3-10：Overview of OJT in Nepal

SN	Date	WG	Contents	Participants
1	September 15, 2023	1	【OJT】 ・Lecture on how to use the cloud system	KVDA, DOTM, KMC, LMC, JET

			・Lecture on prioritization assessment using Excel ・Practical training on visualizing assessment results using QGIS	
2	November 30, 2023	3	【OJT】 ・Practical training on traffic signal operation using CCTV cameras at the traffic control room	KVTPO, JET
3	December 8, 2023	3	【OJT】 ・Practical training on traffic signal operation using CCTV cameras at the traffic control room	KVTPO, JET
4	February 21, 2024	4	【OJT】 Collection of feedback from traffic police on the following topics: ① Intersection improvement ② Improvement of traffic signal operation ③ Traffic safety awareness activities	KVTPO, JET
5	March 5, 2024	2	【OJT】 ・Observation of the current situation at Kalimati and Kamal Pokhari intersections ・Examination of improvement points for Kalimati and Kamal Pokhari intersections using the guideline ・Preparation of improvement proposals	RSTU, JET
6	March 26, 2024	1	【OJT】 ・Learning the basic knowledge of GIS ・Understanding the main functions and applications of GIS ・Hands-on training on QGIS operation	KVDA, RSTU, KMC, KVTPO, MOPIT, LMC, JET
7	March 27, 2024	1	【OJT】 ・Basics and practical use of GNSS (Global Navigation Satellite System) ・Utilization of traffic accident data ・Learning visualization techniques (graphing and mapping)	KVDA, RSTU, KMC, KVTPO, MOPIT, JET
8	August 7, 2024	3	【OJT】 ・Sharing the latest design updates of the pilot intersection ・Discussion on traffic signal synchronization	RSTU, JET
9	August 22, 2024	2	【OJT】 ・Explanation of the updated pilot project intersection design based on the feedback from the 5th JCC	RSTU, JET
10	September 12, 2024	2	【OJT】 ・Purpose and structure of the guideline ・Fundamentals of planning and design (intersection design standards)	DOR, RSTU, ITECO, LMC, JET

			・Design traffic parameters, cross-section and entry elements ・Design and installation methods for right-turn lanes ・Design related to channelization, pedestrian crossings, traffic control, and traffic safety	
11	May 19, 2025	3	【OJT】 ・Explanation of traffic signal synchronization at the pilot intersection ・Practical training on traffic signal operation	KVTPO, JET
12	May 20, 2025	3	【OJT】 ・Explanation of traffic signal synchronization at the pilot intersection ・Practical training on traffic signal operation	KVTPO, JET
13	May 20, 2025	1	【OJT】 ・Field observation and explanation of traffic surveys (travel speed, queue length, and directional traffic volume)	RSTU, JET
14	May 21, 2025	3	【OJT】 ・Explanation of traffic signal synchronization at the pilot intersection ・Practical training on traffic signal operation	KVTPO, JET
15	June 13, 2025	1	【OJT】 ・Training in GNSS tracking and speed visualization using GIS	KVDA, RSTU, KMC, KVTPO, MOPIT, LMC, JET

Source: JICA Expert Team

3.8 Public Relations Activities

3.8.1 Public Relations for Pilot Projects

In the pilot project, publicity activities were conducted by preparing flyers (Figure 3-3) and posters (Figure 3-4), which were distributed and posted in advance of the project to widely publicize the changes in lane operations and compliance with traffic rules.

Source: JICA Expert Team

Figure 3-3 : Flyer Prepared for Pilot Project

Source: JICA Expert Team

Figure 3-4 : Poster Prepared for Pilot Project

3.8.2 Public Relations for Projects

A final seminar was held on August 4, 2025, to report on the results of this project, and s everal media were invited. As a result, as shown in Figure 3-5. the seminar and an overview of this project were featured on the front page of Nepal's leading daily newspaper, Annapurna Post. In addition, the online newspaper Ratopati (article link: https://www.ratopati.com/story/504915/traffic-lights-in-kathmandu-are-a-problem-due-to-traffic) and Bikashnews (article link: https://www.bikashnews.com/story/554827/), ensuring widespread publicity.


काठमाडौंको ट्राफिक सुधारमा जापानको सहकार्य

अन्नपूर्ण | काठमाडौं

काठमाडौं उपत्यकामा बढ्दो जनसंख्या, तीव्र सहरीकरण र बढ्दो सवारी चापका कारण ट्राफिक जाम प्रमुख समस्याको रूपमा रहेको छ। उपत्यकाको ट्राफिक जामलाई लक्षित गर्दै नेपाल सरकार र जापान अन्तर्राष्ट्रिय सहयोग निकाय (जाईका) को साझेदारीमा 'सहरी यातायात व्यवस्थापन परियोजना' सञ्चालन भएको छ। नयाँ बानेश्वर र लैनचौरको जामलाई नमुना परियोजनाको रूपमा छनोट गर्दै कार्यान्वयन गरिएको थियो।

परियोजनाको अन्तिम चरणमा काठमाडौं विकास प्राधिकरण, काठमाडौं तथा ललितपुर महानगर, विभिन्न विकास साझेदारहरू तथा सरोकारवालाहरूको सहभागितामा आयोजना गरिएको सेमिनारमा परियोजनाका उपलब्धिहरू प्रस्तुत गरिएको थियो। सेमिनारमा जाईकाले प्रस्तुत गरेको कार्यपत्रअनुसार नयाँ बानेश्वर चोकमा सन् २०२३ को जुन अन्त्यदेखि अक्टोबर मध्यसम्म पूर्वाधार सुधार कार्यअन्तर्गत दायाँ मोडको छुट्टै लेन बनाउने, सडकमा मध्य भाग छुट्याउने मेडियन स्ट्रिप राख्ने, पोस्ट कोन राख्ने, सडक चिह्नहरू सच्याउने, सुरक्षा उपकरणहरू थप्ने कामहरू गरिएको छ।

लैनचौर चोक र वरपरका केशरमहल तथा खानी विभाग चोकहरूमा पनि लेन चिन्ह, ट्राफिक बत्ती, र समन्वय प्रणाली नेपाल सरकारको आर्थिक सहयोगमा लागू गरिएको छ। काठमाडौं उपत्यकामा पहिलो पटक लैनचौरमा बायाँ मोड्न निषेध गर्ने संकेत बत्तीको प्रयोग गरी पैदलयात्रीहरूको सुरक्षालाई प्राथमिकता दिइएको जाईकाले जनाएको छ।

जाईकाले उपत्यकाको जाम व्यवस्थापनका लागि तीन महत्वपूर्ण दस्तावेज तयार पारी भौतिक पूर्वाधार तथा यातायात मन्त्रालयलाई हस्तान्तरण गरेको छ। सहरी यातायात व्यवस्थापन योजना, चोक सुधारसम्बन्धी निर्देशिका र ट्राफिक बत्ती सञ्चालन र मर्मतका लागि म्यानुअल जाईकाले तयारी गरी मन्त्रालयलाई हस्तान्तरण गरेको हो।

कार्यक्रममा भौतिक पूर्वाधार तथा यातायातमन्त्री देवेन्द्र दाहालले यातायात व्यवस्थापनका लागि सूचना प्रविधिको उपयोग बढाउनुपर्नेमा जोड दिए। जाईकाका नेपाल प्रमुख प्रतिनिधि मिजुकी मात्सुजाकीले नेपाललाई सहयोग गर्न पाउँदा जापान खुसी रहेको र आगामी दिनमा पनि सहयोग निरन्तर रहने उल्लेख गरे।

Japan's Support in Improving Kathmandu's Traffic

Traffic congestion is a major problem in the valley due to the growing population, rapid urbanization, and increasing traffic volume. Targeting traffic congestion in the valley, the 'Urban Transport Management Project' has been launched in partnership with the Government of Nepal and the Japan International Cooperation Agency (JICA). Pilot projects at Naya Baneshwor and Lainchaur Intersection were completed under this project.

The project achievements were presented at a seminar organized in the final phase of the project with the participation of Kathmandu Development Authority, Kathmandu and Lalitpur Metropolitan Cities, various development partners and stakeholders. According to the working paper presented by JICA at the seminar, various infrastructure improvement work which includes a separate right turn lane, central median, road markings, installation of plastic cones, etc., were done from late June to mid-October 2023.

Lane markings, traffic lights installation and synchronization of traffic signals of Lainchaur, Kesharmahal and Khani Bibhag intersections was carried out with financial support from the Government of Nepal. For the first time in the Kathmandu Valley, pedestrian safety has been prioritized by using a signal light stopping left turn vehicle at Lainchaur, according to JICA.

JICA has prepared three important deliverables for managing traffic congestion in the Valley. The documents have been prepared and handed over to the Ministry of Physical Infrastructure and Transport. The Urban Transport Management Plan, the Guidelines for Intersection Improvement, and the Manual for Improvement of Operation and Maintenance of Traffic Lights have been prepared and handed over to the ministry.

At the event, Minister for Physical Infrastructure and Transport Devendra Dahal emphasized the need to increase the use of information technology for transport management. JICA's Chief Representative in Nepal, Mizuki Matsuzaki, stated that Japan is happy to be supporting Nepal and that the support will continue in the coming days.

Source: JICA Expert Team

Figure 3-5 : The content of a newspaper article covering the final seminar

3.9 Preparation of Reports and Related Documents

The issues and lessons learned from the pilot project were summarized along with the activities during the entire project period and the level of achievement of the project purposes. The contents of the Project Completion Report were explained to and agreed upon by the Nepalese side, and submitted to JICA.

4. Output-1: Urban Transport Management Plan Is Developed and There Will Be Opportunities to Coordinate with Relevant Authorities

4.1 Overview

For Output-1, five activities were implemented in PDM with the Objectively Verifiable Indicators shown in Table 4-1.

Table 4-1：Objectively Verifiable Indicators for Output-1

1. Urban transport management plan is formulated.
2. Urban transport management plan is officially approved by the Nepali side.
3. At least one meeting will be held among the related organizations for transportation management in Kathmandu Valley.

Source: JICA Expert Team

4.2 Record of Meetings

Table 4-2 shows the results of discussions with each organization.

Table 4-2：Record of Meeting Related to Output-1

Date	Organization	Agenda
December 6, 2022	KVDA	・Information sharing on KVDA's Urban Transport Management Plan
March 2, 2023	KVDA	・Information sharing on KVDA's Urban Transport Management Plan and the JICA-funded Urban Transport Management Project for the Kathmandu Valley

Source: JICA Expert Team

4.3 Details of Activities

4.3.1 Activity 1-1：Sorting Out Issues Related to Urban Transport Management

(1) Current Status and Issues of Road Network in Kathmandu Valley

1) Current status of road network

Roads in Nepal are determined according to the road classification (Table 4-3). The basic classification was defined in the NRS established in 1970 (NRS-2027) and revised in 1988 (NRS-2045) and 2013 (NRS-2070). Furthermore, for unified urban road design and construction, NURS-2076 (Nepal Urban Road Standards) was formulated by the Ministry of Urban Development (MOUD) in 2020 (Table 4-4), which provides detailed design criteria such as road width and design speed.

Table 4-3：ROW in NRS-2070

Road Classification	ROW
National Highways	50 m
Feeder Roads	30 m
District Roads	20 m

Source: NRS-2070

Table 4-4：ROW in NRS-2076

Road Classification	Recommended ROW
Arterial Roads	50 m
Sub-arterial Roads	30 m
Collector Roads	20 m

Local Roads	10 m

Source: NRS-2070

The road network in the Kathmandu valley is shown in Figure 4-1. The Kathmandu Valley is an important area centered on Kathmandu City, the capital of Nepal, and the road network connects it to the major regions of the country.

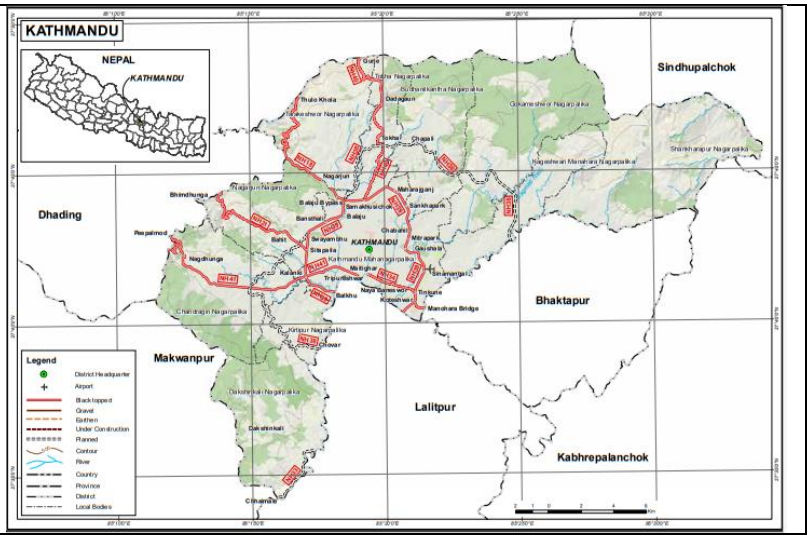
In Kathmandu District, the Inner Ring Road (NH 39) surrounds the city of Kathmandu, and NH 18, NH 21, NH 40, and Tribhuvan Highway (NH 41) radiate from it.

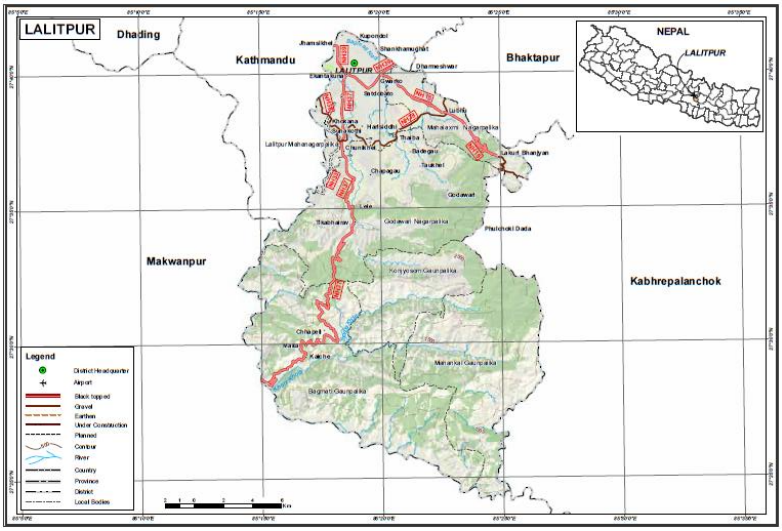
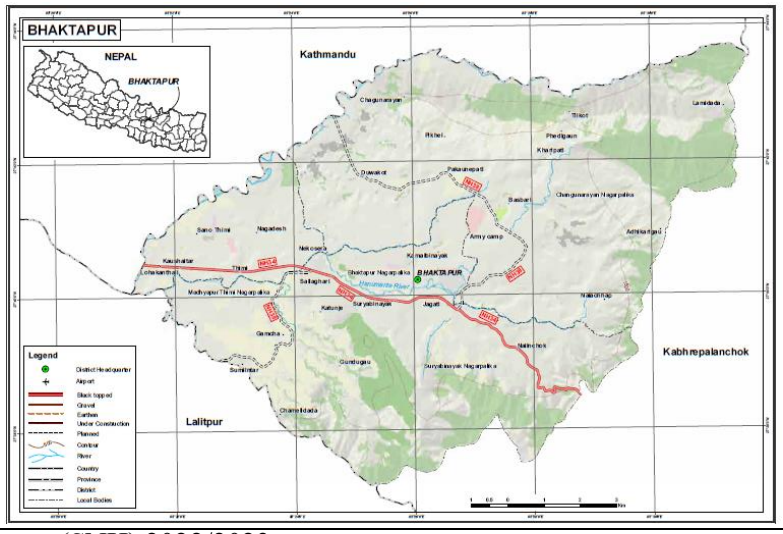
In Lalitpur District, the southern portion of the Ring Road (NH 39) is maintained, and NH 37 extends southward as a radial road from there.

In Bhaktapur District, only Araniko Highway (NH 34), which extends east from the ring road, is maintained.

Until NURS-2076 was developed, urban roads were constructed according to each organization's own standards, so there is no uniformity in the cross section of each road in the Kathmandu Valley, with the exception of some roads such as the southern section of Inner Ring Road. In addition, some roads, such as the northern section of Inner Ring Road, do not have clearly marked lanes, making the situation very dangerous.

Several roads radiate from the Inner Ring Road. Among them, Araniko Highway (NH34) and Tribhuvan Highway (NH41) are the most important trunk roads in terms of both logistics and people flow. Araniko Highway extends to Kodari on the border with China, while the B.P. Highway (NH13) connects Dhulikhel to eastern Nepal. Tribhuban Highway connects western Nepal cities such as Pokhara and Birgunj on the border with India and is a major road with heavy bus and truck traffic.

Kathmandu District NH18 : 11.71km NH21 : 9.60km NH34 : 4.39km NH39 : 21.95km NH40 : 17.00km NH41 : 14.46km Total : 79.11km	

Lalitpur District NH15：13.06km NH37：44.69km NH38：11.00km NH39：7.00km Total：75.75km	
Bhaktapur District NH34：14.12km Total：14.12km	

Source: Statistics of National Highway (SNH) 2022/2023

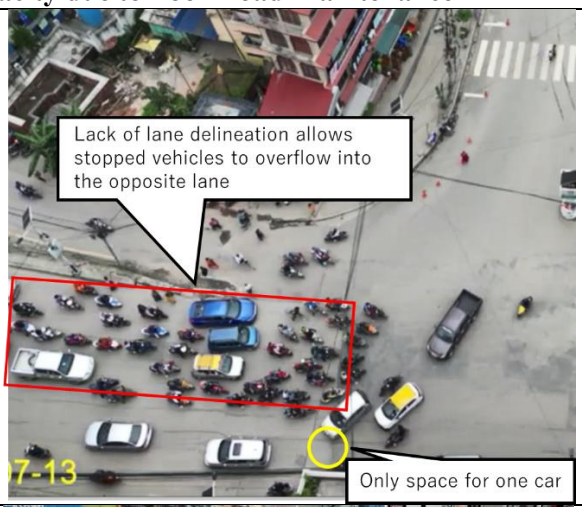
Figure 4-1：National Highway Network in Kathmandu Valley

2) Issues of Road Network

One of the main issues in the road network in the Kathmandu Valley is that the population is concentrated in the Valley and much of the flat land is used for residential purposes, making it difficult to secure land for roads and limiting the widening and construction of new roads. Effective use of existing roads is required, but the following problems are causing further congestion.

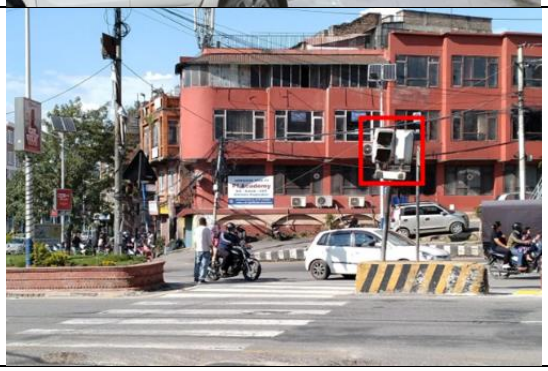
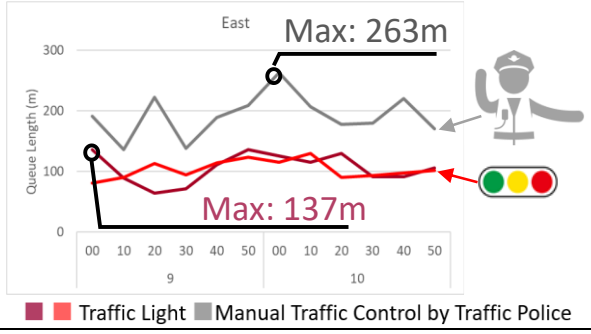
- Poor road maintenance resulting in reduced traffic capacity (Table 4-5)
- Traffic light failures and traffic police traffic management (Table 4-6)

Table 4-5：Reduced Traffic Capacity due to Poor Road Maintenance

Unclear lanes ・ The lack of lanes on a road causes vehicles to line up overhanging the opposite lane. This reduces the effective width of the road, thus significantly reducing traffic capacity.	
Poor road pavement ・ Where road pavement is broken up and uneven, vehicles are forced to slow down and pass through the area. This slows the overall traffic flow and reduces traffic capacity.	
Obstructions on the road ・ Construction materials and equipment left on the road are seen occupying the road. Traffic capacity is reduced due to vehicles avoiding these obstacles.	

Source: JICA Expert Team

Table 4-6 : Traffic Light Failure and Manual Traffic Control by Traffic Police

Non-functioning traffic lights ・ Traffic signals in Kathmandu Valley are often inoperative due to lack of maintenance.	
Non-functioning pedestrian signals ・ Pedestrian signals often do not function as well as traffic signals.	
Manual Traffic Control ・ When traffic signals are not functioning, traffic police conduct manual traffic control, but this is not an efficient operation and contributes to traffic congestion.	

Source: JICA Expert Team

(2) Current Status and Issues of Public Transportation in Kathmandu Valley

1) Current State of Public Transportation

Public transportation available in the Kathmandu Valley includes bus, minibus (20-35 passengers), micro (15-20 passengers), temp (electric tricycles: 10-15 passengers), taxi, and bike taxi. On the other hand, Mass Rapid Transit (MRT) have not been introduced. Therefore, the urban transportation system in Kathmandu Valley is mainly based on the bus.

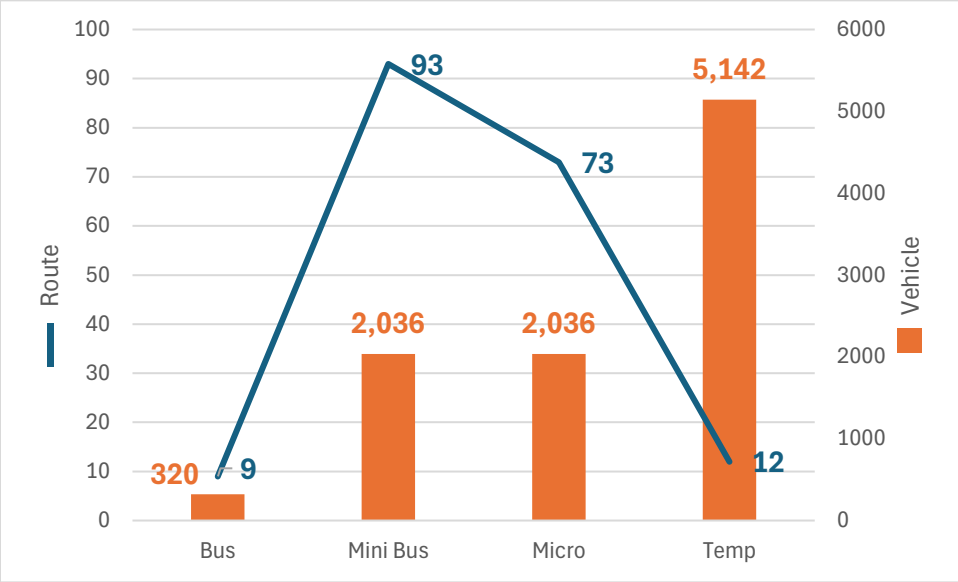
Table 4-7：Main Public Transportation in Kathmandu Valley

 Bus	 Mini Bus
 Micro	 Temp

Source: JICA Expert Team

2) Issues of Public Transportation

According to the survey conducted during the detailed planning study for the Urban Transportation Management Project in Kathmandu Valley, as shown in Figure 4-2, there are 9 bus routes with 320 vehicles, which is a small number compared to other public transportation systems. The situation of many vehicles with low capacity contributes to traffic congestion in Kathmandu Valley.



Source: Information Collection Survey on the Urban Transport Sector in the Kathmandu Valley, Nepal, JICA（2019）

Figure 4-2：Public Transportation Routes and Number of Vehicles in Kathmandu Valley

4.3.2 Activity 1-2：Review of Existing Plans Related to Urban Transport Management

(1) Review of Existing Urban Transportation Management Plans in Kathmandu Valley

A review of the existing plan related transportation within Kathmandu Valley was conducted. A summary of the review is shown in Table 4-8.

Table 4-8：Review Summary of Urban Transportation Management Plans

Title	Formulator	Year	Outline
Provincial Transportation Master Plan of Bagmati Province	Bagmati Province	2021	Most of the content is dominated by a 5-year budget plan for the maintenance/improvement of roads in the province. There are references to the Road Traffic Safety Action Plan and the Public Transport MP, but they are only about one page and no specific activities are mentioned. Draft only, not clear if final approval was given.
Comprehensive Urban Transport Master Plan in Kathmandu Valley	JICA	2017	It proposes activities related to TDM and NMT as well as land use planning, road planning, and public transportation planning. It also describes activities for each of the short-, medium-, and long-term stages, as well as suggestions for organizational structures for their realization.
The Kathmandu Sustainable Urban Transport Project	ADB	2011	The main goals are to improve public transportation, strengthen DOTM capacity, reduce traffic congestion, improve sidewalk comfort, and enhance air pollution monitoring.
Metropolitan Transportation Master Plan of Kathmandu Metropolitan City	KMC	2023	The plan is comprehensive, including public transportation plans, traffic management plans, road safety improvement plans, TDM, and plans related to decarbonized mobility, etc. After the TOR was issued, the plan was cancelled.
Municipal Transport Master Plan of Lalitpur Sub-Metropolitan City	LMC	2017	A zoning plan is being developed based on the results of the population forecast, prioritizing roads to be rehabilitated, and organizing financial institutions that may invest in this plan. The plan itself has been cancelled.
District Transport Master Plan of Bhakutapur District	BD/ DoLIDAR	2017	It is more of a basis document for budget allocation for road maintenance/repair within DoLIDAR rather than an MP.
Nepal Road Safety Action Plan 2021-2030	MOPIT	2013	The plan is developed for road maintenance, vehicle maintenance, post-accident care systems, and safety awareness activities for traffic safety.
20 Years vision Strategic Development Master Plan (2015-2035) for Kathmandu Valley	KVDA	2021	The plan provides analysis and sets 20-year goals for a wide range of areas in the Kathmandu Valley, including land use planning, environment, and infrastructure. The plan is in draft only and has been cancelled in Nepal.
Priority Projects in Comprehensive Urban Transport Master Plan	JICA	2017	It describes six priority projects recommended in the Comprehensive Urban Transport Master Plan.

Source: JICA Expert Team

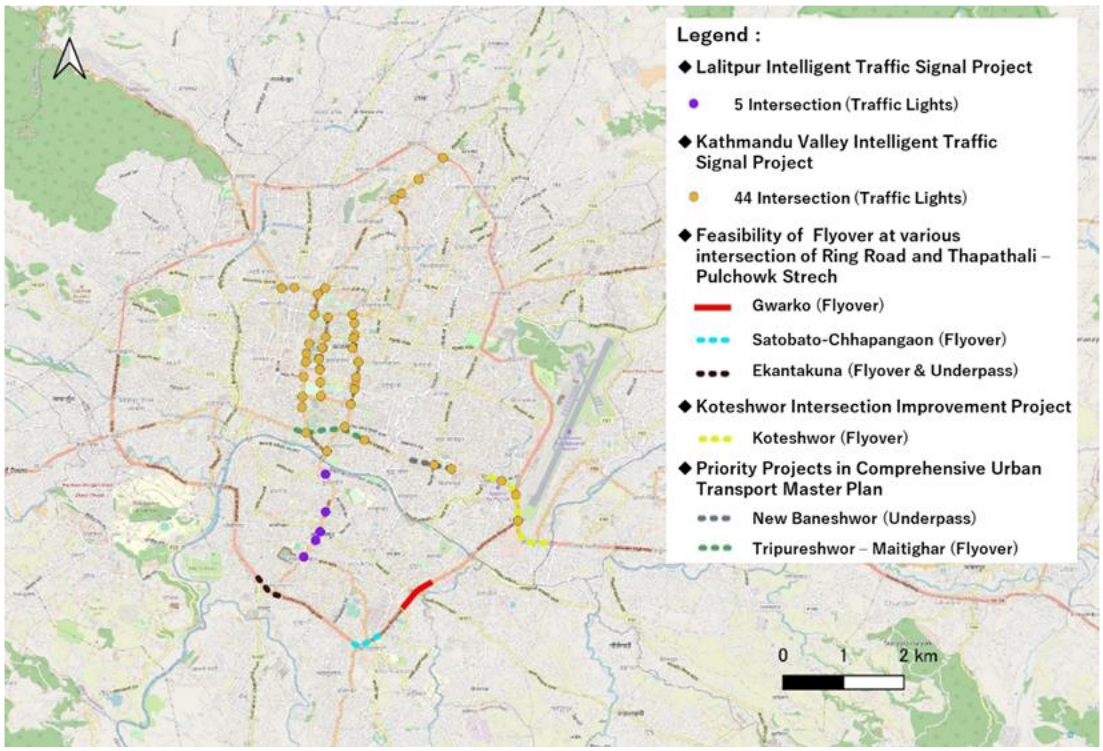
(2) Existing Transportation Infrastructure Development Plans in Kathmandu Valley

A review of the existing plan related transportation within Kathmandu Valley was conducted. A summary of the review is shown in Table 4-9. A location map of transportation infrastructure development plan is shown in Figure 4-3.

Table 4-9：Review Summary of Transportation Infrastructure Development Plans

Title	Formulator	Year	Outline
Kathmandu Valley Intelligent Traffic Signal Project	DOR	2021	The objective of the KVITSP is the overall improvement in traffic management in the streets of Kathmandu Valley through intersection improvement network-wide and develops the basis for expansion of a smarter traffic controls system around the Valley intersection network.
Lalitpur Intelligent Traffic Signal Project	LMC	2017	Preliminary design of intersection improvements at 50 intersections within the LMC and detailed design of intersection improvements and traffic signals at 5 priority intersections. At the time of this report, LMC has installed signals at five intersections. However, there are no further plans for other intersections.
Feasibility Study of Flyover at various intersection of Ring Road and Thapathali-Pulchowk Strech	LMC	2011	Since the construction of Flyover at Gwarko and Satdobato-Chhapangaon and Flyover & Underpass at Ekantakuna are feasible, we recommend that more detailed studies and designs be conducted. Flyover construction in Gwarko has now started but is on hold due to design issues.
Koteshwor Intersection Improvement Project	JICA	2024	Preparatory study for intersection improvement in Tinkune-Koteshwor-Jadibuti. As a result of the study, a new bypass road is proposed to start on the left bank of the Bagmati River Bridge on the Alaniko Highway, follow the Tinkune intersection ramp road southward along the same road, pass through the TIA site, cross the Jadibuti intersection, and end on the right bank of the Manohara River Bridge on the Alaniko Highway again

Source: JICA Expert Team



Source: JICA Expert Team

Figure 4-3：Location Map of Transportation Infrastructure Development Plan

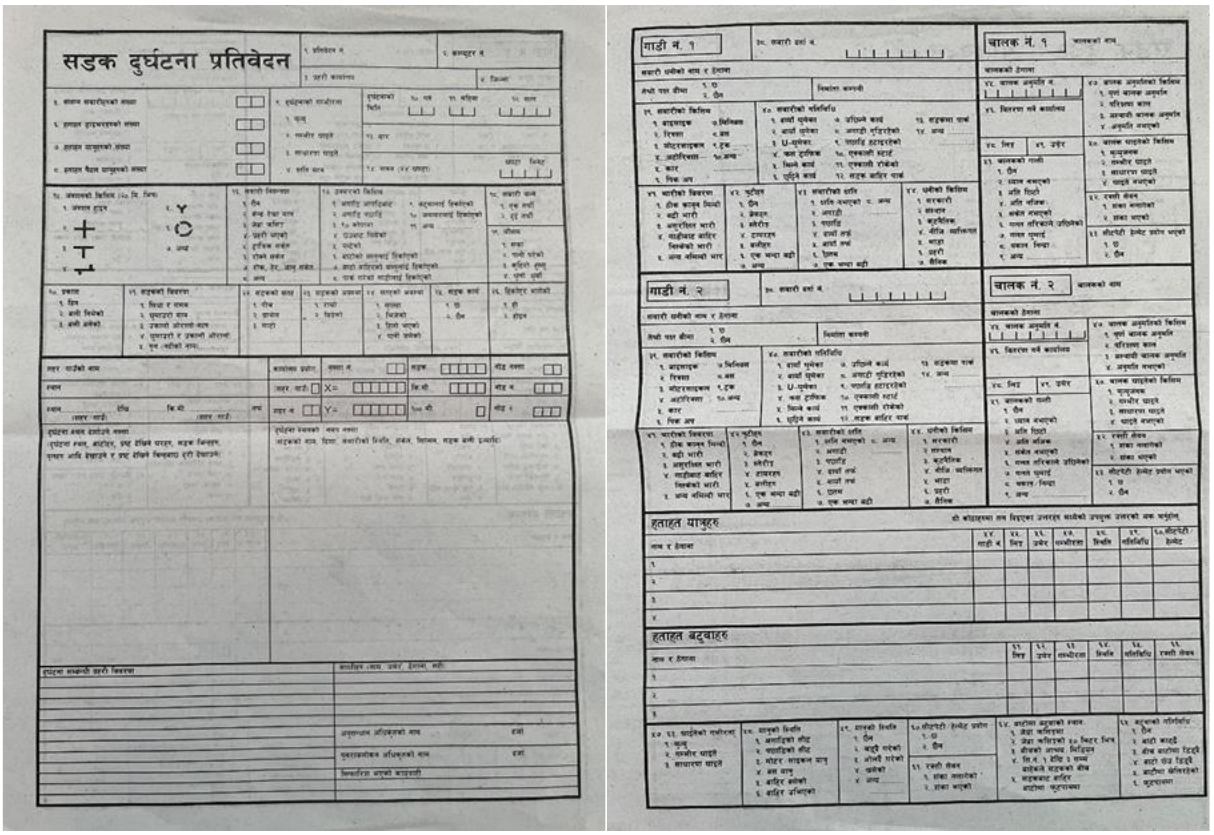
4.3.3 Activity 1-3 : Confirmation & Development of Traffic-Related Data, Such as Traffic Congestion, Traffic Volume, and Traffic Accident

(1) Confirmation & Development of Traffic Accident in the Kathmandu Valley

1) Summary of Traffic Accident Records

The form of traffic accident data used by the KVTPO is shown in Figure 4-4. The data is currently converted from paper-based records to WORD. The location information is descriptive and there is no latitude/longitude recorded.

Records of traffic accidents that occurred in the Kathmandu Valley from July 2021 to June 2022 were obtained from the KVTPO to create the database shown in Figure 4-5.



Source: JICA Expert Team

Figure 4-4 : Traffic Accident Data Form

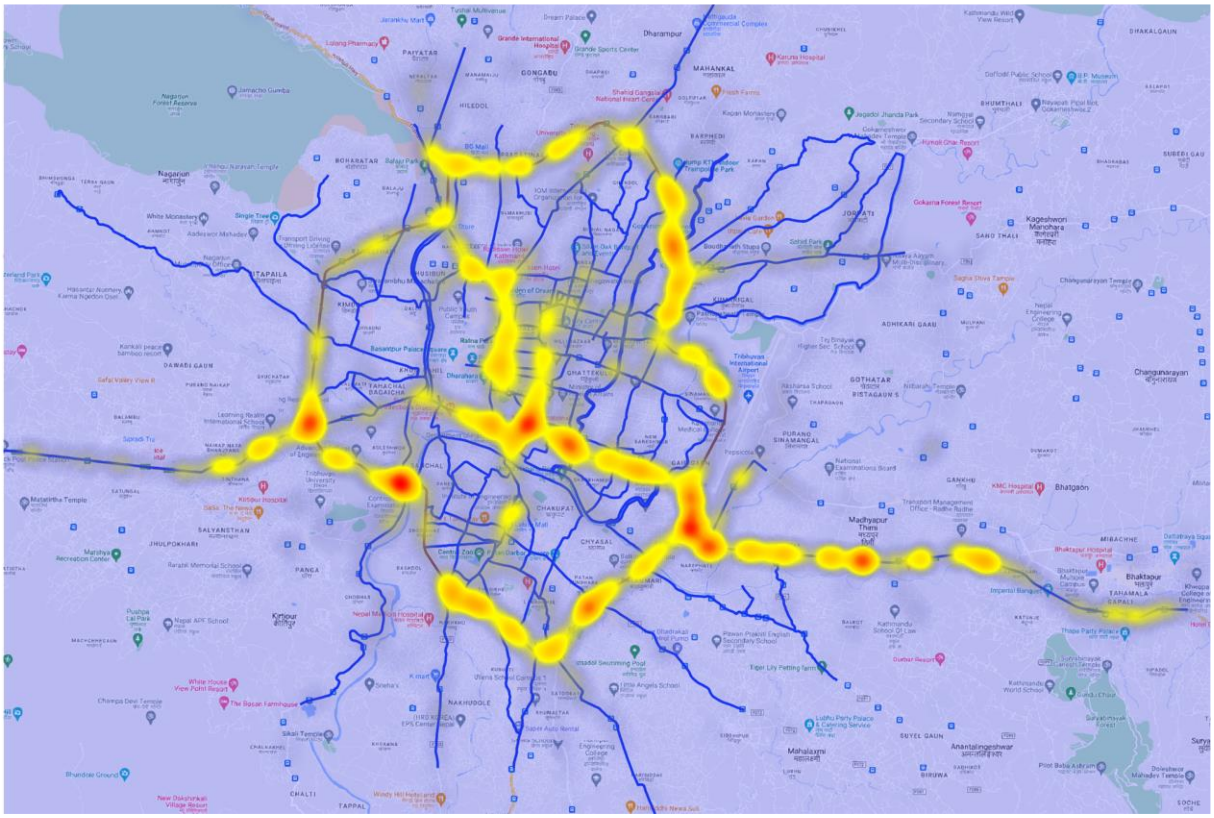
S.No.	Date/Time/ Location	Brief Description of Accident	Time of Notification	Time of arrival at site	Name, and age of dead and injured	Name, and age of the driver	Cause of accident	Death				Serios Injury				Minor Injury				Type of Vehicle								Animals		Damaged vehicles	Remarks
								Men	Women	Boys	Girls	Men	Women	Boys	Girls	Men	Women	Boys	Girls	Truck	Bus	Public Micro Bus	Car/Jeep/Van	Motorbike	Tempo (Autorickshaw)	Tractor	Bicycle	Serious Injury	Death		
1.	2078/04/01 9:30 Koteshwor (Friday)	On the road located in Jadibuti, Kathmandu district, the car of Province 3-01-022 Ch 7033 coming from Pepsicola towards Koteshwar was hit by the government jeep No. 2 Ch 2325 coming from the same direction. The car sustained minor damage. Road accident site 400m south	09:35	09:40	None.	Name of Car driver , age of car driver Name of Jeep driver and age of jeep driver	Negligence by Jeep driver																2						1	

Source: JICA Expert Team

Figure 4-5 : Traffic Accident Data Base

2) Traffic Accident Location

The location information (descriptive) from the traffic accident database created above was plotted on the GIS to create a traffic accident heat map. The results are shown in Figure 4-6. The colored areas are the locations of traffic accidents, with the number of traffic accidents increasing from yellow to red. Traffic accidents are more frequent on arterial roads, inner ring roads, and roads moving east-west and north-south within the inner ring road.



Source: JICA Expert Team

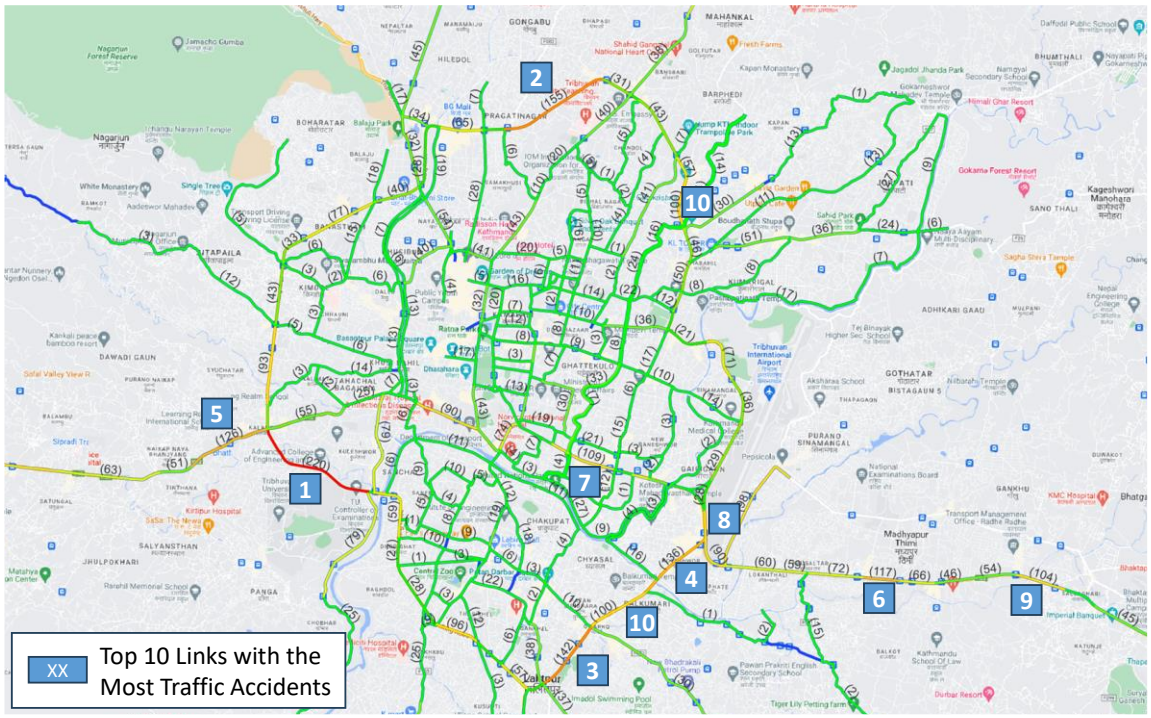
Figure 4-6：Traffic Accident Heat Map

The number of traffic accidents was tabulated by link to see which roads in the Kathmandu Valley have the most traffic accidents. Table 4-10 shows the top 10 links with the most traffic accidents, and Figure 4-7 shows the number of traffic accidents by link.

Table 4-10：Top 10 Links with the Highest Number of Traffic Accidents

Rank	Link Name	Traffic Accident Count
No.1	Balkhu1 - Basundhara1	220
No.2	Samakhushi - Basundhara	155
No.3	Gwarko - Satdobato	142
No.4	Koteshwor - Balkumari	136
No.5	Tinthana – Kalanki1	126
No.6	Gatthaghar - Sanothimi	117
No.7	Babarmahal2 – Naya Baneshwor	109
No.8	Tinkune2 - Koteshwor	107
No.9	Shyamdham – Sallaghari West	104
No.10	Balkumari - Gwarko	100
No.10	Sukedhara – Gopikrishna1	100

Source: JICA Expert Team



Source: JICA Expert Team

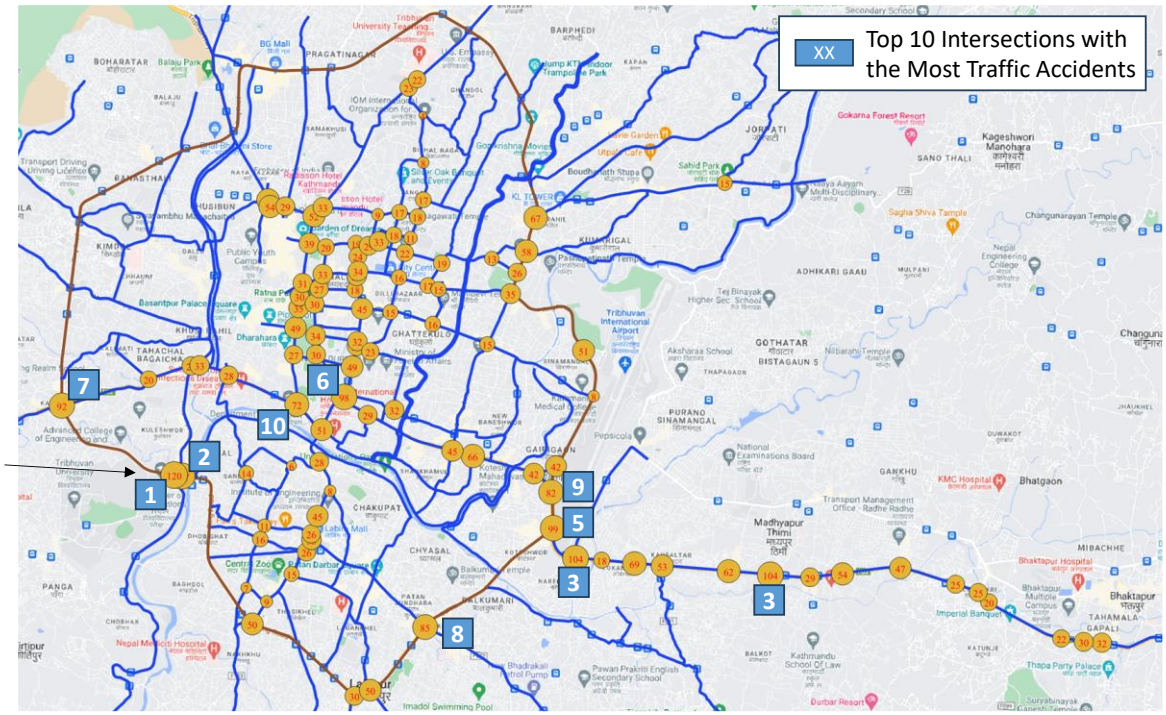
Figure 4-7：Number of Traffic Accident by Link

The number of traffic accidents was tabulated by intersection to identify which locations in the Kathmandu Valley have the highest number of traffic accidents. Table 4-11 shows the top 10 intersections with the most traffic accidents, and Figure 4-8 shows the number of traffic accidents by intersection.

Table 4-11：Top 10 Intersections with the Highest Number of Traffic Accidents

Rank	Intersection Name	Traffic Accident Count
No.1	Balkhu 1	120
No.2	Balkhu 2	107
No.3	Jadibuti	104
No.3	Sanothimi	104
No.5	Koteshwor	99
No.6	Maitighar	98
No.7	Kalanki	92
No.8	Gwarko	85
No.9	Tinkune 2	82
No.10	Tripureshwor	72

Source: JICA Expert Team



Source: JICA Expert Team

Figure 4-8：Number of Traffic Accident by Intersection

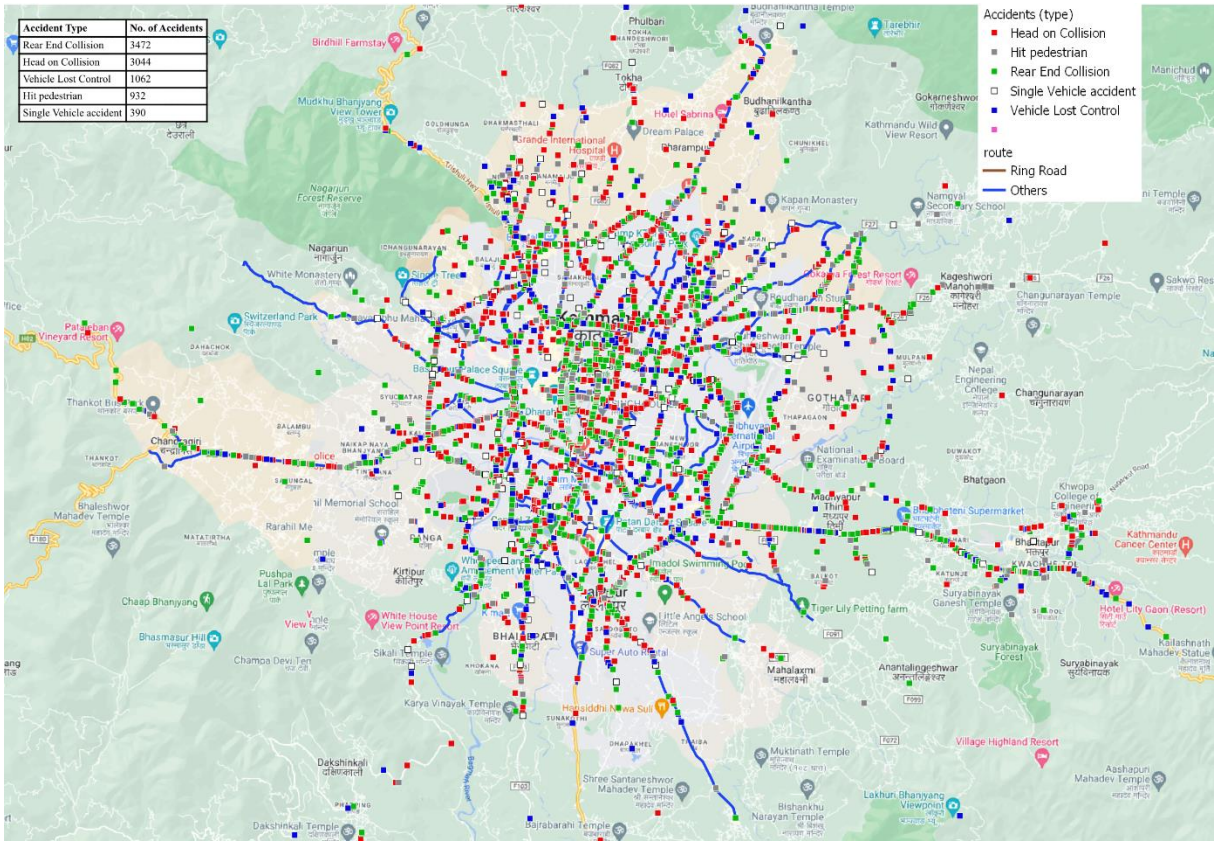
3) Analysis of Traffic Accident Data

An organizing traffic accident types is shown Table 4-12 and Figure 4-9. There were 8,900 traffic accidents, of which 39% were Rear end collision and 34% were Head on Collision.

Table 4-12：Traffic Accident Types

Rank	Accident Type	Traffic Accident Count	Percentage
No.1	Rear End Collision	3,472	39%
No.2	Head on Collision	3,044	34%
No.3	Vehicle Lost Control	1,062	12%
No.4	Hit Pedestrian	932	10%
No.5	Single Vehicle Accident	390	4%
	Total	8,900	100%

Source: JICA Expert Team



Source: JICA Expert Team

Figure 4-9：Traffic Accident Types Map

A organizing traffic accident cause is shown Table 4-13 and Figure 4-10. There were 8,895 traffic accidents, of which 54% were Driver Carelessness and 33% were High Speed.

Table 4-13：Traffic Accident Cause

Rank	Accident Cause	Traffic Accident Count	Percentage
No.1	Driver Carelessness	4,827	54%
No.2	High Speed	2,978	33%
No.3	Drink and Drive	497	6%
No.4	Others	297	3%
No.5	Overtake	159	2%
No.6	Vehicle Condition	91	1%
No.7	Road Condition	18	0%
No.8	Lane Violation	17	0%
No.9	Bad Weather	3	0%
No.9	Calling on Mobile	3	0%
No.9	Right Turn	3	0%
No.12	U-turn	2	0%
	Total	8,895	100%

Source: JICA Expert Team

Source: JICA Expert Team

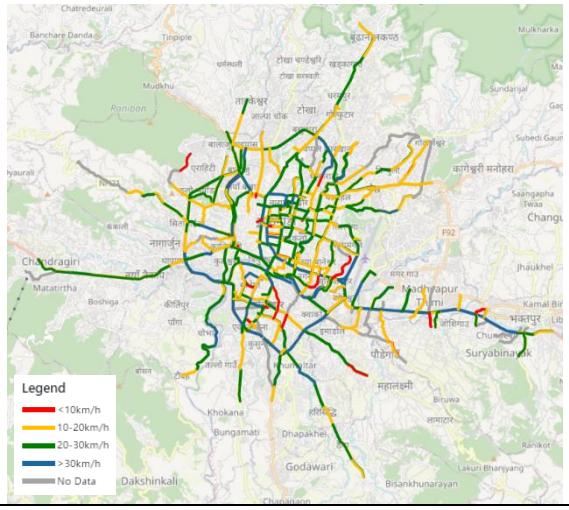
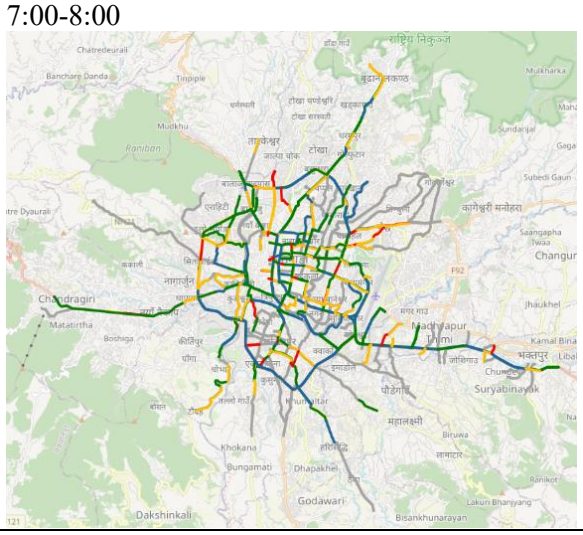
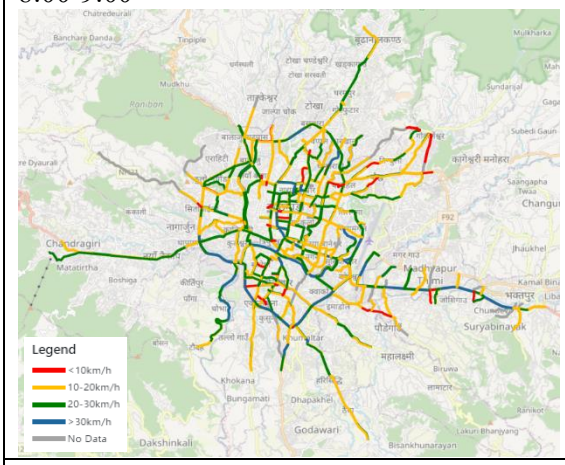
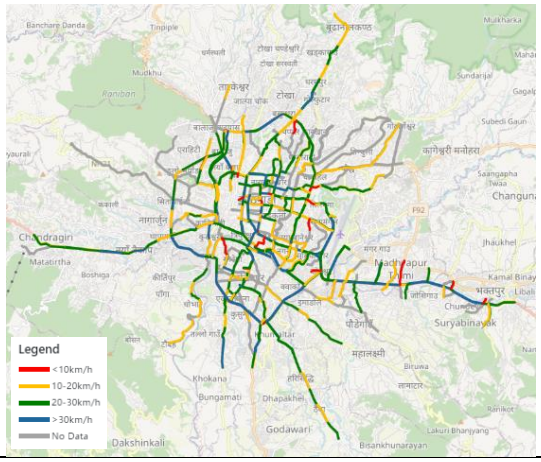
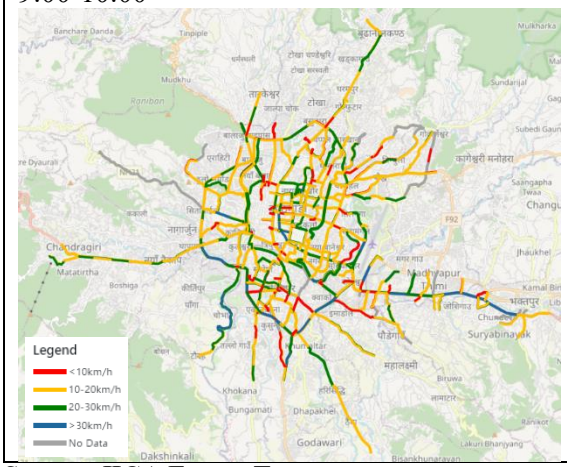
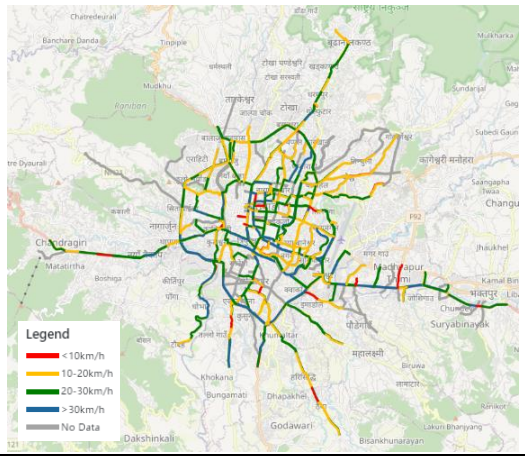
Figure 4-10 : Traffic Accident Causes Map

(2) Confirmation & Development of Traffic Congestion

1) Results of Travel Speed Survey

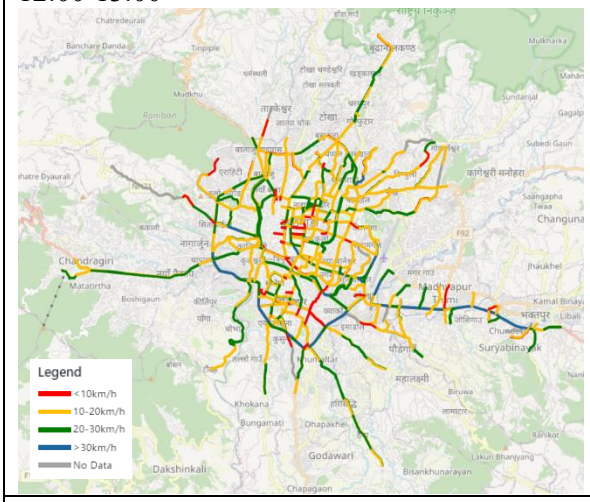
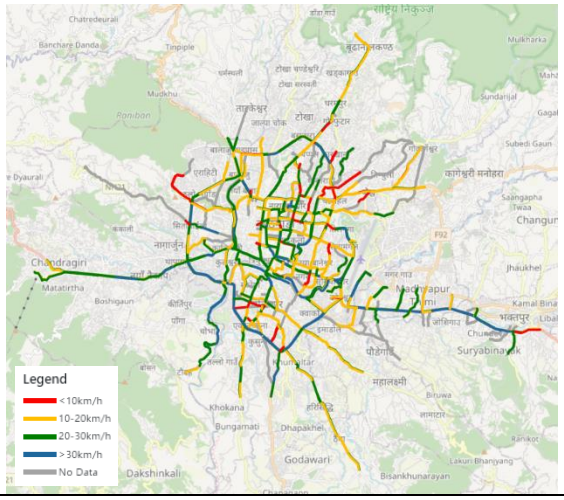
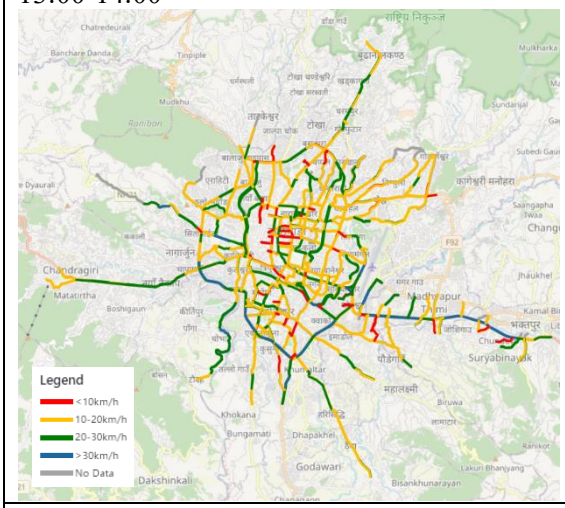
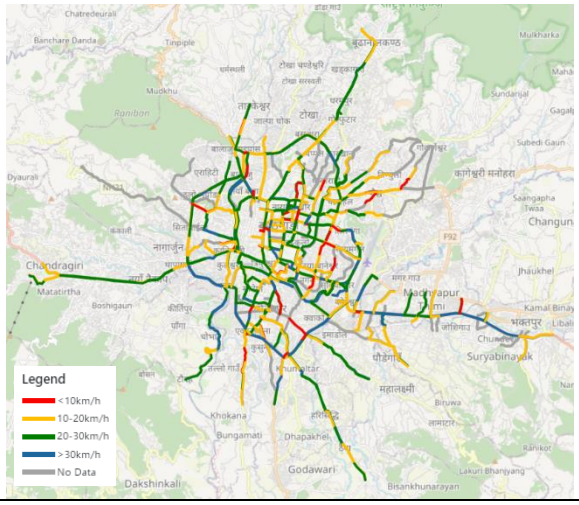
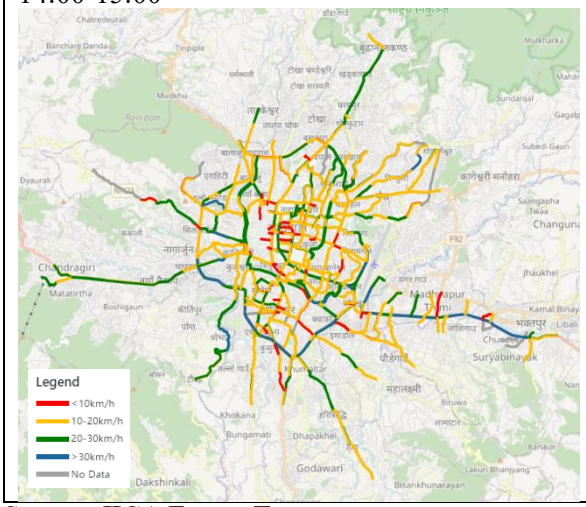
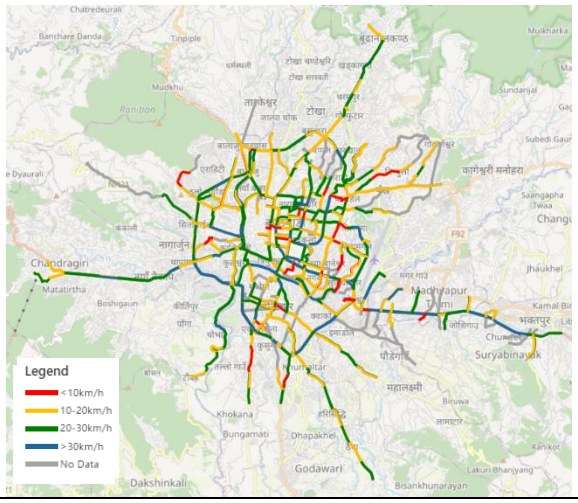
The travel speed results from the analysis of the GPS tracker survey data presented in Table 3-2 are shown in Figure 4-11 through Figure 4-13. The results of the travel speed survey can be viewed on the website, too (https://ktmtraffic.softavi.com/SpeedMap).

Travel speeds are slower on weekdays than on weekends, and the road network as a whole is chronically congested on weekdays. In particular, it can be seen that congestion intensifies from 9:00 a.m. on weekdays, which is the commuter rush hour, and that congestion eases from 7:00 p.m. on weekdays when the rush to return home calms down.Thus, the road network in the Kathmandu Valley is severely congested, with average speeds below 20 km/h during the morning and evening peak hours as well as afternoon off peak hours, and below 10 km/h in the most congested areas.

Weekday	Weekends
7:00-8:00 	7:00-8:00 
8:00-9:00 	8:00-9:00 
9:00-10:00 	9:00-10:00 

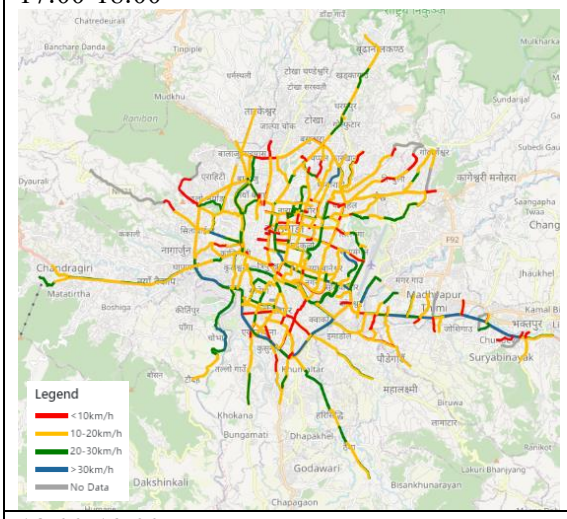
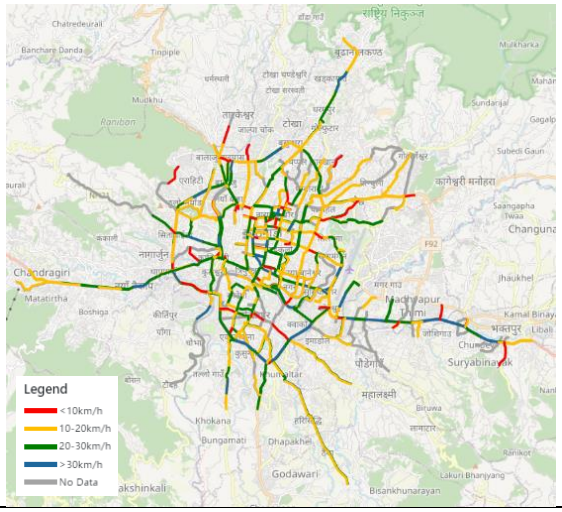
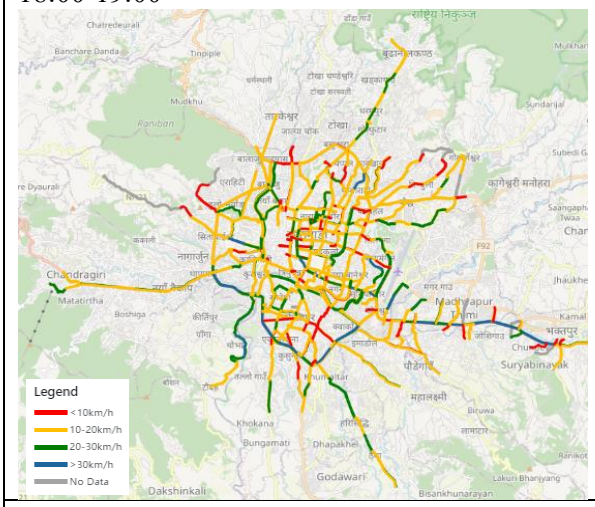
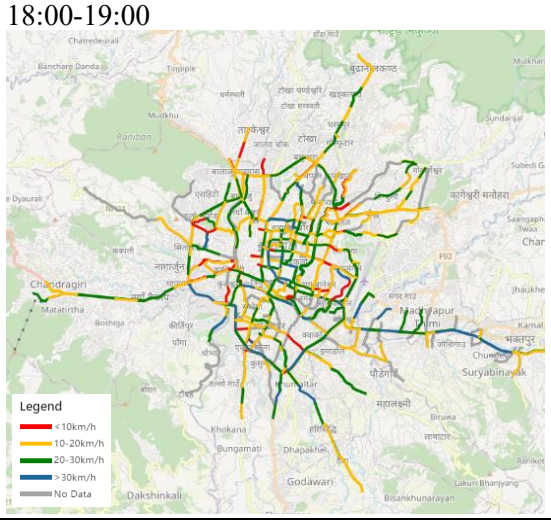
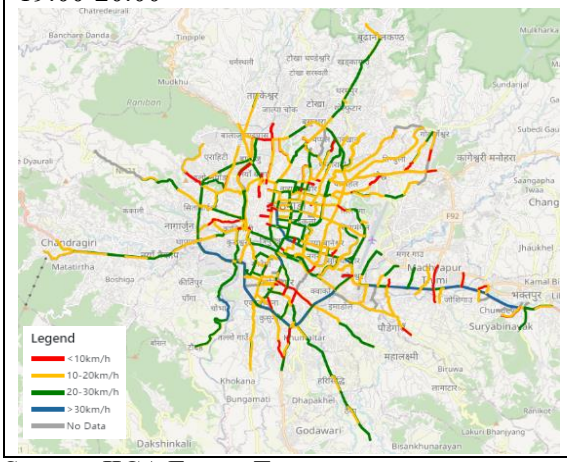
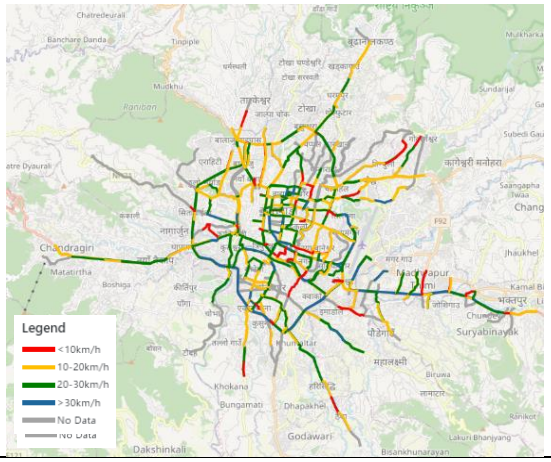
Source: JICA Expert Team

Figure 4-11 : Travel Speed Results for Weekday and Holiday Morning Hours

Weekday	Weekends
12:00-13:00 	12:00-13:00 
13:00-14:00 	13:00-14:00 
14:00-15:00 	14:00-15:00 

Source: JICA Expert Team

Figure 4-12：Travel Speed Results for Weekday and Holiday Afternoon Hours

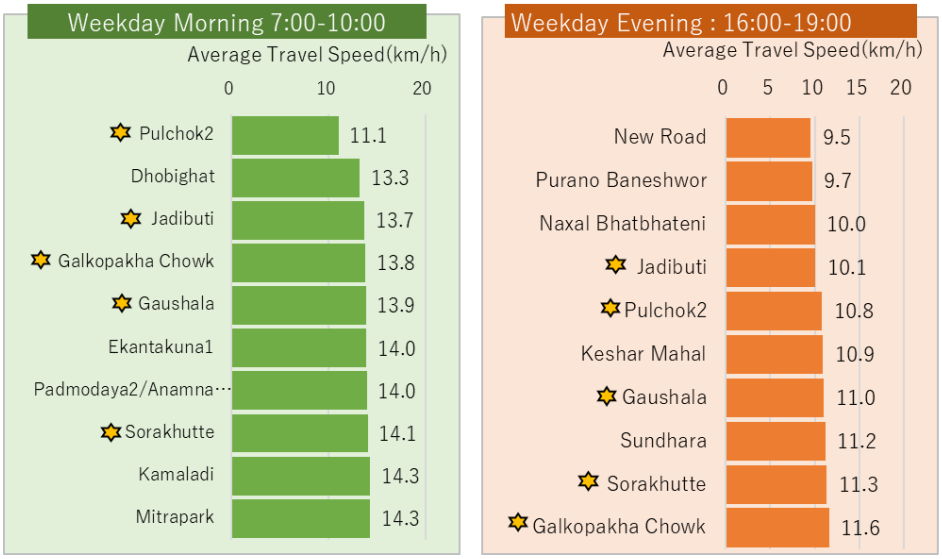
Weekday	Weekends
17:00-18:00	17:00-18:00
	
18:00-19:00	18:00-19:00
	
19:00-20:00	19:00-20:00
	

Source: JICA Expert Team

Figure 4-13：Travel Speed Results for Weekday and Holiday Evening Hours

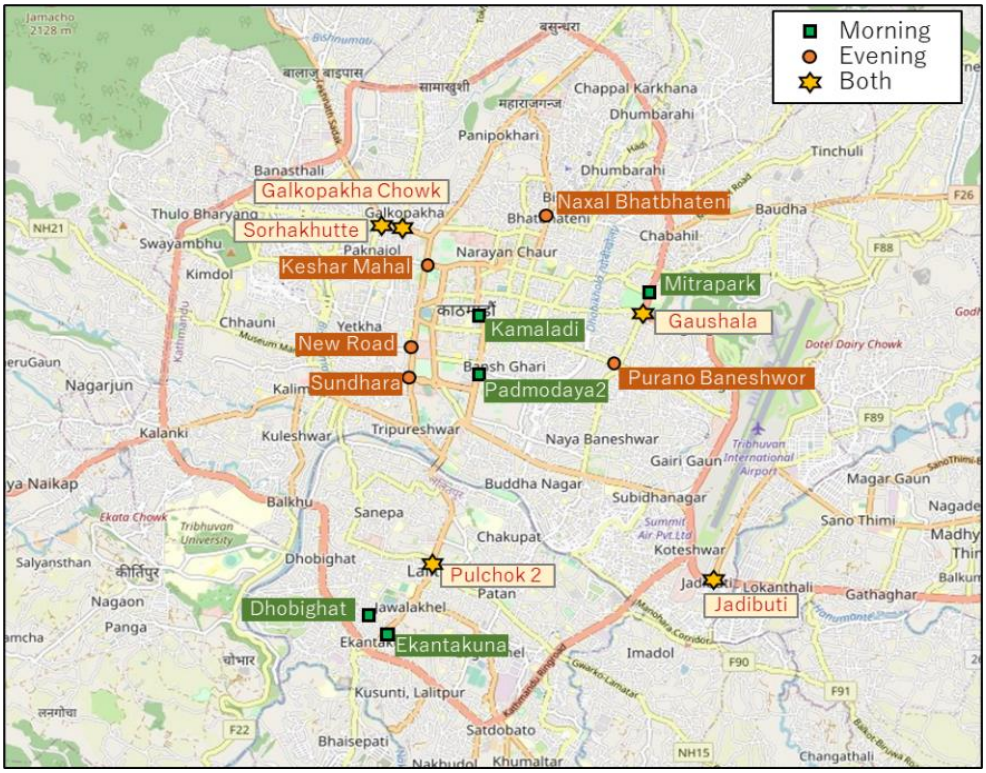
2) Analysis of Travel Speed Survey Results

As indicated above, traffic congestion is a serious problem in Kathmandu Valley. In order to understand the situation of traffic congestion in Kathmandu Valley, travel speed results were analyzed for each intersection, and 10 intersections with particularly slow average speeds were selected. The results are shown in Figure 4-14 and Figure 4-15. These congested intersections are the bottleneck locations for traffic and are particularly noticeable at intersections connecting arterial roads and inner-city roads.



Source: JICA Expert Team

Figure 4-14：The 10 Most Congested Intersections (Weekday Morning and Evening)



Source: JICA Expert Team

Figure 4-15：The location of The 10 Most Congested Intersections (Weekday Morning and

Evening)

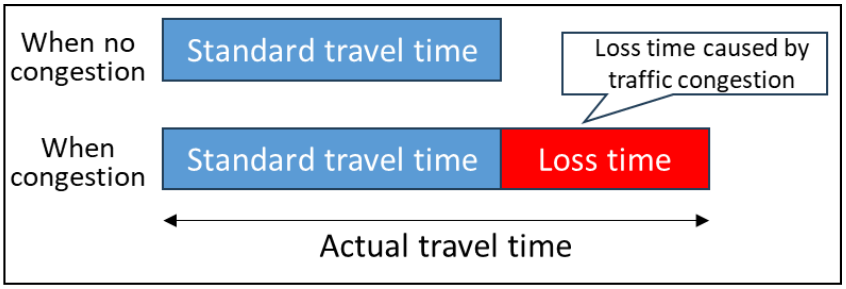
3) Calculation of Congestion Loss Time

Using the results of the GPS tracker survey and traffic volume survey conducted in the baseline survey, the congestion loss time was calculated. Traffic congestion loss time is an indicator of the overall loss due to traffic congestion, taking into consideration the traffic volume, and identifies the amount of loss due to traffic congestion within the Kathmandu Valley. The congestion loss time is calculated using the following formula taken from the Ministry of Land, Infrastructure, Transport and Tourism in Japan (Figure 4-16).

$$congestion\ loss\ time\ [veh \cdot h/day] = \sum_{T=1}^{12}((actual\ travel\ time\ [h] - standard\ travel\ time\ [h]) \times traffic\ volume\ [veh])$$

(Daytime 12h) (10% tile of actual travel time) (Daytime 12h)

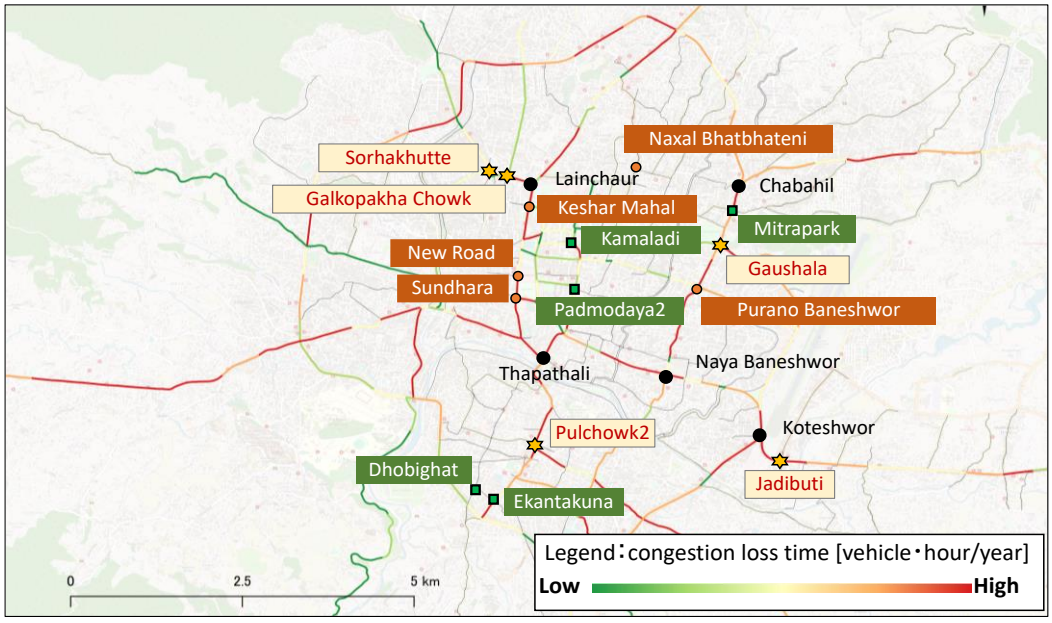
*Nighttime 12h is assumed to have no loss time



Source: JICA Expert Team

Figure 4-16：Calculation Method of Congestion Loss time

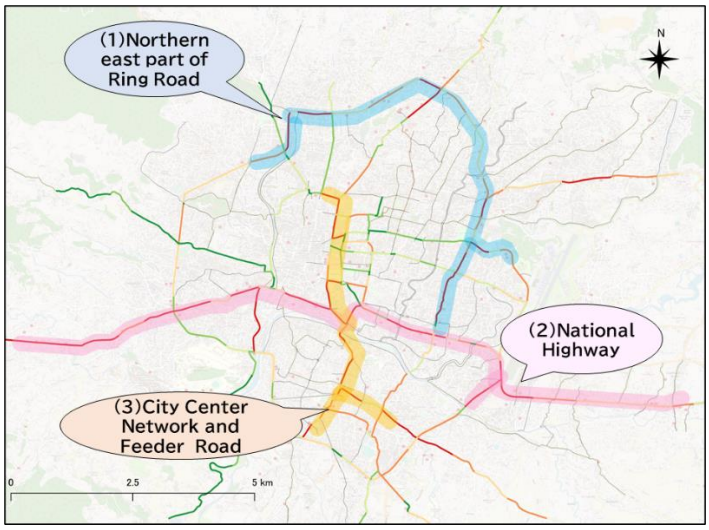
The congestion loss time was calculated for each road link and plotted on a map, the results are shown in Figure 4-17.



Source: JICA Expert Team

Figure 4-17：Results of Congestion Loss Time

Corridors with particularly high congestion losses can be classified into three categories as shown in Figure 4-18: (1) Northern east part of Ring Road, (2) National Highway that runs east-west through the Kathmandu Valley, and (3) the road that connects the city center of the Kathmandu Valley from north to south.



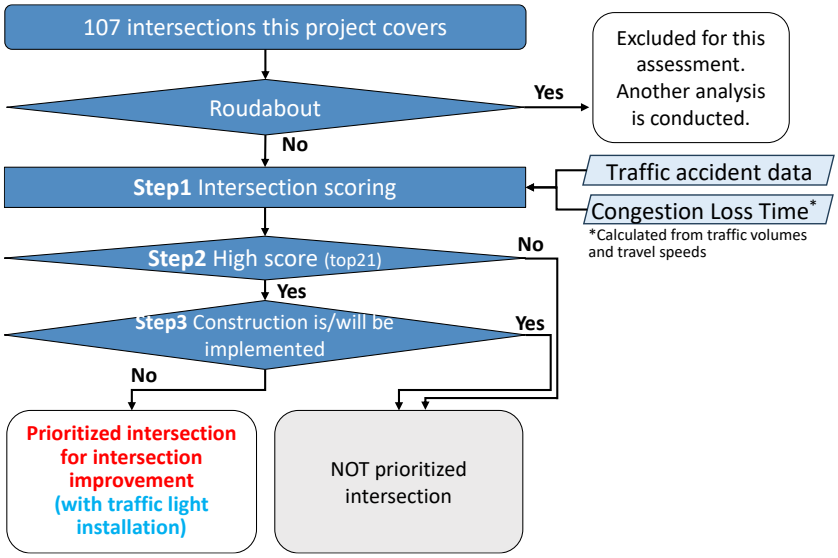
Source: JICA Expert Team

Figure 4-18 : Corridors with High Congestion Losses

4.3.4 Activity 1-4 : Development of Urban Transport Management Plan, including the Possibility to Install ITS

(1) Selection Method for Target Intersections

Targeting the 107 intersections covered by the project for introduction of urban transport management in Kathmandu Valley, roundabouts were excluded first, and each intersection was scored based on traffic accident data and congestion loss time as Step 1, and the top 21 were selected in order of highest score as Step 2. Intersections with construction plans were excluded and prioritized intersections for intersection improvement. Selection flow of target intersections is shown in Figure 4-19.



Source: JICA Expert Team

Figure 4-19 : Selection Flow of Target Intersections

(2) Prioritized Intersection for Intersection Improvement

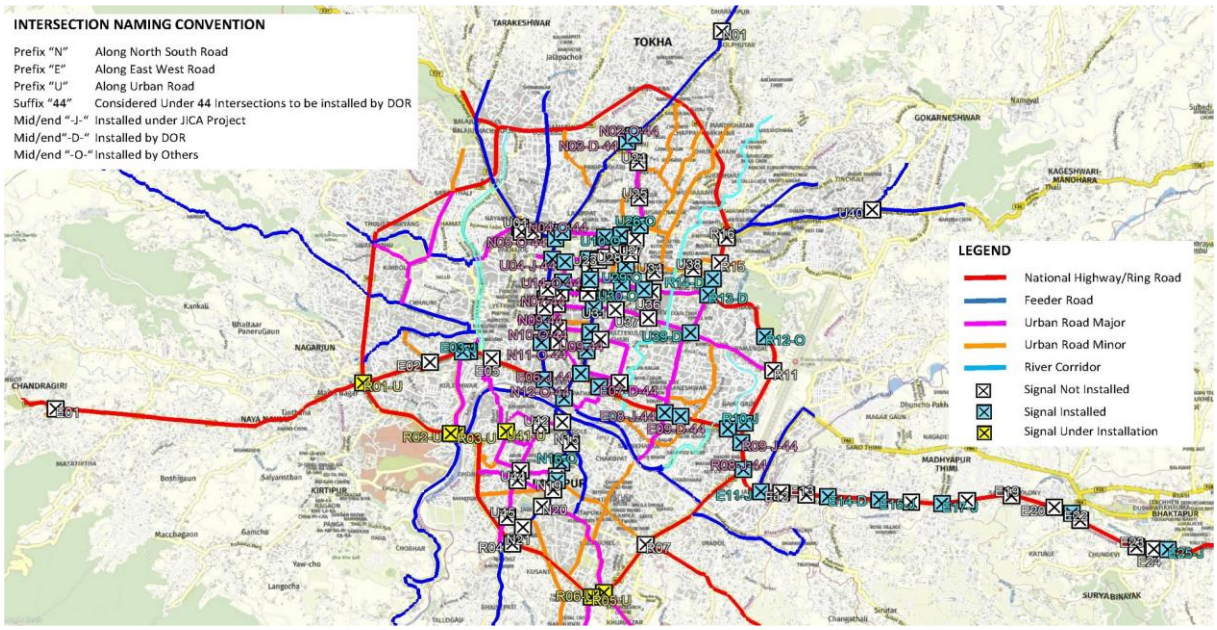
1) 107 Intersections

The 107 intersections were selected along National Highway (NH), Feeder Road (FR), Urban Road Major (Uj), and Urban Road Minor (Un) (urban roads under DOR jurisdiction). The results are shown in Table 4-14 and Figure 4-20.

Table 4-14：List of 107 Intersections (Reprint)

SN	Name	Location	SN	Name	Location	SN	Name	Location	SN	Name	Location	SN	Name	Location	SN	Name	Location
1	R01	Kalanki	19	E03	Kalimati-1	37	E21	Sallaghari Tinkune	55	N14	Kupandole	73	U11	Nagpokhari	91	U29	Naxal Bhagwati
2	R02	Balkhu1	20	E04	Kalimati-2	38	E22	Sallaghari East	56	N15	Chakupat	74	U12	Jaya Nepal	92	U30	Kamal Pokhari
3	R03	Balkhu2	21	E05	Teku	39	E23	Ghalate Tol	57	N16	Mantri Qtr/Harihar Bhawan	75	U13	Hattisar	93	U31	Charkhal
4	R04	Ekantakuna2	22	E06	Maitighar	40	E24	Pandu Bazaar	58	N17	Pulchok1	76	U14	Hattisar/Kamal Pokhari	94	U32	Kalikasthan
5	R05	Chapagau Dobato	23	E07	Babar Mahal DOR Chowk	41	E25	Suryabinayak	59	N18	Pulchok2	77	U15	Kathmandu Plaza	95	U33	Anamnagar
6	R06	Satdobat	24	E08	Naya Baneshwor	42	N01	Galfutar	60	N19	Pulchok3	78	U16	Kamaladi	96	U34	Sano Gaucharan
7	R07	Gwarko	25	E09	Civil Hospital Mid Block	43	N02	Teaching/Kanti Hospital	61	N20	Jawalakhel	79	U17	Dilli Bazar/Putali Sadak	97	U35	Gyaneshwor
8	R08	Koteshwor	26	E10	Tinkune1	44	N03	Shital Niwas	62	N21	Ekantakuna1	80	U18	Padmodaya1	98	U36	Maitidevi1
9	R09	Tinkune2	27	E11	Jadibuti	45	N04	Lainchaur North/Lazimpat	63	U01	Sorakhutte North	81	U19	Padmodaya2/Anamnagar North	99	U37	Maitidevi2
10	R10	Tinkune3	28	E12	Manohara	46	N05	Lainchaur	64	U02	Sorakhutte	82	U20	Singha Durbar	100	U38	Siphal
11	R11	Sinamangal	29	E13	Lokanthali	47	N06	Keshar Mahal	65	U03	Galkopakha Chowk	83	U21	Gairidhara	101	U39	Purano Baneshwor
12	R12	Airport	30	E14	Kaushaltar	48	N07	Jamal	66	U04	Royal Palace South Gate	84	U22	Naxal	102	U40	Jorpati
13	R13	Gaushala	31	E15	Gathaghar	49	N08	Bhotahiti	67	U05	Mahendra Statue/Tindhara	85	U23	Narayanchaur	103	U41	Sanepa
14	R14	Mitrapark	32	E16	Sanothimi	50	N09	Bir Hospital	68	U06	Trichandara/Kamaladi	86	U24	Baluwatar1	104	U42	Summit Hotel
15	R15	Guheshwori	33	E17	Thimi	51	N10	New Road	69	U07	Ratnapark	87	U25	Baluwatar2	105	U43	Jhamshikahl Chowk
16	R16	Chabahil	34	E18	Thimi Bypass	52	N11	Sundhara	70	U08	Exhibition Road	88	U26	Naxal Bhatbhateni	106	U44	Jhamshikhel
17	E01	Chandragiri	35	E19	Shyamadham	53	N12	Tripureshwor	71	U09	Bhadrakali	89	U27	Tangal	107	U45	Dhobighat
18	E02	Soalteemod	36	E20	Sallaghar West	54	N13	Thapathali	72	U10	Tukucha Chowk	90	U28	Police HQ			

Source: JICA Expert Team



Source: JICA Expert Team

Figure 4-20：Location of 107 Intersections

2) Exclude Roundabout

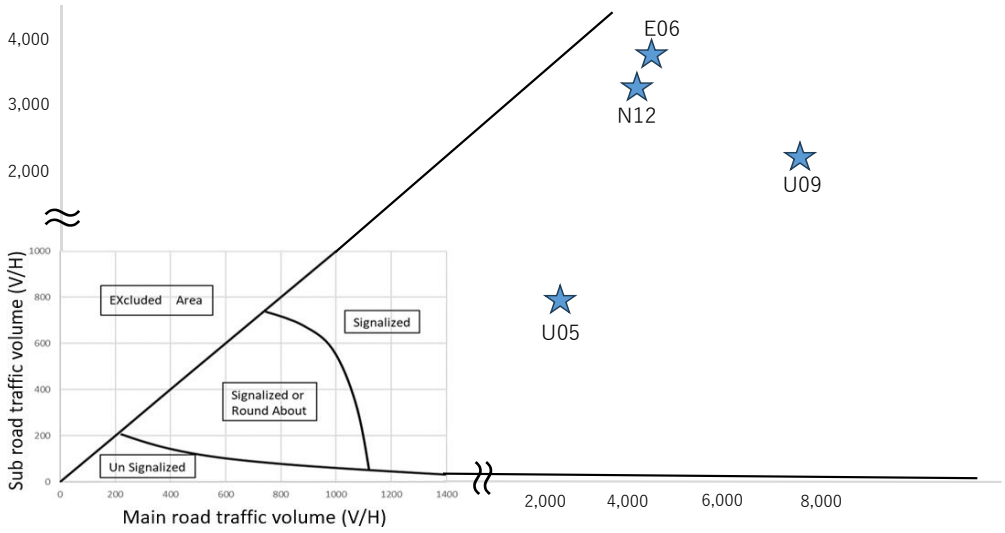
Of the 107 intersections, roundabouts are the four intersections. Traffic volumes on these main and secondary roads are shown in Table 4-15.

Roundabout intersections are plotted in Figure 4-21 based on the traffic volume on the main and secondary road. The results showed that four intersections were classified as signalized intersections due to high traffic volumes that could not be handled by the roundabout.

Table 4-15：List of 107 Intersections (Reprint)

ID	Intersection name	Traffic volume(veh/h)	
		Main road	Secondary road
N12	Tripureshwor	4,135	3,361
E06	Maitighar	4,435	3,963
U05	Mahendra Statue/Tindhara	2,487	791
U09	Bhadrakali	7,741	2,215

Source: JICA Expert Team



Source: FHWA Roundabounts: An informational Guide, 2000

Figure 4-21：Classification of Roundabouts and Signalized Intersections

3) Intersection Scoring

Prioritization of intersection improvement and traffic light installation is calculated by congestion loss value and traffic accident data.

Scoring is performed for each intersection and the intersection with the higher total score become the intersection with the higher priority for improvement and installation. Scoring criteria is shown Table 4-16. Scoring results of ranking for congestion loss time and number of traffic accident are shown Table 4-17 and Table 4-18.

Table 4-16：Scoring Criteria

No	Scoring Item	Scoring criteria	Scores					
			Unit	High	Somewhat High	Average	Somewhat Low	Low
1	Congestion Loss Time	Ranking for congestion loss value is high → High score	rank	1~3	4~10	11~30	31~50	51~107
			point	10	7.5	5	2.5	0
2	Traffic Accident	Ranking for the number of traffic accidents is high → High score	rank	1~3	4~10	11~30	31~50	51~107
			point	10	7.5	5	2.5	0

Source: JICA Expert Team

Table 4-17：Scoring Result of Ranking for Congestion Loss Time

SN	ID	Name	Annual Loss Time (hour・veh)	Rank	Score
1	E01	Chandragiri	347,335	34	2.5
2	E02	Soalteemod	637,266	18	5
3	E03	Kalimati-1	773,210	13	5
4	E04	Kalimati-2	135,773	62	0
5	E05	Teku	1,142,582	3	10
6	E06	Maitighar	1,121,752	5	7.5
7	E07	Babar Mahal DOR Chowk	169,872	55	0
8	E08	Naya Baneshwor	1,013,036	7	7.5
9	E09	Civil Hospital Mid Block	166,357	56	0
10	E10	Tinkune1	180,961	54	0
11	E11	Jadibuti	1,078,776	6	7.5
12	E12	Manohara	302,629	38	2.5
13	E13	Lokanthali	276,299	42	2.5
14	E14	Kaushaltar	206,130	49	2.5
15	E15	Gathaghar	228,486	48	2.5
16	E16	Sanothimi	182,905	53	0
17	E17	Thimi	413,676	31	2.5
18	E18	Thimi Bypass	117,806	65	0
19	E19	Shyamadham	67,255	73	0
20	E20	Sallaghar West	58,170	76	0
21	E21	Sallaghari Tinkune	30,717	84	0
22	E22	Sallaghari East	24,641	85	0
23	E23	Ghalate Tol	17,520	86	0
24	E24	Pandu Bazaar	37,175	82	0
25	E25	Suryabinayak	93,354	69	0
26	N01	Galfutar	123,860	64	0
27	N02	Teaching/Kanti Hospital	290,430	39	2.5
28	N03	Shital Niwas	110,139	67	0
29	N04	Lainchaur North/Lazimpat	288,038	40	2.5
30	N05	Lainchaur	419,943	30	5
31	N06	Keshar Mahal	920,871	9	7.5
32	N07	Jamal	249,092	45	2.5
33	N08	Bhotahiti	164,478	57	0
34	N09	Bir Hospital	231,989	47	2.5
35	N10	New Road	375,521	33	2.5
36	N11	Sundhara	939,723	8	7.5
37	N12	Tripureshwor	3,110,274	1	10
38	N13	Thapathali	637,819	17	5
39	N14	Kupandole	582,382	21	5
40	N15	Chakupat	607,132	19	5
41	N16	Mantri Qtr/Harihar Bhawan	716,964	15	5
42	N17	Pulchok1	194,844	51	0
43	N18	Pulchok2	804,004	12	5
44	N19	Pulchok3	462,301	28	5
45	N20	Jawalakhel	517,607	24	5
46	N21	Ekantakuna1	269,777	43	2.5
47	R01	Kalanki	714,104	16	5
48	R02	Balkhu1	81,270	71	0

49	R03	Balkhu2	317,954	37	2.5
50	R04	Ekantakuna2	455,206	29	5
51	R05	Chapagau Dobato	276,630	41	2.5
52	R06	Satdobato	835,110	11	5
53	R07	Gwarko	1,136,024	4	7.5
54	R08	Koteshwor	1,718,800	2	10
55	R09	Tinkune2	534,345	23	5
56	R10	Tinkune3	143,278	59	0
57	R11	Sinamangal	189,650	52	0
58	R12	Airport	335,611	35	2.5
59	R13	Gaushala	767,130	14	5
60	R14	Mitrapark	495,160	26	5
61	R15	Guheshwori	240,330	46	2.5
62	R16	Chabahil	539,824	22	5
63	U01	Sorakhutte North	43,889	81	0
64	U02	Sorakhutte	17,314	88	0
65	U03	Galkopakha Chowk	266,913	44	2.5
66	U04	Royal Palace South Gate	327,300	36	2.5
67	U05	Mahendra Statue/Tindhara	128,912	63	0
68	U06	Trichandara/Kamaladi	57,875	77	0
69	U07	Ratnapark	115,930	66	0
70	U08	Exhibition Road	143,270	60	0
71	U09	Bhadrakali	145,158	58	0
72	U10	Tukucha Chowk	17,363	87	0
73	U11	Nagpokhari	62,821	74	0
74	U12	Jaya Nepal	201,065	50	2.5
75	U13	Hattisar	32,882	83	0
76	U14	Hattisar/Kamal Pokhari	46,010	80	0
77	U15	Kathmandu Plaza	142,898	61	0
78	U16	Kamaladi	380,136	32	2.5
79	U17	Dilli Bazar/Putali Sadak	468,697	27	5
80	U18	Padmodaya1	91,179	70	0
81	U19	Padmodaya2/Anamnagar North	108,233	68	0
82	U20	Singha Durbar	603,093	20	5
83	U21	Gairidhara	0	91	0
84	U22	Naxal	0	91	0
85	U23	Narayanchaur	14,858	90	0
86	U24	Baluwatar1	0	91	0
87	U25	Baluwatar2	0	91	0
88	U26	Naxal Bhatbhateni	0	91	0
89	U27	Tangal	0	91	0
90	U28	Police HQ	0	91	0
91	U29	Naxal Bhagwati	0	91	0
92	U30	Kamal Pokhari	61,718	75	0
93	U31	Charkhal	16,827	89	0
94	U32	Kalikasthan	0	91	0
95	U33	Anamnagar	0	91	0
96	U34	Sano Gaucharan	0	91	0
97	U35	Gyaneshwor	53,555	78	0
98	U36	Maitidevi1	49,172	79	0
99	U37	Maitidevi2	72,676	72	0

100	U38	Siphal	0	91	0
101	U39	Purano Baneshwor	847,462	10	7.5
102	U40	Jorpati	506,293	25	5
103	U41	Sanepa	0	91	0
104	U42	Summit Hotel	0	91	0
105	U43	Jhamshikehl Chowk	0	91	0
106	U44	Jhamshikhel	0	91	0
107	U45	Dhobighat	0	91	0

*xxx: Roundabout
Source: JICA Expert Team

Table 4-18：Scoring Result of Ranking for the Number of Traffic Accidents within 50m from the Intersection

SN	ID	Name	Number of Accident				Rank	Score
			Accident	Death	Major Injury	Minor Injury		
1	E01	Chandragiri	2	0	0	0	103	0
2	E02	Soalteemod	11	0	0	13	67	0
3	E03	Kalimati-1	20	0	0	4	37	2.5
4	E04	Kalimati-2	7	0	0	4	89	0
5	E05	Teku	17	0	1	9	42	2.5
6	E06	Maitighar	74	1	1	35	5	7.5
7	E07	Babar Mahal DOR Chowk	14	0	1	17	53	0
8	E08	Naya Baneshwor	26	0	1	22	26	5
9	E09	Civil Hospital Mid Block	34	1	1	29	19	5
10	E10	Tinkune1	18	0	1	9	39	2.5
11	E11	Jadibuti	85	1	2	37	3	10
12	E12	Manohara	12	0	3	10	62	0
13	E13	Lokanthali	27	0	0	25	25	5
14	E14	Kaushaltar	39	1	0	27	13	5
15	E15	Gathaghar	51	0	1	33	8	7.5
16	E16	Sanothimi	95	3	1	96	1	10
17	E17	Thimi	26	0	1	19	26	5
18	E18	Thimi Bypass	36	0	2	40	16	5
19	E19	Shyamadham	31	0	1	26	23	5
20	E20	Sallaghar West	14	0	3	11	53	0
21	E21	Sallaghari Tinkune	16	0	0	15	45	2.5
22	E22	Sallaghari East	11	0	0	7	67	0
23	E23	Ghalate Tol	4	0	0	5	96	0
24	E24	Pandu Bazaar	26	1	2	34	26	5
25	E25	Suryabinayak	16	1	0	11	45	2.5
26	N01	Galfutar	7	0	0	8	89	0
27	N02	Teaching/Kanti Hospital	14	0	1	15	53	0
28	N03	Shital Niwas	10	0	0	3	76	0
29	N04	Lainchaur North/Lazimpat	19	0	0	15	38	2.5
30	N05	Lainchaur	23	0	0	11	31	2.5
31	N06	Keshar Mahal	24	0	1	11	29	5
32	N07	Jamal	10	0	0	6	76	0
33	N08	Bhotahiti	15	0	0	11	50	2.5
34	N09	Bir Hospital	10	1	0	3	76	0
35	N10	New Road	36	0	0	15	16	5
36	N11	Sundhara	16	0	0	9	45	2.5
37	N12	Tripureshwor	47	0	0	18	9	7.5
38	N13	Thapathali	33	0	0	12	20	5
39	N14	Kupandole	15	0	0	8	50	2.5
40	N15	Chakupat	2	0	0	0	103	0
41	N16	Mantri Qtr/Harihar Bhawan	22	0	0	15	34	2.5
42	N17	Pulchok1	9	0	0	4	80	0
43	N18	Pulchok2	7	0	0	4	89	0
44	N19	Pulchok3	13	0	0	8	58	0
45	N20	Jawalakhel	8	0	0	3	84	0
46	N21	Ekantakuna1	8	0	0	7	84	0

47	R01	Kalanki	69	1	1	39	7	7.5
48	R02	Balkhu1	32	0	0	25	21	5
49	R03	Balkhu2	78	1	1	55	4	7.5
50	R04	Ekantakuna2	38	0	0	36	14	5
51	R05	Chapagau Dobato	17	0	0	4	42	2.5
52	R06	Satdobato	45	0	0	13	10	7.5
53	R07	Gwarko	37	1	0	34	15	5
54	R08	Koteshwor	86	2	0	24	2	10
55	R09	Tinkune2	73	0	0	53	6	7.5
56	R10	Tinkune3	24	0	0	15	29	5
57	R11	Sinamangal	5	0	0	3	93	0
58	R12	Airport	42	0	1	26	11	5
59	R13	Gaushala	29	0	0	14	24	5
60	R14	Mitrapark	14	1	0	10	53	0
61	R15	Guheshwori	18	0	0	18	39	2.5
62	R16	Chabahil	42	0	0	16	11	5
63	U01	Sorakhutte North	35	0	0	22	18	5
64	U02	Sorakhutte	12	0	1	10	62	0
65	U03	Galkopakha Chowk	13	0	0	6	58	0
66	U04	Royal Palace South Gate	12	0	0	11	62	0
67	U05	Mahendra Statue/Tindhara	18	0	0	8	39	2.5
68	U06	Trichandara/Kamaladi	17	1	1	12	42	2.5
69	U07	Ratnapark	22	0	0	18	34	2.5
70	U08	Exhibition Road	23	0	1	20	31	2.5
71	U09	Bhadrakali	23	0	0	14	31	2.5
72	U10	Tukucha Chowk	4	0	0	2	96	0
73	U11	Nagpokhari	15	0	0	14	50	2.5
74	U12	Jaya Nepal	8	0	1	5	84	0
75	U13	Hattisar	2	0	0	0	103	0
76	U14	Hattisar/Kamal Pokhari	21	0	0	10	36	2.5
77	U15	Kathmandu Plaza	2	0	0	0	103	0
78	U16	Kamaladi	11	0	0	5	67	0
79	U17	Dilli Bazar/Putali Sadak	16	0	0	7	45	2.5
80	U18	Padmodaya1	4	0	0	5	96	0
81	U19	Padmodaya2/Anamnagar North	16	0	0	13	45	2.5
82	U20	Singha Durbar	32	0	0	19	21	5
83	U21	Gairidhara	14	0	0	5	53	0
84	U22	Naxal	8	0	0	7	84	0
85	U23	Narayanchaur	12	0	0	3	62	0
86	U24	Baluwatar1	1	0	0	0	107	0
87	U25	Baluwatar2	4	0	0	1	96	0
88	U26	Naxal Bhatbhateni	11	0	0	7	67	0
89	U27	Tangal	9	0	0	4	80	0
90	U28	Police HQ	6	0	0	3	92	0
91	U29	Naxal Bhagwati	12	0	0	4	62	0
92	U30	Kamal Pokhari	9	0	0	4	80	0
93	U31	Charkhal	11	0	1	4	67	0
94	U32	Kalikasthan	11	0	0	5	67	0
95	U33	Anamnagar	11	0	0	5	67	0
96	U34	Sano Gaucharan	13	0	0	6	58	0

97	U35	Gyaneshwor	11	0	0	8	67	0
98	U36	Maitidevi1	5	0	0	5	93	0
99	U37	Maitidevi2	5	0	0	3	93	0
100	U38	Siphal	8	0	0	8	84	0
101	U39	Purano Baneshwor	13	2	0	11	58	0
102	U40	Jorpati	11	0	0	9	67	0
103	U41	Sanepa	10	0	0	5	76	0
104	U42	Summit Hotel	3	0	0	2	101	0
105	U43	Jhamshikehl Chowk	3	0	0	2	101	0
106	U44	Jhamshikhel	9	0	0	5	80	0
107	U45	Dhobighat	4	0	0	1	96	0

*xxx: Roundabout
Source: JICA Expert Team

4) High Score Extraction (Top 21)

The results of the above scoring of congestion loss time and the number of traffic accidents were added together to calculate a ranking of intersections in need of improvement. The red-shaded rows in Table 4-19 are the high-scoring Top 21 intersections.

Table 4-19：Ranking of Intersection Improvements Needed

SN	ID	Name	Score			Rank
			Congestion	Accident	Total	
1	E01	Chandragiri	2.5	0	2.5	49
2	E02	Soalteemod	5	0	5	32
3	E03	Kalimati-1	5	2.5	7.5	21
4	E04	Kalimati-2	0	0	0	71
5	E05	Teku	10	2.5	12.5	5
6	E06	Maitighar	7.5	7.5	15	4
7	E07	Babar Mahal DOR Chowk	0	0	0	71
8	E08	Naya Baneshwor	7.5	5	12.5	5
9	E09	Civil Hospital Mid Block	0	5	5	32
10	E10	Tinkune1	0	2.5	2.5	49
11	E11	Jadibuti	7.5	10	17.5	2
12	E12	Manohara	2.5	0	2.5	49
13	E13	Lokanthali	2.5	5	7.5	21
14	E14	Kaushaltar	2.5	5	7.5	21
15	E15	Gathaghar	2.5	7.5	10	12
16	E16	Sanothimi	0	10	10	12
17	E17	Thimi	2.5	5	7.5	21
18	E18	Thimi Bypass	0	5	5	32
19	E19	Shyamadham	0	5	5	32
20	E20	Sallaghar West	0	0	0	71
21	E21	Sallaghari Tinkune	0	2.5	2.5	49
22	E22	Sallaghari East	0	0	0	71
23	E23	Ghalate Tol	0	0	0	71
24	E24	Pandu Bazaar	0	5	5	32
25	E25	Suryabinayak	0	2.5	2.5	49
26	N01	Galfutar	0	0	0	71
27	N02	Teaching/Kanti Hospital	2.5	0	2.5	49
28	N03	Shital Niwas	0	0	0	71
29	N04	Lainchaur North/Lazimpat	2.5	2.5	5	32
30	N05	Lainchaur	5	2.5	7.5	21
31	N06	Keshar Mahal	7.5	5	12.5	5
32	N07	Jamal	2.5	0	2.5	49
33	N08	Bhotahiti	0	2.5	2.5	49
34	N09	Bir Hospital	2.5	0	2.5	49
35	N10	New Road	2.5	5	7.5	21
36	N11	Sundhara	7.5	2.5	10	12
37	N12	Tripureshwor	10	7.5	17.5	2
38	N13	Thapathali	5	5	10	12
39	N14	Kupandole	5	2.5	7.5	21
40	N15	Chakupat	5	0	5	32
41	N16	Mantri Qtr/Harihar Bhawan	5	2.5	7.5	21
42	N17	Pulchok1	0	0	0	71
43	N18	Pulchok2	5	0	5	32

44	N19	Pulchok3	5	0	5	32
45	N20	Jawalakhel	5	0	5	32
46	N21	Ekantakuna1	2.5	0	2.5	49
47	R01	Kalanki	5	7.5	12.5	5
48	R02	Balkhu1	0	5	5	32
49	R03	Balkhu2	2.5	7.5	10	12
50	R04	Ekantakuna2	5	5	10	12
51	R05	Chapagau Dobato	2.5	2.5	5	32
52	R06	Satdobato	5	7.5	12.5	5
53	R07	Gwarko	7.5	5	12.5	5
54	R08	Koteshwor	10	10	20	1
55	R09	Tinkune2	5	7.5	12.5	5
56	R10	Tinkune3	0	5	5	32
57	R11	Sinamangal	0	0	0	71
58	R12	Airport	2.5	5	7.5	21
59	R13	Gaushala	5	5	10	12
60	R14	Mitrapark	5	0	5	32
61	R15	Guheshwori	2.5	2.5	5	32
62	R16	Chabahil	5	5	10	12
63	U01	Sorakhutte North	0	5	5	32
64	U02	Sorakhutte	0	0	0	71
65	U03	Galkopakha Chowk	2.5	0	2.5	49
66	U04	Royal Palace South Gate	2.5	0	2.5	49
67	U05	Mahendra Statue/Tindhara	0	2.5	2.5	49
68	U06	Trichandara/Kamaladi	0	2.5	2.5	49
69	U07	Ratnapark	0	2.5	2.5	49
70	U08	Exhibition Road	0	2.5	2.5	49
71	U09	Bhadrakali	0	2.5	2.5	49
72	U10	Tukucha Chowk	0	0	0	71
73	U11	Nagpokhari	0	2.5	2.5	49
74	U12	Jaya Nepal	2.5	0	2.5	49
75	U13	Hattisar	0	0	0	71
76	U14	Hattisar/Kamal Pokhari	0	2.5	2.5	49
77	U15	Kathmandu Plaza	0	0	0	71
78	U16	Kamaladi	2.5	0	2.5	49
79	U17	Dilli Bazar/Putali Sadak	5	2.5	7.5	21
80	U18	Padmodaya1	0	0	0	71
81	U19	Padmodaya2/Anamnagar North	0	2.5	2.5	49
82	U20	Singha Durbar	5	5	10	12
83	U21	Gairidhara	0	0	0	71
84	U22	Naxal	0	0	0	71
85	U23	Narayanchaur	0	0	0	71
86	U24	Baluwatar1	0	0	0	71
87	U25	Baluwatar2	0	0	0	71
88	U26	Naxal Bhatbhateni	0	0	0	71
89	U27	Tangal	0	0	0	71
90	U28	Police HQ	0	0	0	71
91	U29	Naxal Bhagwati	0	0	0	71
92	U30	Kamal Pokhari	0	0	0	71
93	U31	Charkhal	0	0	0	71

94	U32	Kalikasthan	0	0	0	71
95	U33	Anamnagar	0	0	0	71
96	U34	Sano Gaucharan	0	0	0	71
97	U35	Gyaneshwor	0	0	0	71
98	U36	Maitidevi1	0	0	0	71
99	U37	Maitidevi2	0	0	0	71
100	U38	Siphal	0	0	0	71
101	U39	Purano Baneshwor	7.5	0	7.5	21
102	U40	Jorpati	5	0	5	32
103	U41	Sanepa	0	0	0	71
104	U42	Summit Hotel	0	0	0	71
105	U43	Jhamshikehl Chowk	0	0	0	71
106	U44	Jhamshikhel	0	0	0	71
107	U45	Dhobighat	0	0	0	71

*xxx: Roundabout
Source: JICA Expert Team

5) Construction Plan

Table 4-20 shows the intersections covered by the DOR, LMC, and JICA plans shown in 4.3.2. Intersections where construction has already been implemented (R07: Gwarko) or will be implemented (E11: Jadibuti, N14: Kupandole, N16: Mantri Qtr/Harihar Bhawan, R08: Koteshwor, R09: Tinkune2) were excluded from this list. Figure 4-22 shows a map of intersection locations that need priority improvement based on intersections where existing plans exist.

Table 4-20：Intersection Included in the Existing Plan

SN	ID	Name	Rank	DOR Plan*	LMC Plan**	LMC F/S***	JICA Plan****
3	E03	Kalimati-1	21				
5	E05	Teku	5				
6	E06	Maitighar	4	O			
8	E08	Naya Baneshwor	5	O			
11	E11	Jadibuti	2				●
13	E13	Lokanthali	21				
14	E14	Kaushaltar	21				
15	E15	Gathaghar	12				
16	E16	Sanothimi	12				
17	E17	Thimi	21				
30	N05	Lainchaur	21	O			
31	N06	Keshar Mahal	5	O			
35	N10	New Road	21	O			
36	N11	Sundhara	12	O			
37	N12	Tripureshwor	2	O			
38	N13	Thapathali	12	O			
39	N14	Kupandole	21		●		
41	N16	Mantri Qtr/Harihar Bhawan	21		●		
47	R01	Kalanki	5				
49	R03	Balkhu2	12				
50	R04	Ekantakuna2	12			O	
52	R06	Satdobato	5			O	
53	R07	Gwarko	5			●	
54	R08	Koteshwor	1	O			●
55	R09	Tinkune2	5	O			●
58	R12	Airport	21				
59	R13	Gaushala	12				
62	R16	Chabahil	12				
79	U17	Dilli Bazar/Putali Sadak	21	O			
82	U20	Singha Durbar	12	O			
101	U39	Purano Baneshwor	21				

* DDR, Analysis, Procurement, Supervision & Commissioning of Intelligent Traffic System in Kathmandu Valley, DOR, 2021

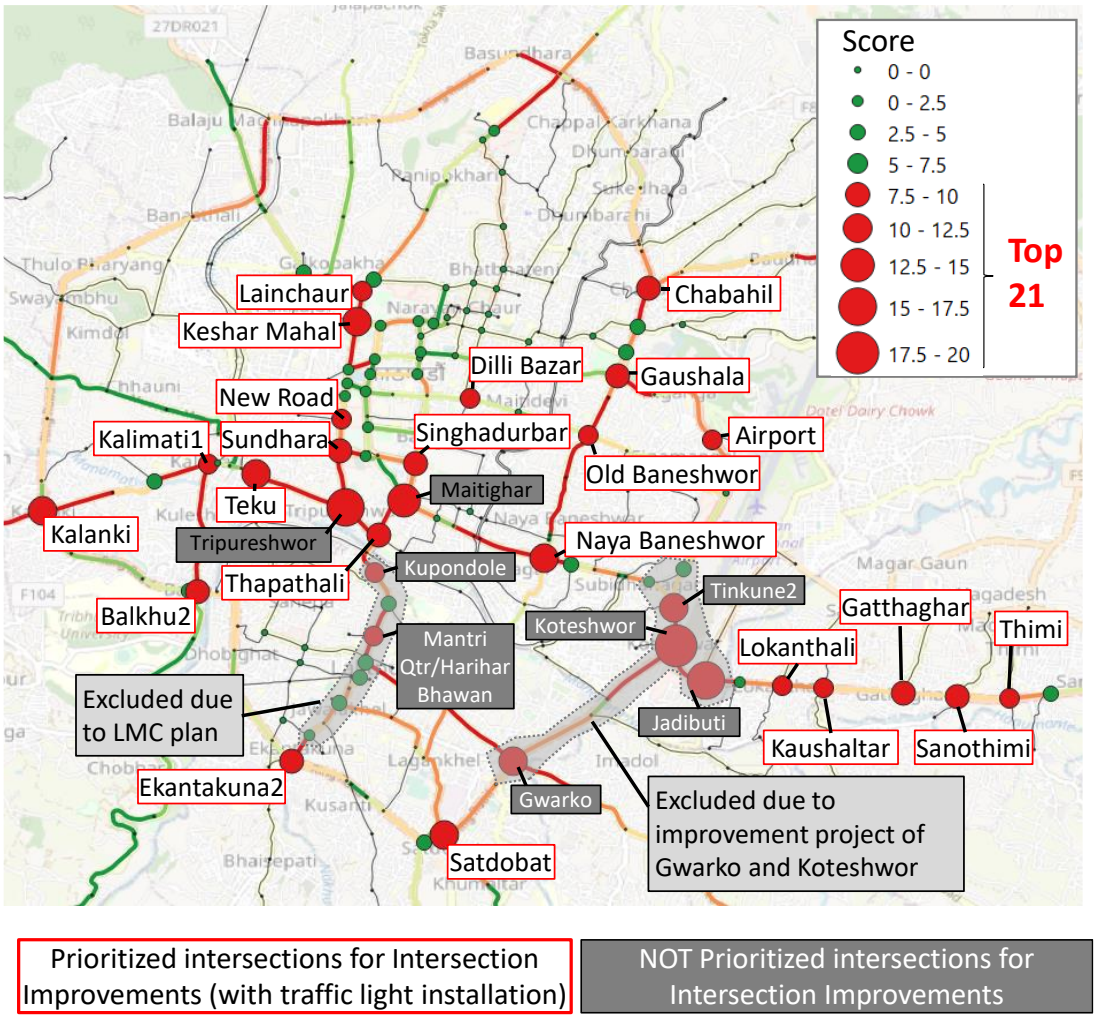
** Design Install Operate and Maintain (DIOM) Contract of Intelligent Traffic Signals in Lalitpur, LMC, 2020

*** Feasibility Study of Flyover at various intersection of Ring Road and Thapathali-Pulchowk Strech, LMC, 2020

**** Koteshwor Intersection Improvement Project

●: Already constructed or will be constructed, O: Plan only

Source: JICA Expert Team



Source: JICA Expert Team

Figure 4-22 : Prioritized Intersection for Intersection Improvements

6) Prioritized Intersection for Intersection Improvement

Table 4-21 shows the list of intersections from the high-scoring Top 21, excluding intersections where construction plans exist. These 23 intersections are the priority intersections requiring improvement and also are signalized for area control.

Table 4-21：Prioritized Intersection for Intersection Improvement

No.	SN	ID	Name	Rank
1	3	E03	Kalimati-1	21
2	5	E05	Teku	5
3	8	E08	Naya Baneshwor	5
4	13	E13	Lokanthali	21
5	14	E14	Kaushaltar	21
6	15	E15	Gathaghar	12
7	16	E16	Sanothimi	12
8	17	E17	Thimi	21
9	30	N05	Lainchaur	21
10	31	N06	Keshar Mahal	5
11	35	N10	New Road	21
12	36	N11	Sundhara	12
13	38	N13	Thapathali	12
14	47	R01	Kalanki	5
15	49	R03	Balkhu2	12
16	50	R04	Ekantakuna2	12
17	52	R06	Satdobato	5
18	58	R12	Airport	21
19	59	R13	Gaushala	12
20	62	R16	Chabahil	12
21	79	U17	Dilli Bazar/Putali Sadak	21
22	82	U20	Singha Durbar	12
23	101	U39	Purano Baneshwor	21

Source: JICA Expert Team

4.3.5 Activity 1-5：Coordination Meetings with Related Organizations

(1) Holding of JCC

The JCC held a total of 7 JCC meetings as described in Section 3.

(2) Holding of WG

Table 4-22 shows a summary of the WGs held.

Table 4-22：Summary of WG

WG	Date	Contents	Participants
1	September 15, 2025	・Information sharing on the status of DOR, LMC, KMC and KVDA projects related to urban transportation ・Discuss and agree on the outcomes of the Urban Transportation Management Plan	KVDA, LMC, RSTU, DOTM, KVTPO, KMC, JET

Source: JICA Expert Team

5. Output-2: Intersection Improvement Capacity Is Enhanced

5.1 Overview

For Output-2, five activities were implemented in PDM with the Objectively Verifiable Indicators shown in Table 5-1.

Table 5-1：Objectively Verifiable Indicators for Output-2

1.	Intersections required to be improved in the Kathmandu Valley will be identified and intersection improvement plans will be formulated.
2.	At least one intersection will be improved.

Source: JICA Expert Team

5.2 Record of Meetings

Table 5-2 shows the results of discussions with each organization.

Table 5-2：Record of Meeting Related to Output-2

Date	Organization	Agenda
December 9, 2022	RSTU	・Consensus-building process for the selection of the pilot project intersection ・Selection process of the pilot project intersection by JET ・Implementation contents and schedule of the pilot project
December 21, 2022	RSTU, LMC, KVDA, KVTPO, DOTM	・Discussion on the selection of the target intersection for the pilot project
May 18, 2023	RSTU, LMC, KMC, KVDA, KVTPO, DOTM	・Discussion and agreement on the detailed design drawings and bidding documents prepared by JET for the implementation of the pilot project ・Discussion and agreement on the items to be coordinated by each relevant agency
September 7, 2023	RSTU, KMC, KVTPO, DOTM	・Discussion and agreement with the Nepalese side on the basic design drawings prepared by JET for the implementation of the pilot project

Source: JICA Expert Team

5.3 Details of Activities

5.3.1 Activity 2-1 : Recognition & Identification of Current Situation and Issues of Road Network and Intersections in Kathmandu Valley

(1) Field survey of the subject intersections

The 107 major intersections in the Kathmandu Valley selected for the baseline study were classified into 17 types in the following manner in terms of typology of intersection improvements. Representative intersections for each type were also selected for traffic-related data collection and analysis.

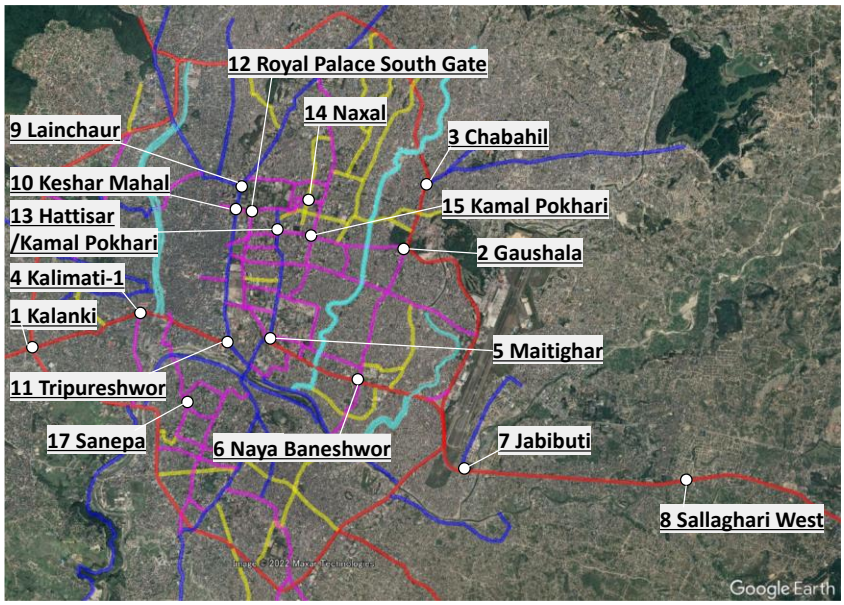
- ✓ Collect information on the number of connecting legs, number of lanes on each connecting leg, presence of median, presence of service roads, presence of nearby bus stops, alignment of intersecting roads, crossing angles, conflicts, presence of nearby intersections, etc.

- ✓ Each intersection is grouped based on the combination of road classifications of the intersecting roads, such as National Highway and National Highway (NH-NH), National Highway and Feeder Road (NH-FR), National Highway and Urban Road Major (NH-Uj), National Highway and Urban Road Minor (NH-Un), etc., and classified into 10 types in total
- ✓ For each intersection classification, further classification by number of intersecting legs, etc. (4-legs, 3-legs, land-about/other)

Table 5-3：Intersection Data Table for Intersection Classification

SN	Name	Location	Link Code L1	Link Code L2	Extra Code	Signal Code	No. of Legs Major	No. of Legs Minor	No. of Lanes in Leg MJ1	MJ2	MN1	MN2	Median	Service Road	BusStop Nearby	Curve	Skew	Stagger	Close	Rt Turn Lanes	Lt.Turn Channel	Round-about	One Way	Degree of Congestion	General Remarks	Filter reason
NH-NH																										
4-leg																										
1	R07	Gwarko	NH	NH	RR-W	N	2	2	4	4	2	1	0	1	1	1	0	0	0	0	0	0	0	3	Widened	
3-leg																										
1	R09	Tinkune2	NH	NH	KB	J	2	1	4	4	4	0	1	0	0	1	1	0	0	1	0		0	2		delete similar considered
2	R10	Tinkune3	NH	NH		J	2	1	4	4	4	0	0	0	0	1	1	0	0	1	0		0	2		delete similar considered
3	E10	Tinkune1	NH	NH	KB	J	2	1	4	4	4	0	1	0	0	1	1	0	0	1	1		0	2		
Irregular/Roundabout																										
1	R01	Kalanki	NH	NH	RR-W	N	2	2	4	4	4	4	1	1	1	1	0	0	0	0	0	0	0	3	Widened Underpass	
2	R08	Koteshwor	NH	NH	KB	J	2	2	4	4	4	2	1	1	1	0	1	0	0	1	0		0	3	1-minor irregular	
NH-FR																										
4-leg																										
2	R04	Ekantakuna2	NH	FR	RR-W	N	2	2	4	4	2	2	0	1	0	1	1	0	0	0	0	0	0	2	Widened	
3	R16	Chabahil	NH	FR	RR	N	2	2	4	4	4	1	0	1	1	0	1	0	0	0	0		0	2		
5	E11	Jadibuti	NH	FR	KB	J	2	2	4	4	2	2	1	0	1	0	0	0	0	1	1		0	3		

Source:：JICA Expert Team



SN	Name	Location
1	R01	Kalanki
2	R13	Gaushala
3	R16	Chabahil
4	E03	Kalimati-1
5	E06	Maitighar
6	E08	Naya Baneshwor
7	E11	Jadibuti
8	E20	Sallaghari West
9	N05	Lainchaur
10	N06	Keshar Mahal
11	N12	Tripureshwor
12	U04	Royal Palace South Gate
13	U14	Hattisar/Kamal Pokhari
14	U22	Naxal
15	U30	Kamal Pokhari
16	U39	Purano Baneshwor
17	U41	Sanepa

Source：JICA Expert Team

Figure 5-1：Representative Intersections of the 17 Selected Types

(2) Collection and Analysis of Traffic Flow Data of Intersection and Road Networks

Detailed field surveys were conducted for all representative intersections of 17 types, and video image analysis was conducted for 13 intersections (Figure 5-2).

The results of the video image analysis showed that there are many potential accident case, and the results were categorized as follows.

① Traffic conflicts between intersecting straight-through vehicles

② Traffic conflicts between right-turning vehicles and straight-through vehicles

③ Traffic conflicts related to crossing pedestrians

④ Traffic conflicts by the traffic jams ahead

⑤ Traffic conflicts by bus stops

⑥ Traffic conflicts by vehicles ignoring traffic signals

⑦ Traffic conflicts by no designated running position

⑧ Traffic conflicts by two way traffic flow lines

⑨ Traffic conflicts by signalized intersection within roundabout

Source：JICA Expert Team

Figure 5-2：Example of Video Analysis from Drone Photography (Traffic Conflicts Between Intersecting Straight-Through Vehicles)

(3) Collection and analysis of accident data at intersections

From the results of 4.3.3(1), the accident data for each representative intersection was reviewed and analyzed.

(4) Identification of current status of intersections and classification of issues

Six types of traffic problems were extracted: straight with straight vehicles, straight with right-turning vehicle, other vehicle with vehicles, with pedestrians, with stopping bus, and within roundabout. In addition, three types of traffic congestion were extracted: by deadlocked traffic jam, by waiting flow-in vehicles, and by stopping vehicles, while two types of violation behavior were extracted: walking outside walkway and signal ignoring (Table 5-4).

Table 5-4：Traffic Problem Classification for Representative Intersections

issues		intersection number																
		R01	R13	R16	E03	E06	E08	E11	E20	N05	N06	N12	U04	U14	U22	U30	U39	U41
traffic behavior analysis		✓	✓		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓		✓
traffic conflicts	straight with straight vehicles	✓	✓	—	✓			—							✓	✓		
	straight with right-turning	✓	✓	—	✓		✓	—	✓		✓				✓			✓
	other vehicles with vehicles	✓	✓	—	✓	✓	✓	—	✓		✓			✓	✓	✓		
	with pedestrians	✓	✓	—	✓		✓	—		✓	✓		✓	✓	✓	✓		
	with stopping bus	✓	✓	—	✓				✓									
	within roundabaut	—	—	✓	—	✓	—	—	—	—	—	✓	—	—	—	—	—	—
traffic congestions	by deadlocked traffic jam	✓	✓	—	✓	✓	✓	—		✓			✓	✓	✓	✓		
	by waiting flow-in vehicles	✓	✓	—	✓	✓		—										
	by stopping vehicles	✓	✓	—	✓													
violation behavires	walking outside walkway	✓	✓	—	✓		✓	—		✓	✓		✓	✓	✓	✓	✓	
	signal ignoring	✓	✓	—	✓		✓	—		✓	✓		✓			✓	✓	
✓ : yes、blank : no or pending、— : not subject																		

Source：JICA Expert Team

5.3.2 Activity 2-2：Development of Guideline for Intersection Improvement

(1) Purpose and Content of Developing Intersection Improvement Guidelines

1) Purpose of Guideline Formulation

The purpose of developing these guidelines was to

- ✓ Compile the results, issues, etc. obtained through the implementation of the pilot project, and formulate intersection improvement guidelines that summarize possible improvement measures based on the utilization of existing intersections.
- ✓ Conduct seminars and training for Nepalese government officials in leadership positions on the Guidelines for Intersection Improvement, and establish a system to enable Nepalese government officials to conduct their own seminars, etc. after the completion of this project.
- ✓ Develop an intersection improvement plan for the Kathmandu metropolitan area using the Intersection Improvement Guidelines (relatively small-scale improvements utilizing existing intersections rather than large-scale construction)

2) Guideline Content

This guideline is composed of three parts: the theoretical part, the case study part, and the applications part, which can be applied step by step from theory to practice (Table 5-5). The case study and application parts are based on the pilot project intersections and other intersections in the Kathmandu Valley, taking into account the characteristics of intersections in the Kathmandu Valley.

Table 5-5：Composition and Content of the Guidelines

Part	Contents
PART-I THEORETICAL	BASICS OF PLANNING AND DESIGN Explanation on fundamentals of intersection planning and design Introduction of Intersection Design Standards for Nepal Introduction of improvement methods in planning and design aspects Introduction of Procedure for Intersection Improvement
PART-II CASE STUDY	PILOT PROJECT AT NAYA BANESWOR INTERSECTION Application of guideline for improvement of typical four leg intersection PILOT PROJECT AT LAINCHAUR INTERSECTION Application of guideline for improvement of typical three leg intersection Feedback from the application of guideline in real field and improvement of guideline based on field application SIMULATION AT GAUSHALA INTERSECTION
PART-III APPLICATIONS	IMPROVEMENT METHODS OF TYPICAL INTERSECTIONS IN KTM VALLEY Selection of typical intersections (17) to represent major intersections in KTM valley Follow basic steps of guideline to find issues Follow basic steps of guideline to provide general countermeasures Recommendations for applying guidelines for remaining intersection in KTM valley

Source：JICA Expert Team

(2) Analysis of current traffic at intersections

When planning and designing intersections, the following should be understood with respect to traffic flow and geometric conditions

1) Quantitative data collection

The necessary data shown in Table 5-6 should be collected and summarized as shown in Figure 5-3 in 4) Current Traffic Analysis.

Table 5-6：Data Required for Intersection Design

Items		Remarks
Traffic data	Hourly traffic volume by direction, vehicle type	Peak hours(2~3 hours) traffic should be counted and 12、24 hour traffic if necessary.
	Bicycle, pedestrian traffic volume	When there is extremely large Pedestrian traffic, during peak hours should be counted by crossing point.
	Que Length	Que length should be measured by surveyor in congestion time.
	Travel Speed Survey	Floating car method using GPS devise
	Traffic Accident Data	For the past 3 years by location and type
Geometric Structure		Road Alignment, Crossing angles, Number of lanes, Cross section, Lane width, Lane markings

Source：JICA Expert Team

2) Understanding the geometry of the intersection and the location of facilities

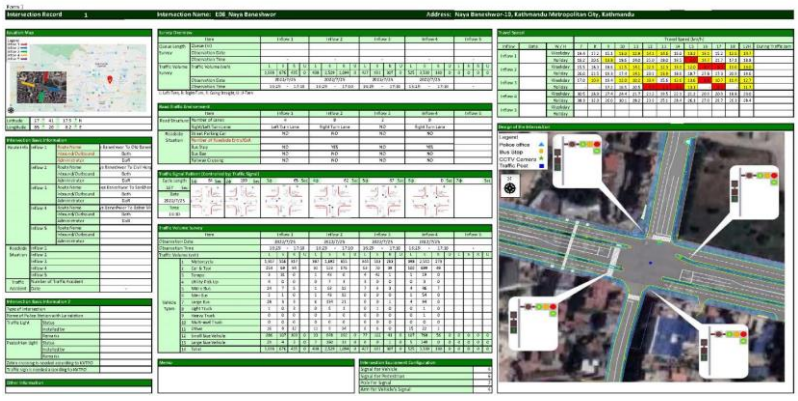
The location of road markings, traffic signals, and other traffic safety facilities will be shown on a schematic map, and a plan for improvements will be discussed.

3) Identification of surrounding land use and facility location

Identify facilities and land uses that affect traffic flow at the intersection, such as roadside parking lots and commercial facilities. For structural improvements, verify site boundaries.

4) Examples of current traffic analysis

An example of a table listing the location, shape, traffic-related facilities, traffic volume by direction, and current status of signals at the intersection to be studied (Figure 5-3).



Source：JICA Expert Team

Figure 5-3：Example of Traffic Analysis of an Intersection

(3) Identification of traffic flow problems at intersections

Based on the traffic flow issues at each representative intersection organized in 5.3.1(4), the proposed intersection improvements were studied.

(4) Specifics of proposed intersection improvements

Table 5-7 shows the relationship between the problems identified as a result of the field observations and video analysis and the countermeasures. As shown in the same table, the problem events identified were traffic congestion due to traffic conflicts with vehicles proceeding straight ahead, vehicles proceeding straight ahead and turning right, pedestrians crossing, stopped buses, etc., and traffic violations such as crossing outside the sidewalk and disregarding traffic signals.

Table 5-7：Proposed Improvements to Address Traffic Issues

issues		countermeasures										
		roadway maintenance		road markings			traffic signal		traffic control tower	Compacting intersections	Roundabout intersectionization	management for bus-stops
		intersection	sidewalk around intersection/road	running lane (position)	pedestrian walkway	stop line	vehicles	pedestrian	move or remove			
traffic conflicts	straight with straight vehicles	○		○		○	○			○	－	－
	straight with right-turning	○		○		○				○	－	－
	other vehicles with vehicles	○		○		○				○	－	－
	with pedestrians	○	○	○	○	○		○		○	－	－
	with stopping bus										－	○
	within roundabaut			○			－	－		－	○	－
traffic congestions	by deadlocked traffic jam			○								－
	by waiting flow-in vehicles			○								－
	by stopping vehicles			○								－
violation behavires	walking outside walkway		○		○			○		○	－	－
	signal ignoring			○		○	○	○		○	－	－
○：required、blank：no or pending、－：not subject												

Source：JICA Expert Team

The following is a summary of the proposed improvements that address each issue.

① Roadway maintenance: In many locations, the road surface at intersections and surrounding sidewalks is uneven and the width of the surrounding sidewalks is narrow. As a result, it has been observed that vehicles change their driving position to avoid uneven surfaces and pedestrians walk on the roadway.

② Road surface markings: There are few road surface markings indicating driving positions within the intersection, and right-turning vehicles, vehicles going straight, left-turning vehicles, etc. are not controlled in an orderly manner. In addition, many of the temporary stop lines and crosswalks are unclear and their locations are not desirable.

③ Traffic signals: some intersections are not maintained for cars and pedestrians, but even when they are, they are often unlit and uncontrolled.

④ Traffic Control Islands: The location of traffic control islands within an intersection allows for observation of the impact of the islands on the location of traffic traveling through the intersection. It may be desirable to change the location of the control island or it may be necessary to consider removing it.

⑤ Compacting intersections: Generally, intersection sites are large, and some spaces are identified that are completely unrelated to traffic flow. Compacting intersections is expected to increase traffic capacity at intersections by reducing the time required to pass through or cross intersections.

⑥ Conversion of roundabouts to intersections: Some roundabouts have been seen with traffic signals installed without changing the shape of the roundabout. Given that roundabouts and intersections have completely different traffic control mechanisms, there are cases where it is desirable to convert a roundabout into an intersection or other form.

⑦ Regulations regarding bus stop locations and stopping methods: Bus stops are not designated, or even if they are designated, buses are seen stopping even within intersections because they are not stopping accordingly. In consideration of the impact on traffic flow, bus stop locations should be designated and the method of stopping should be regulated. In addition, the installation of bus bays should be considered in some locations.

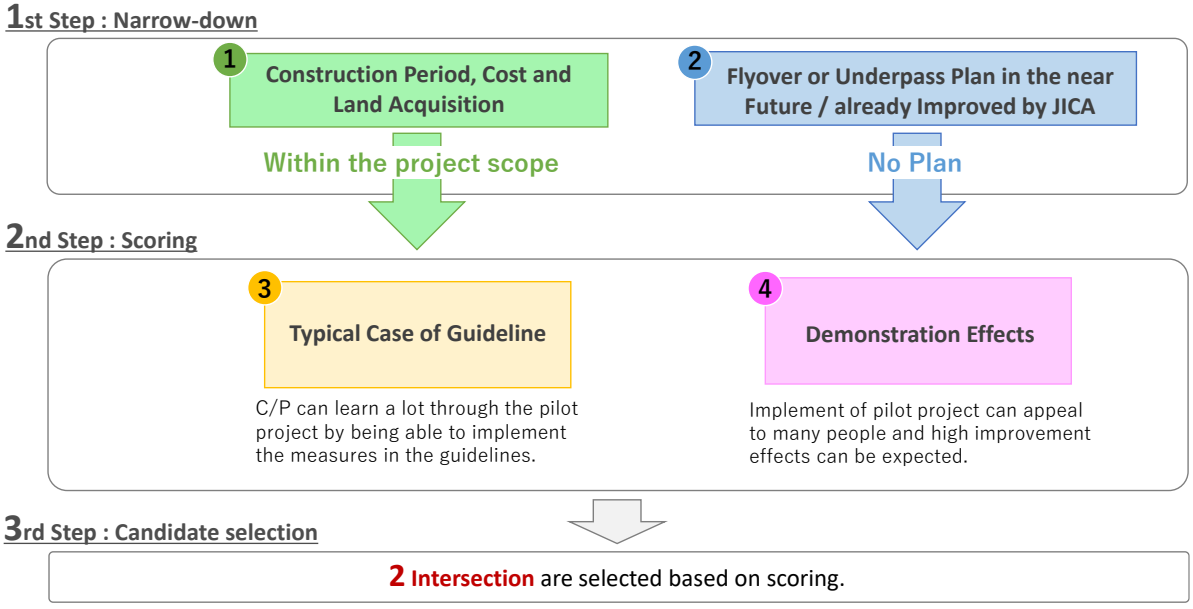
(5) Study of measures to address remaining issues after intersection improvements

While the above measures are mainly engineering-related hard measures, education and enforcement, i.e., traffic safety education and traffic guidance and enforcement activities related to the measures, are also essential to increase the effectiveness of the measures and should be implemented in a planned and phased manner in conjunction with the implementation of hard measures.

5.3.3 Activity 2-3：Implementation of Pilot Project on Improvement of an Existing Intersection

(1) Selection of intersections for the pilot project

Selection of intersections for the pilot project was made for 17 representative intersections listed in 5.3.1(1). Selection was narrowed down in the first stage by confirming the construction period, construction cost, land expropriation allowance, and existence of a multi-level crossing plan. The five selected intersections were scored based on their appropriateness and appeal as targets for application of the guidelines, and the Naya Baneshwor and Lainchaur intersections were selected (Figure 5-4).



Source：JICA Expert Team

Figure 5-4：Selection Flow for Pilot Project Intersections

The first phase of the project was narrowed down to five intersections (Table 5-8).

Table 5-8：Results of the First Stage of Selection

SN	ID	Location	Construction Period, Cost and Land Acquisition	Whether a grade separation plan exists	Narrow Down
1	R01	Kalanki	○	Yes	×
2	R13	Gaushala	○	No	Go to Step 2
3	R16	Chabahil	×	No	×
4	E03	Kalimati-1	○	Yes	×
5	E06	Maitighar	×	No	×
6	E08	Naya Baneshwor	○	No	Go to Step 2
7	E11	Jabibuti	○	Yes	×
8	E20	Sallaghari West	○	Yes	×
9	N05	Lainchaur	○	No	Go to Step 2
10	N06	Keshar Mahal	○	Yes	×
11	N12	Tripureshwor	×	No	×
12	U04	Royal Palace South Gate	○	No	Go to Step 2
13	U14	Hattisar/Kamal Pokhari	○	No	Go to Step 2
14	U22	Naxal	×	No	×
15	U30	Kamal Pokhari	×	No	×
16	U39	Purano Baneshwor	×	No	×
17	U41	Sanepa	×	No	×

Source：JICA Expert Team

In the second stage, the Naya Baneshwor and Lainchaur intersections, which received high selection scores, were chosen (Table 5-9).

Table 5-9：Results of the Second Stage of Selection

Evaluation Method

Evaluation Item	Evaluation Method / Criteria	
3 Typical Case of Guideline	Classification typical and unique case of guideline.	A: Typical Case. B: Unique Case.
4 Demonstration Effect	Qualitatively evaluate the improvement effect of intersection.	A: High effectiveness is expected. B: Medium effectiveness is expected. C: Low effectiveness is expected.

Evaluation Score

SN	Location	3 Typical Case of Guideline	4 Demonstration Effect	Evaluation Score A: 3 point, B: 2 point, C: 1 point
2	Gaushala	B: Unique case	B: Medium effectiveness is expected.	4
6	Naya Baneshwor	A: Typical case	A: High effectiveness is expected.	6
9	Lainchaur	A: Typical case	A: High effectiveness is expected.	6
12	Royal Palace South Gate	B: Unique case	B: Medium effectiveness is expected.	4
13	Hattisar/Kamal Pokhari	B: Unique case	C: Low effectiveness is expected.	3

Source：JICA Expert Team

(2) Planning and design of intersection improvement measures

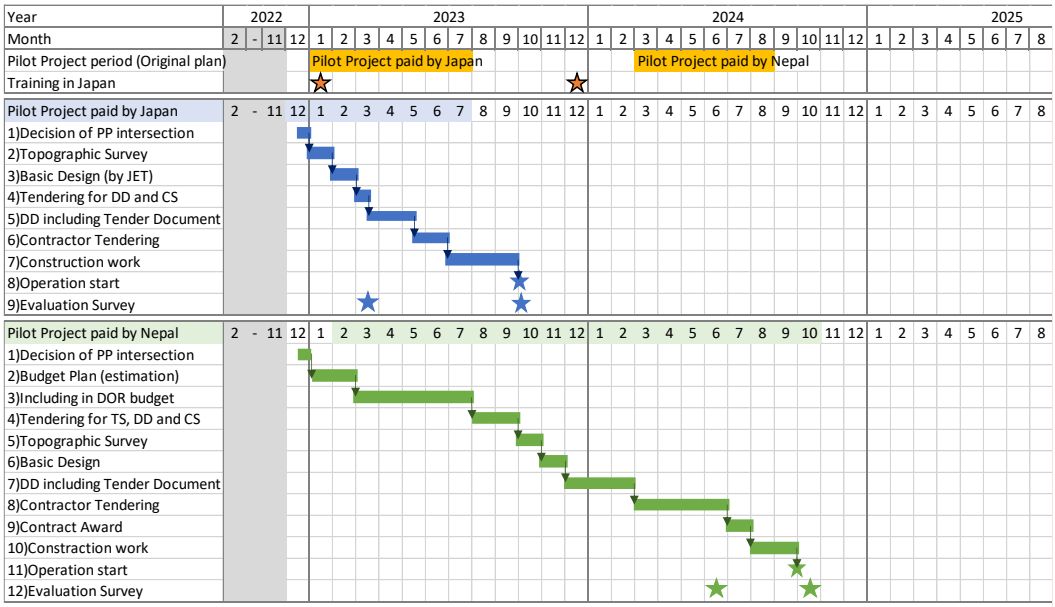
1) Pilot Project Implementation Plan

The Japanese pilot project included surveying, basic design, bidding for detailed design and construction supervision, detailed design and preparation of bid documents, construction bidding, construction work, and project evaluation. The detailed design, construction supervision, and construction work were performed by procuring local contractors through local re-commissioning.

The pilot project implemented by the Nepalese side involved budgeting by the Road Bureau, bidding for detailed design and construction supervision, surveying and investigation, basic design, detailed design and preparation of bid documents, construction bidding, construction work, and project evaluation. Design-related matters were carried out by the Road Bureau.

The overall process plan is shown in Table 5-10.

Table 5-10：Pilot Project Implementation Plan

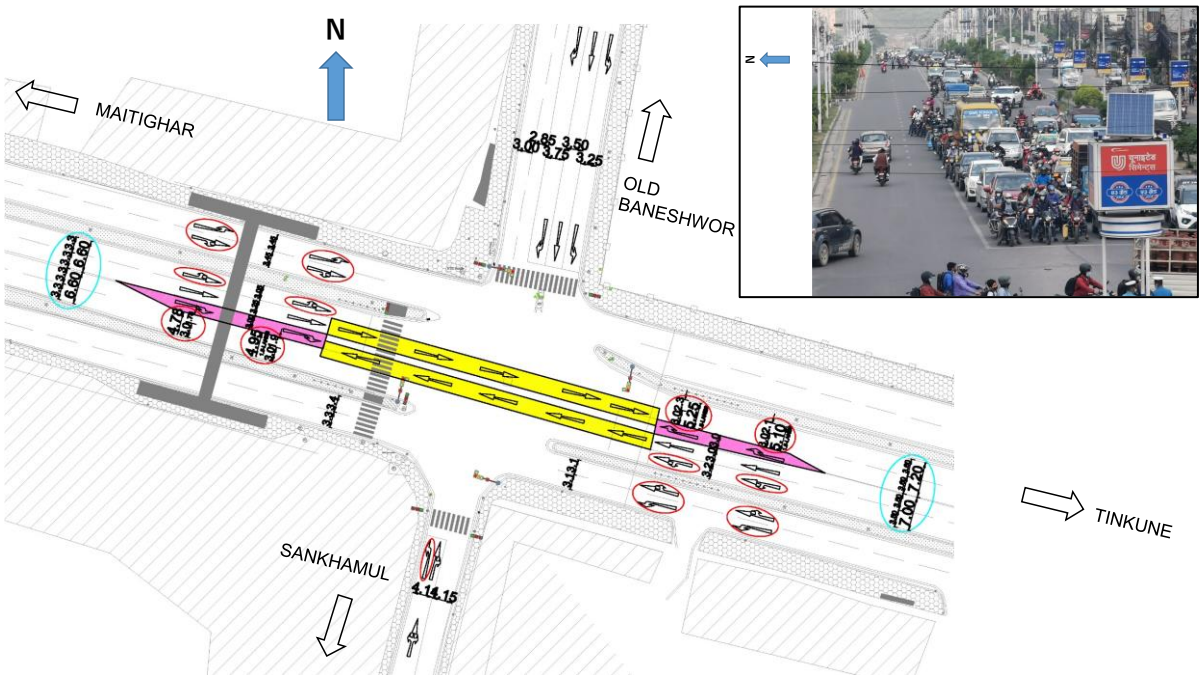


Source: JICA Expert Team

2) Planning and design of the pilot project (Naya Baneshwor intersection) for Japanese implementation

The Naya Baneshwor intersection is a cross signal intersection located on the main road connecting the east and west sides of downtown Kathmandu. It is a busy intersection with a mix of motorcycles, cars, and large buses. It also has a high pedestrian traffic volume and a pedestrian bridge on the west side. An improvement plan was studied to remedy the following problems identified as causes of traffic congestion.

- ✓ The right turn lane on the incoming road from the east side is made using the partial width of the straight lane in the opposite direction
- ✓ In the east-west direction, the straight lane in the opposite direction is encroaching into the right turn lane in the opposite direction
- ✓ Only 1.5 lanes wide are available at the entrance, compared to 2 lanes wide at the exit of the east outflow road (Figure 5-5).

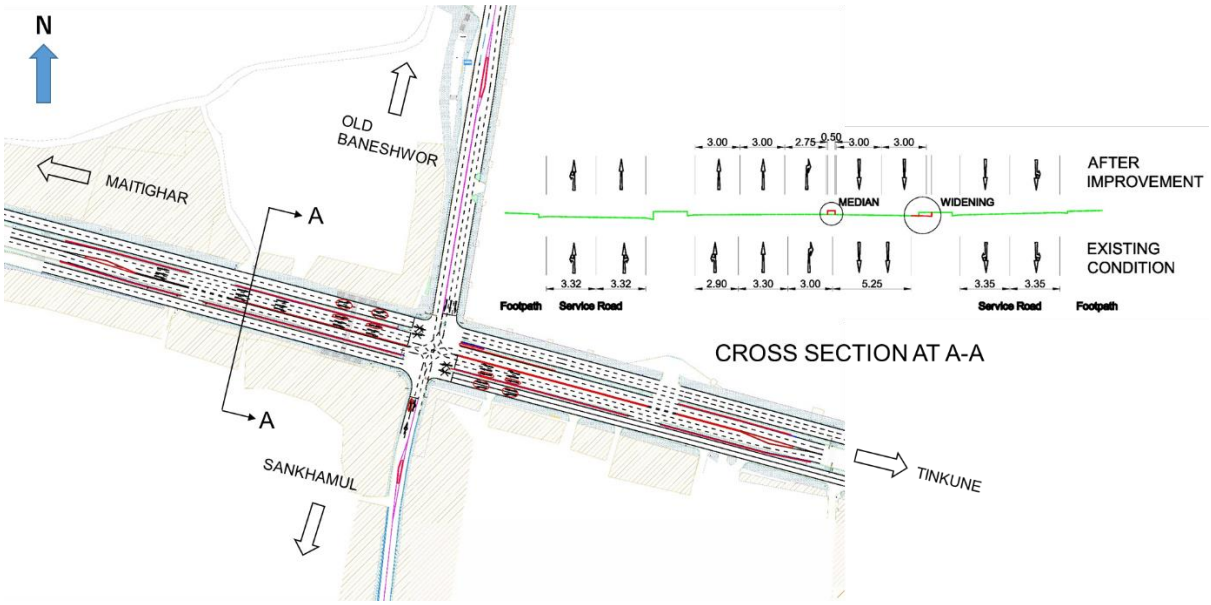


Source: JICA Expert Team

Figure 5-5 : Traffic Flow Issues at the Naya Baneshwor Intersection

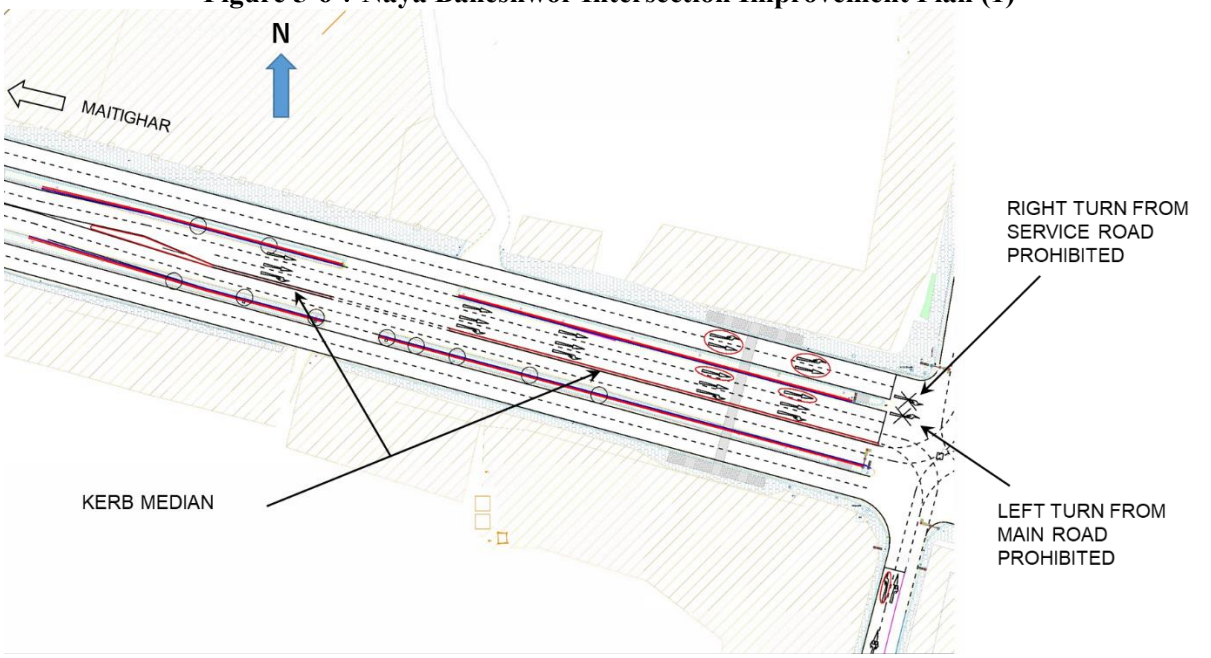
The following improvement plan was proposed to remedy the above problems.

- ✓ Right turn lane along Maitighar-Tinkune with a narrow median barrier of 0.5 m width (Figure 5-6)
- ✓ Reduce width of existing separation island and widen (Figure 5-6, Figure 5-7)
- ✓ Utilize and optimize existing signals
- ✓ New signals to be installed in future DOR projects



Source: JICA Expert Team

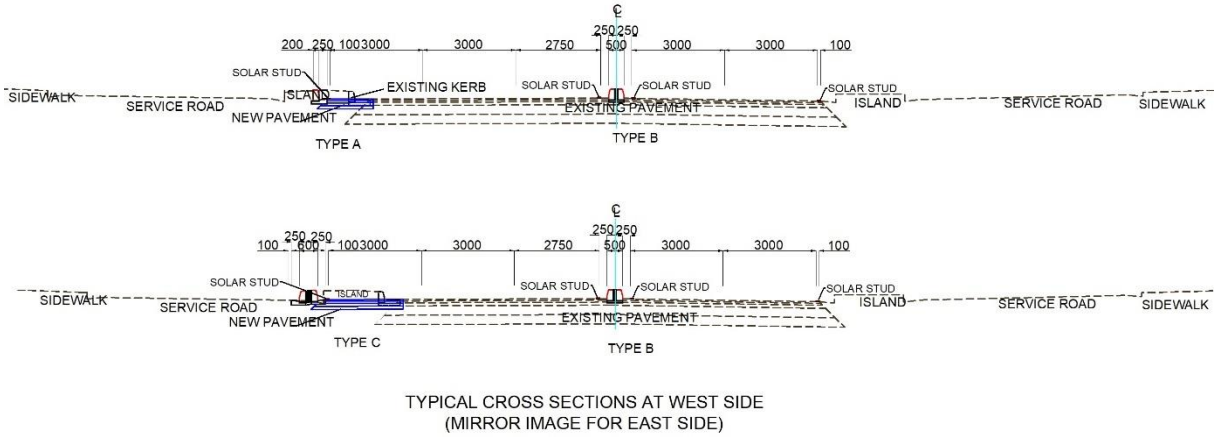
Figure 5-6：Naya Baneshwor Intersection Improvement Plan (1)



Source: JICA Expert Team

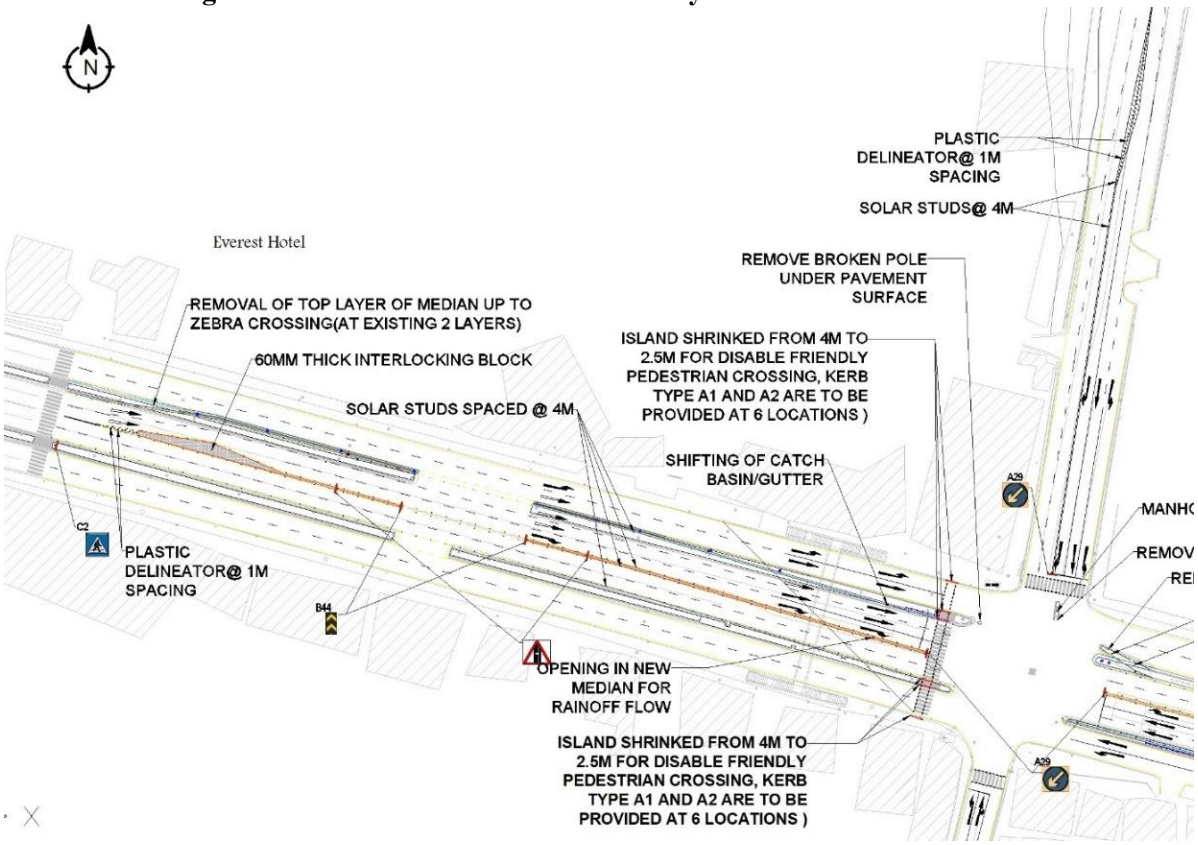
Figure 5-7：Naya Baneshwor Intersection Improvement Plan (2)

Based on the agreement with the relevant agencies on the above proposed improvement plan, the design was implemented as follows (Figure 5-8, Figure 5-9, Figure 5-10, Figure 5-11).



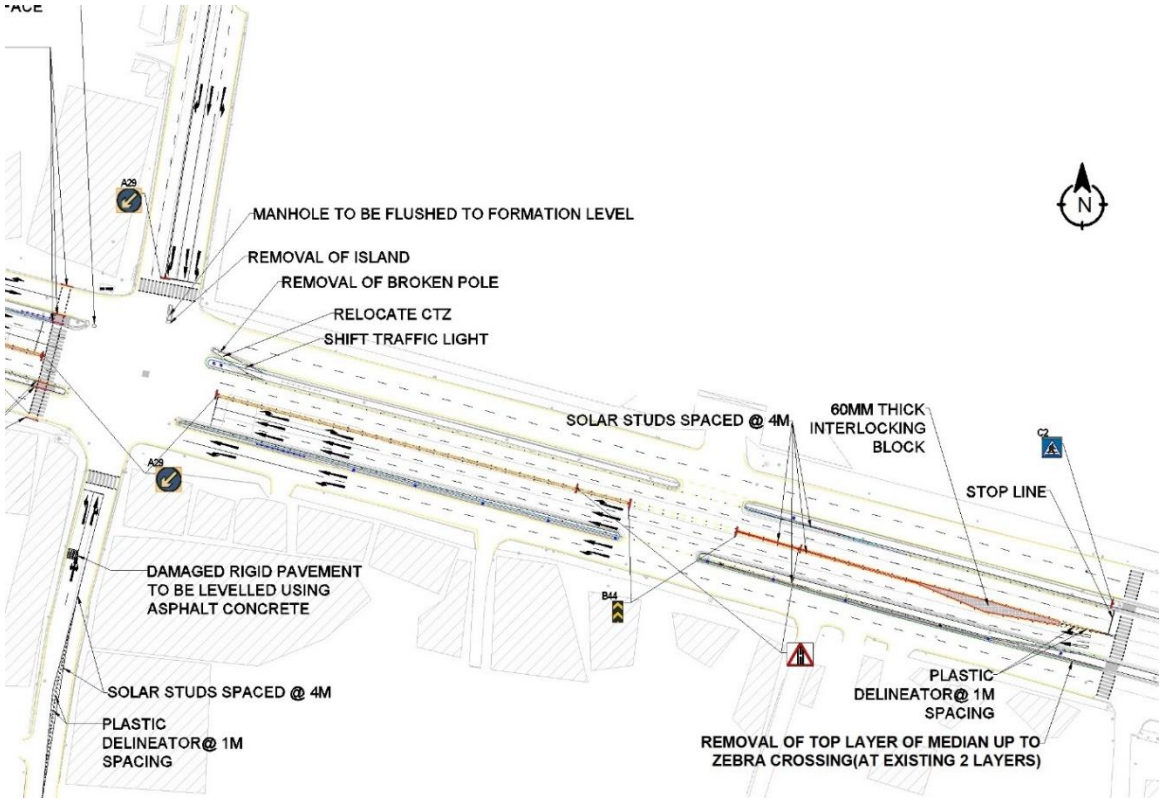
Source: JICA Expert Team

Figure 5-8：Standard Transect of the Naya Baneshwor Intersection



Source: JICA Expert Team

Figure 5-9：Plan of Naya Baneshwor Intersection (1)



Source: JICA Expert Team

Figure 5-10：Plan of Naya Baneshwor Intersection (2)

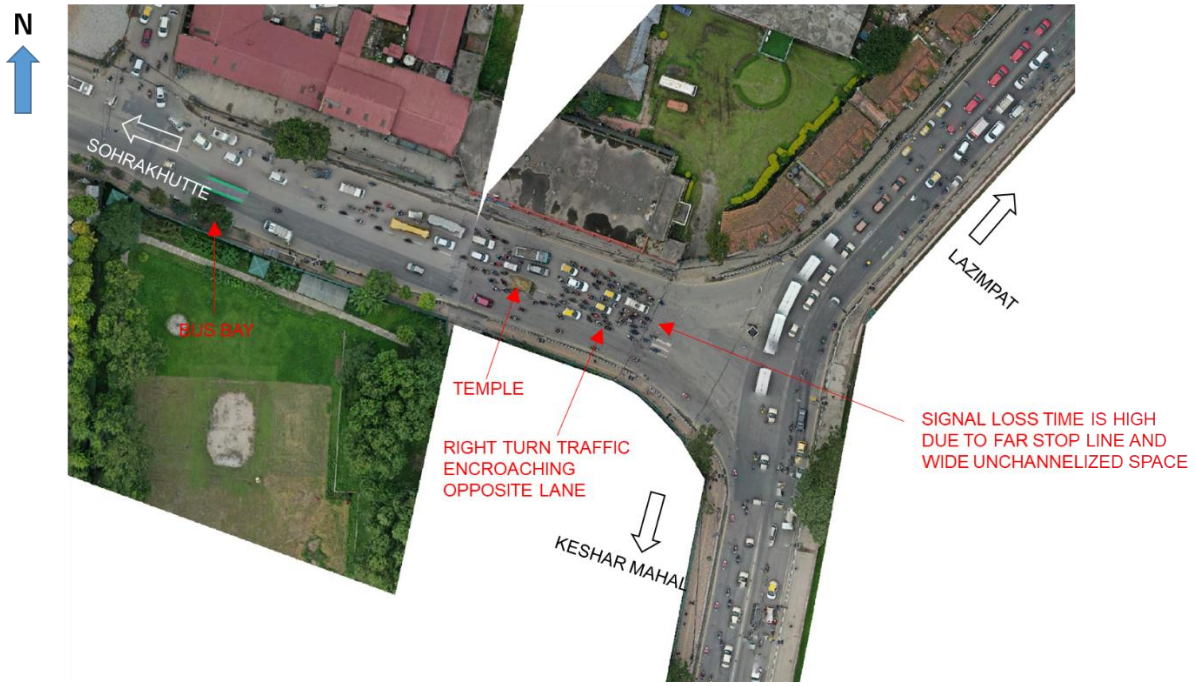
Source: JICA Expert Team

Figure 5-11：Layout of Road Facilities at Naya Baneshwor Intersection

3) Planning and Design of a Pilot Project (Lainchaur Crossing) for Implementation on the Nepalese Side

The Lainchaur intersection is a T-shaped signalized intersection located on the main road connecting the north and south sides of downtown Kathmandu, and is a congested intersection with a mix of motorcycles, cars, and small and medium-sized buses. Improvements have been made to address the following issues identified as causes of traffic congestion (Figure 5-12).

- ✓ Signal indications do not match traffic flow and traffic is not handled efficiently
- ✓ The road surface markings at the intersection are unclear and the stop line position is far from the center of the intersection, resulting in a large amount of lost time.
- ✓ Right turn incoming vehicles from the west are encroaching into the outflow channel.
- ✓ A small shrine is in the median.
- ✓ Bus stop on west outflow road causing congestion.

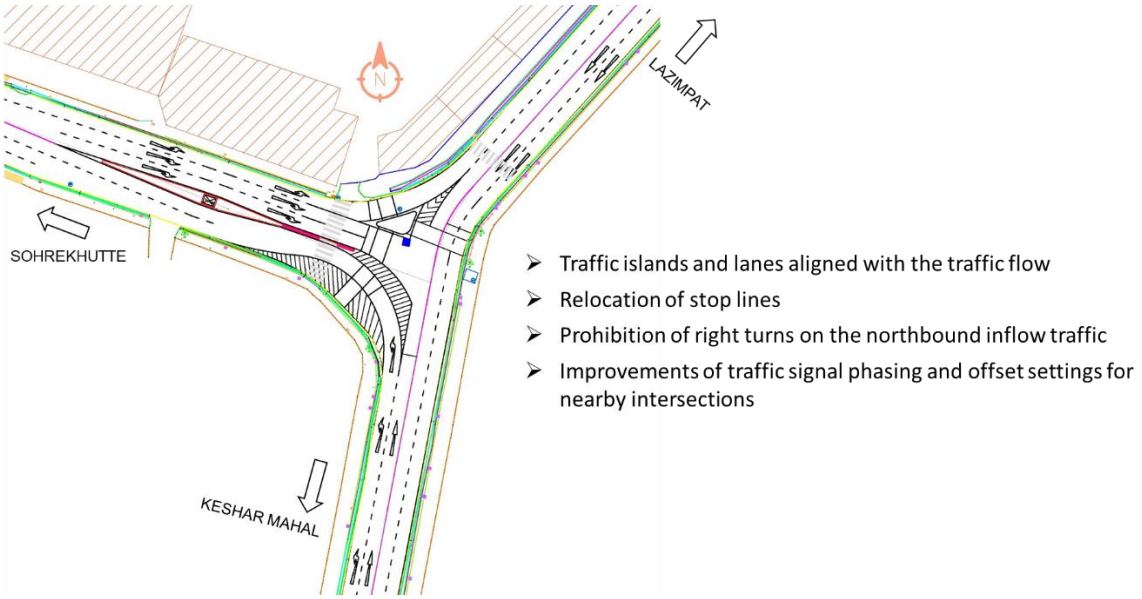


Source: JICA Expert Team

Figure 5-12：Problems at the Lainchaur Intersection

The following improvements were proposed to remedy the above problems.

- ✓ Improve signal indications and set offsets to signals at adjacent intersections
- ✓ Bring road surface markings such as conduit and stop line locations closer to the center of the intersection (Figure 5-13)
- ✓ Road surface markings for smooth avoidance of medians with shrines (Figure 5-13)



Source: JICA Expert Team

Figure 5-13：Proposed Improvements to the Lainchaur Intersection

(3) Implementation of Intersection Improvement Measures

The construction work at the Naya Baneshwor intersection was carried out by ITECO Nepal Ltd. as construction supervision consultant and Swachehanda Nirman Sewa Ltd. as construction contractor. The main construction work was carried out during the nighttime to avoid congestion at the intersection, and special attention was paid to safety measures. The construction period was initially planned to be two and a half months, but was delayed due to unexpected rainfall conditions (Figure 5-14, Figure 5-15, Figure 5-16).

Source: JICA Expert Team

Figure 5-14：Naya Baneshwor Intersection Construction (Leading to Detour for Construction)

Source: JICA Expert Team

Figure 5-15：Naya Baneshwor Intersection Construction (Demolition of Existing Ditch)

Source: JICA Expert Team

Figure 5-16：Naya Baneshwor Intersection Construction (Left: Streetlight Relocation, Right: Flagpole Relocation)

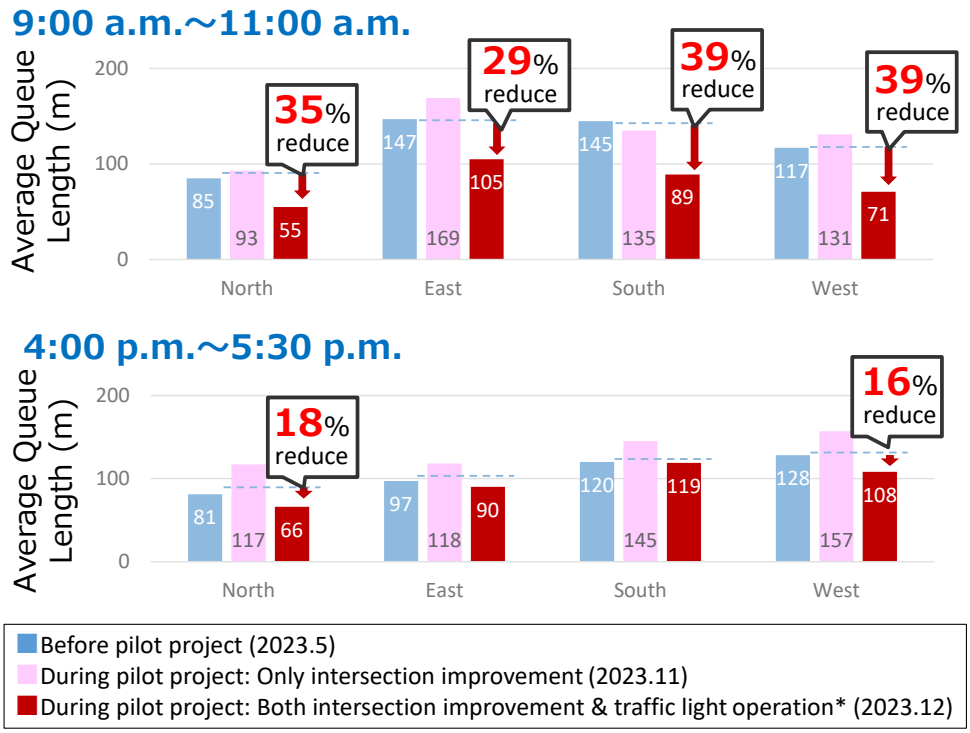
(4) Evaluation, operation, and monitoring after intersection improvements

1) Evaluation of the Pilot Project Implemented by the Japanese Side (Naya Baneshwor Intersection)

To evaluate the effects of the intersection improvement, a baseline survey was conducted in May 2023, a post-improvement survey in November 2023, and a further survey in December 2023 after both the intersection improvement and signal operation were implemented. Regarding signal operation, the traffic control room monitored congestion length in each direction through CCTV images, and applied pre-prepared signal phase patterns that prioritized traffic flow in the congested directions. In preparing these signal patterns, the previously excessive cycle length was shortened to 160 seconds as the standard, and 15 different patterns corresponding to congestion length in each direction were developed and applied.

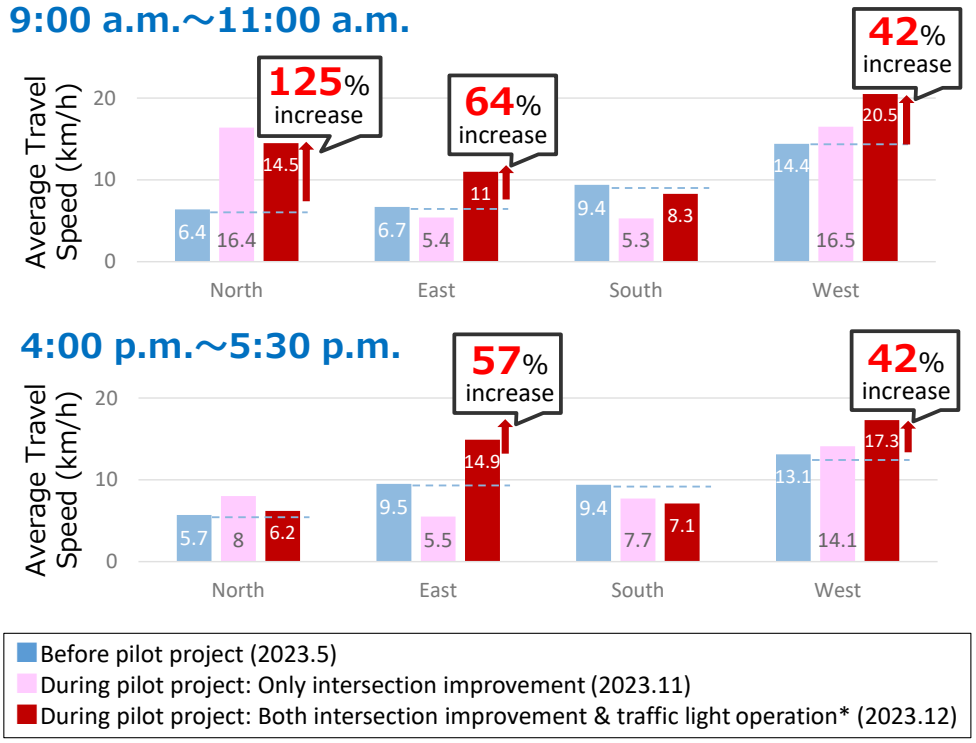
The survey results are shown in Figure 5-17 (average queue length) and Figure 5-18 (average travel speed). In the case of intersection improvement alone, the average queue length became longer and the average travel speed became lower compared to before the pilot project. This is considered to have been caused by a reduction in traffic capacity, as vehicles could no longer make right turns by encroaching into the opposite lane due to the installation of the median strip and post cones. In contrast, with the combination of intersection improvement and signal operation, the average queue length was significantly reduced and the average travel speed was improved.

From the pilot project implemented by the Japanese side, a key lesson learned was that not only intersection improvements but also appropriate traffic signal operations must be carried out together



Source: JICA Expert Team

Figure 5-17 : Average Queue Length



Source: JICA Expert Team

Figure 5-18：Average Travel Speed

One of the lessons learned during the construction period was to consider the construction schedule in anticipation of the rainy season in Nepal, given the delay in construction progress due to rainfall as described in (3) Implementation of Intersection Improvement Measures above.

Construction began on July 14, 2023, but as shown in the rainy weather record in Table 5-11, there were only 13 (37%) sunny days in July and August. Kathmandu has a rainy season from June to September, which limits the number of days when construction can be implemented. The schedule should be set with this in mind.

Table 5-11：Rainy Weather Record from July 14 to August 28, 2023 (■: Rain)

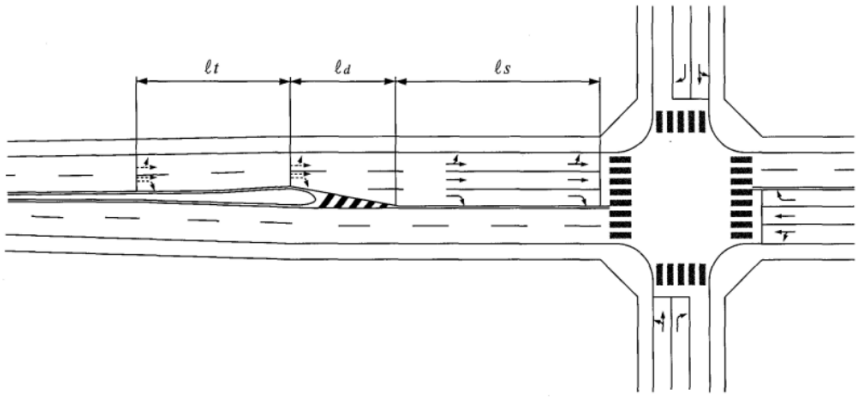
Date\Time	8pm	9pm	10pm	11pm	12am	1am	2am	3am	4am	5am
14-Jul-23	■	■				■	■			
15-Jul-23										
16-Jul-23	■					■	■	■	■	■
17-Jul-23	■	■	■	■	■	■	■	■		
18-Jul-23				■	■	■				
19-Jul-23										
20-Jul-23						■	■	■	■	
21-Jul-23		■	■	■	■	■	■	■		
22-Jul-23	■	■	■			■	■			
23-Jul-23	■	■								
24-Jul-23	■	■	■	■	■	■	■	■	■	
25-Jul-23										
26-Jul-23					■	■	■	■	■	■
27-Jul-23									■	■
28-Jul-23								■	■	■
29-Jul-23	■	■						■	■	
30-Jul-23										
31-Jul-23						■	■	■	■	■

Date\Time	8pm	9pm	10pm	11pm	12am	1am	2am	3am	4am	5am
1-Aug-23	■	■	■	■	■	■	■	■	■	■
2-Aug-23										
3-Aug-23										
4-Aug-23										
5-Aug-23		■	■	■	■	■	■	■	■	■
6-Aug-23	■	■	■	■	■	■	■	■	■	■
7-Aug-23			■	■	■	■	■	■	■	■
8-Aug-23										
9-Aug-23					■	■	■	■		
10-Aug-23										
11-Aug-23	■	■	■	■	■	■	■	■	■	■
12-Aug-23	■	■	■	■	■	■	■	■	■	■
13-Aug-23			■	■	■	■				
14-Aug-23										
15-Aug-23										
16-Aug-23										
17-Aug-23										
18-Aug-23										
19-Aug-23							■	■	■	
20-Aug-23	■	■	■	■	■	■	■	■	■	■
21-Aug-23	■	■	■	■	■	■	■	■	■	■
22-Aug-23	■	■	■	■	■	■	■	■	■	■
23-Aug-23	■	■	■	■	■	■	■	■	■	■
24-Aug-23	■	■	■	■	■	■	■	■	■	■
25-Aug-23	■	■	■	■	■	■	■	■	■	■
26-Aug-23										
27-Aug-23										
28-Aug-23										

Source: JICA Expert Team

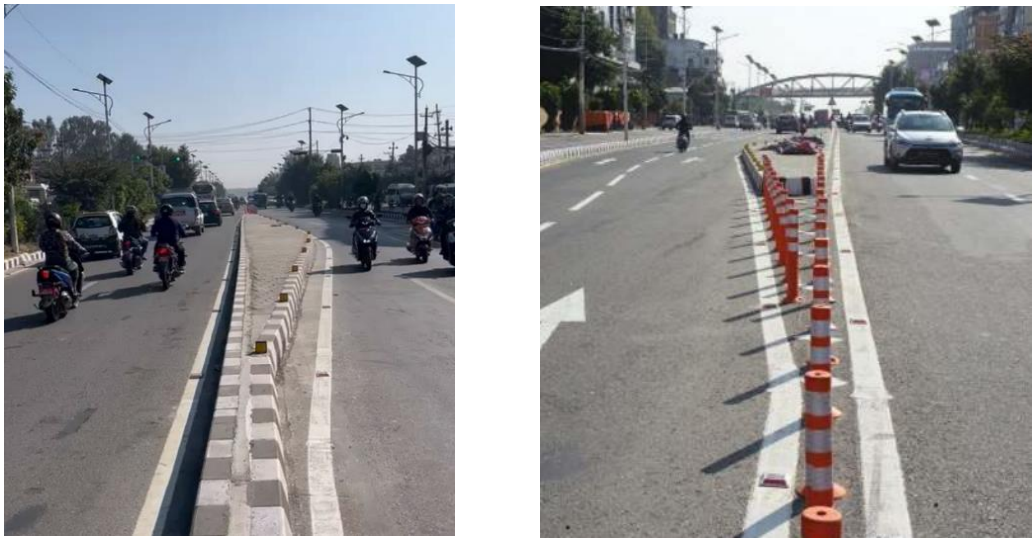
At the Naya Baneshwor intersection, the mainline shift method (Figure 5-19, Figure 5-20) was introduced for the first time in Nepal to improve the situation where straight traffic is blocked by the stay of right-turning vehicles at the intersection. In Nepal, drivers typically do not queue separately lane for straight and right-turn movements, instead, both types of vehicles often encroach into each other's space, trying to push forward. As a result, straight vehicles are frequently blocked by right-turning vehicles, and vice versa. Under such conditions, simply installing traffic signals fails to achieve the intended effect, and may even reduce the intersection's capacity. To address this, we proposed the main line shift as a method of securing a waiting space for right-turning vehicles and separating them from vehicles proceeding straight ahead within the limited width of the road. However, there was no precedent for this method in Nepal, there were many initial concerns that it might increase danger. We carefully explained the purpose of introducing the main line shift (to improve traffic capacity by clearly separating straight and right turns) and its effects (to ensure the effectiveness of signal control and to reduce traffic congestion and collision risks), and why it was essential for the signal operation to function as intended. Through this detailed presentation, stakeholders agreed, and the construction proceeded successfully.

From the above, as a lesson learned, it became clear that introducing a new technology in Nepal requires more than merely applying design techniques, and it is also essential to share and understand the traffic-reality challenges encountered locally, and to carefully explain the technical solution and build consensus before implementation.



Source: Commentary and Application of the Road Structure Ordinance in Japan

Figure 5-19：Main Line Shift



Source: JICA Expert Team

Figure 5-20：Main Line Shift installed at Naya Baneshwor Intersection

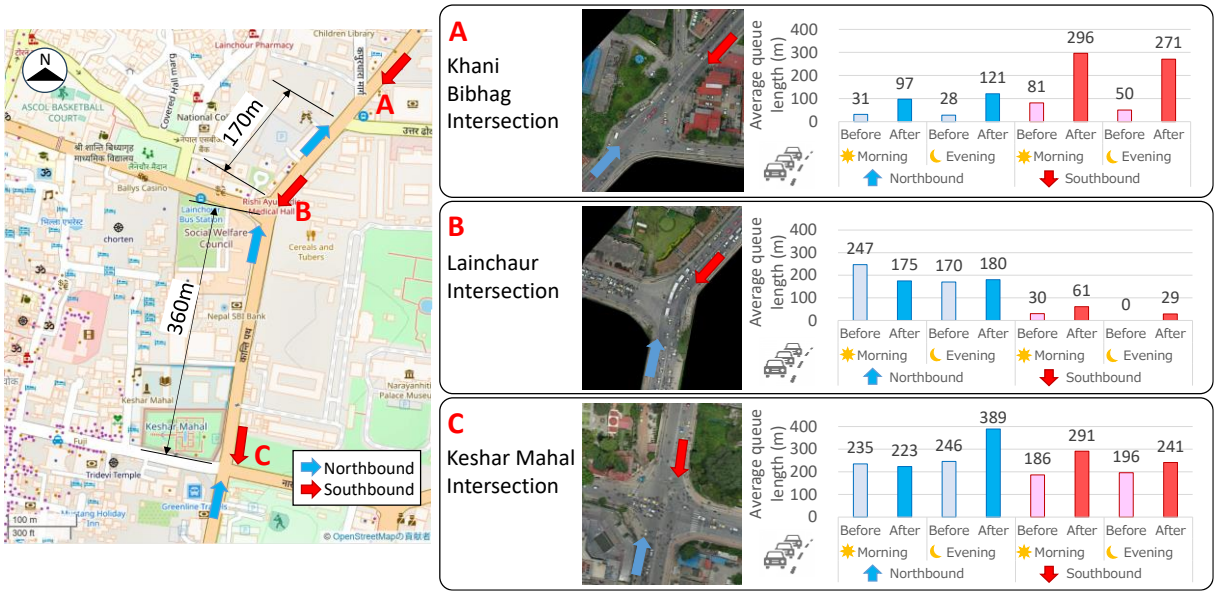
2) Evaluation of the Pilot Project Implemented by the Nepalese Side (Lainchaur Intersection)

A preliminary traffic survey was conducted in June 2024 to evaluate the intersection after improvement, and a survey was conducted in May 2025 when the intersection improvement and signal operation were implemented. The pilot project conducted by the Nepale side only covered the Lainchaur intersection. However, at the request of the Nepalese side, it was decided to implement synchronized control at three intersections, including the Khani Bibhag and Kesha Mahal intersections. Accordingly, traffic surveys were also conducted for the three intersections.

Figure 5-21 shows the average queue length in the north-south direction for each intersection, and Figure 5-22 shows the average travel speed survey results. Intersection improvements were implemented only at the Lainchaur intersection. At the time of the preliminary study, the traffic police used manual signals for traffic control, but when the pilot project was implemented, the three intersections were synchronized.

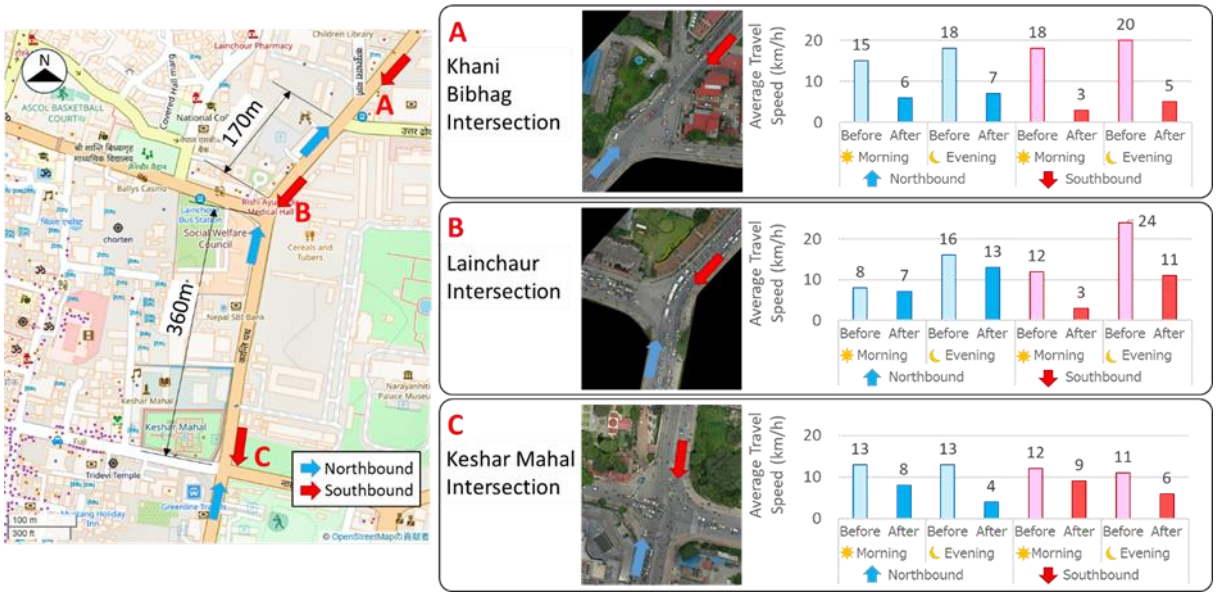
After synchronizing the signals at the three intersections, the average queue length increased and the average travel speed decreased, leading to an overall deterioration in traffic flow. As shown in Figure

5-23 through Figure 5-25, this was due to the introduction of signal operations at each intersection, which reduced traffic capacity compared to manual traffic control by traffic police. The main differences between signal operation and manual traffic control by traffic police are shown in Table 5-12. Because the traffic police prioritize smooth flow and flexibly adjust signal phases to real-time conditions, their control method provides greater traffic capacity than fixed signal operation. On the other hand, the flow of vehicles is prioritized even with some risk, which leads to traffic safety issues. Therefore, a trade-off between safety and smoothness can be seen in intersection operations.



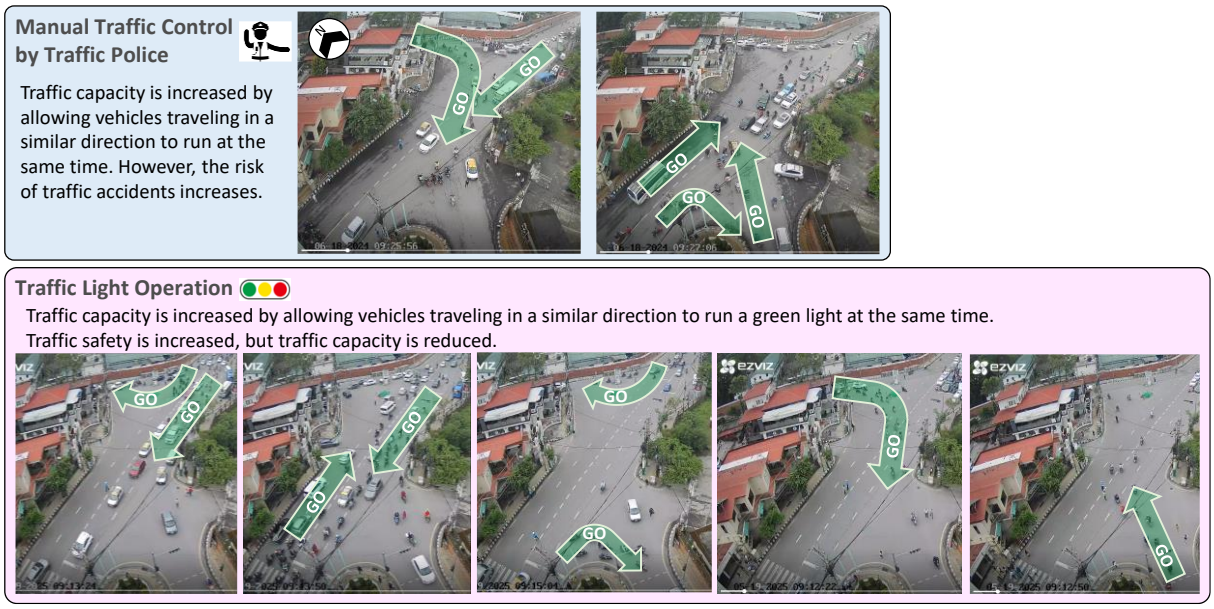
Source: JICA Expert Team

Figure 5-21 : Average Queue Length



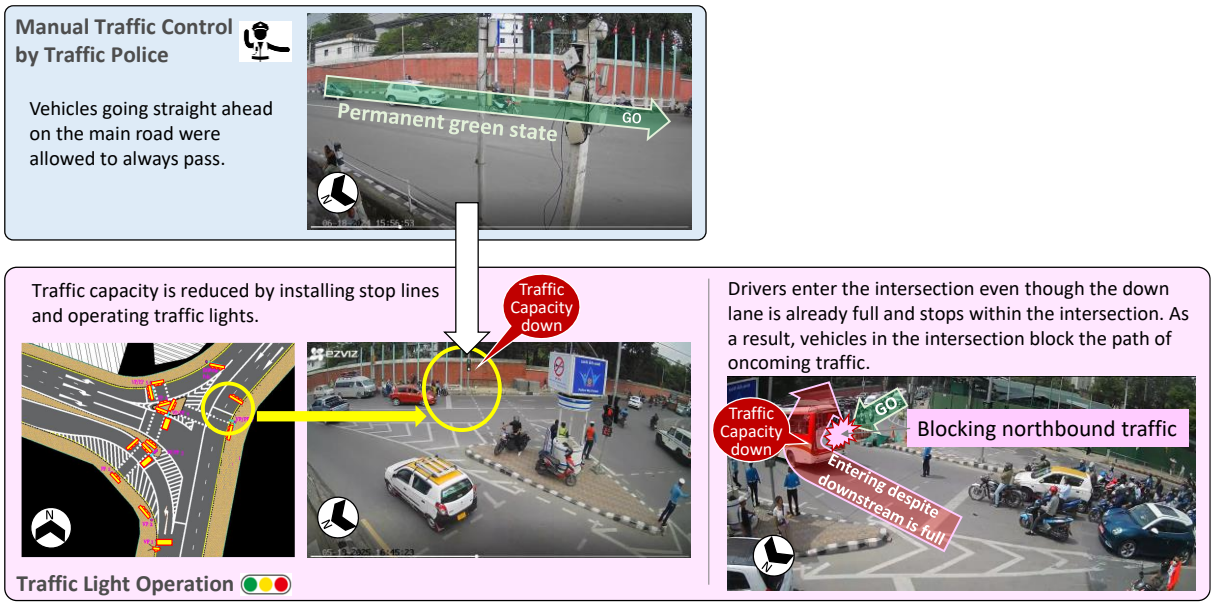
Source: JICA Expert Team

Figure 5-22 : Average Travel Speed



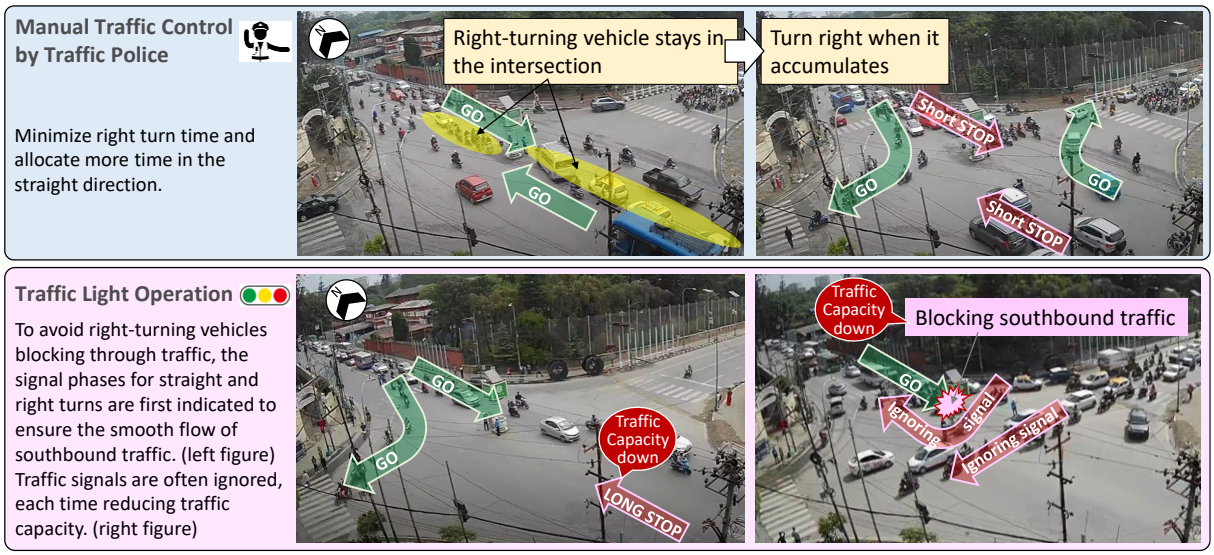
Source: JICA Expert Team

Figure 5-23 : Causes of Traffic Capacity Reduction at Khani Bibhag Intersection



Source: JICA Expert Team

Figure 5-24 : Causes of Traffic Capacity Reduction at Lainchaur Intersection



Source: JICA Expert Team

Figure 5-25：Causes of Traffic Capacity Reduction at Keshar Mahal Intersection

Table 5-12：Major Differences between Signal Operations and Manual Traffic Control by Traffic Police

Item	Signal Operation	Manual Traffic Control by Traffic Police
Different purposes of traffic control	<Safe signal phase design> The need to set safe signal phase for each direction of travel to avoid collisions within an intersection limits the flow of traffic that can pass at the same time. As a result, safety is improved, but the number of vehicles that can pass is reduced. <Signal phase design that considers traffic flow smoothing> A signal phase has been set so that right-turning vehicles do not obstruct through traffic.	<Focus on smoothing traffic flow> Priority is given to vehicle flow even with some risk, and traffic is allowed to pass even in mixed directions of travel.
Decreased traffic capacity due to vehicles ignoring traffic signals	<Increased wasted time due to ignoring signals> When a vehicle stays in an intersection ignoring a signal, it blocks traffic in the other direction, but since the green time remains fixed, only time passes. As a result, the given green time cannot be used effectively, resulting in an increase in wasted time.	<Flexible Adjustment of Signal Indication> The green time in each direction is not set, instead, traffic police are flexibly adjusted to match real-time conditions at the site.

Source: JICA Expert Team

Lessons learned from the Japanese pilot project indicate that not only intersection improvements but also proper signalization are needed. However, the Nepalese pilot project did not include intersection improvements at the added intersections of Khani Bibhag and Kesha Mahal, which also contributed to the deterioration of traffic flow.

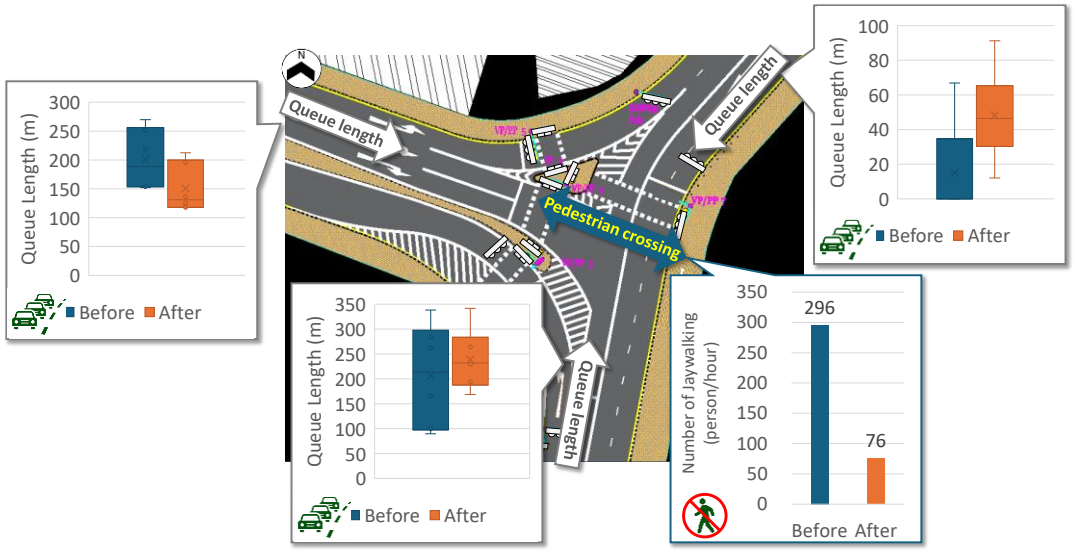
Since there is no right-turn lane and median in the inflow direction on the main road side of the Khani Bibhag intersection, many right-turning vehicles use the opposite lane, as shown in Figure 5-26. If a right-turning vehicle can't finish its turn before the light turns red, it stops in the opposite lane and blocks the vehicles coming straight. Even when the vehicle waits in its own lane, it still slows straight-through traffic and reduces the capacity of straight traffic.

Source: JICA Expert Team

Figure 5-26 : Blocking of Straight-through Traffic by Right-turning Vehicles that Using the Opposite Lane at the Khani Bibhag Intersection

Focusing on the Lainchaur intersection, where the intersection improvements were implemented, Figure 5-27 shows a before and after the pilot project comparison of box-and-whisker plots of queue lengths in each direction and the number of jaywalking pedestrians. The queue length on the west approach decreased. This is attributable in part to signalizing the previously free-flow southbound through movement, which made it easier for right-turning vehicles from the west to enter. On the other hand, the southbound through queue length increased. However, by signalizing the southbound through movement and installing a marked crosswalk, the number of jaywalking pedestrians reduced by 74%, resulting in a significant improvement in safety.

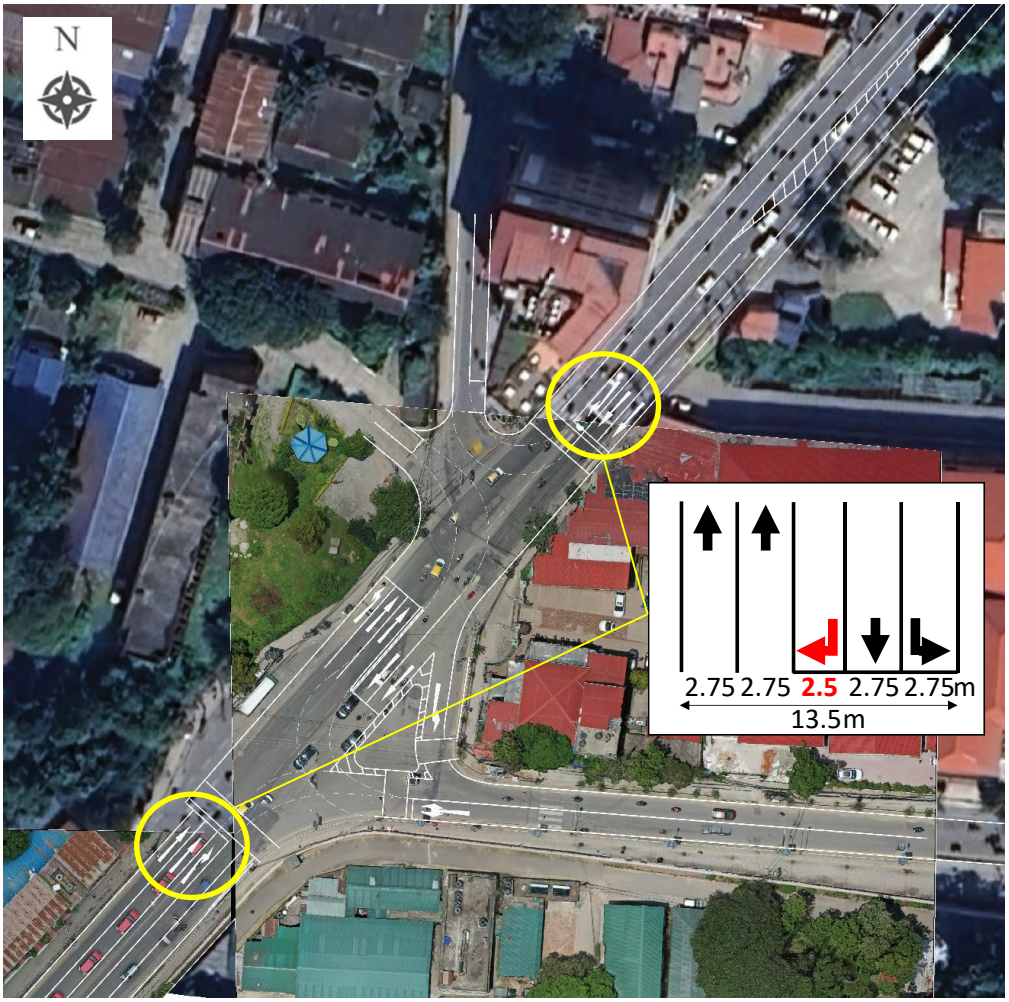
From the above, it can be evaluated that the overall improvement effect with a significant improvement in pedestrian safety was confirmed, although some traffic operational trade-offs were observed.



Source: JICA Expert Team

Figure 5-27 : Effectiveness of the Pilot Project at Lainchaur Intersection

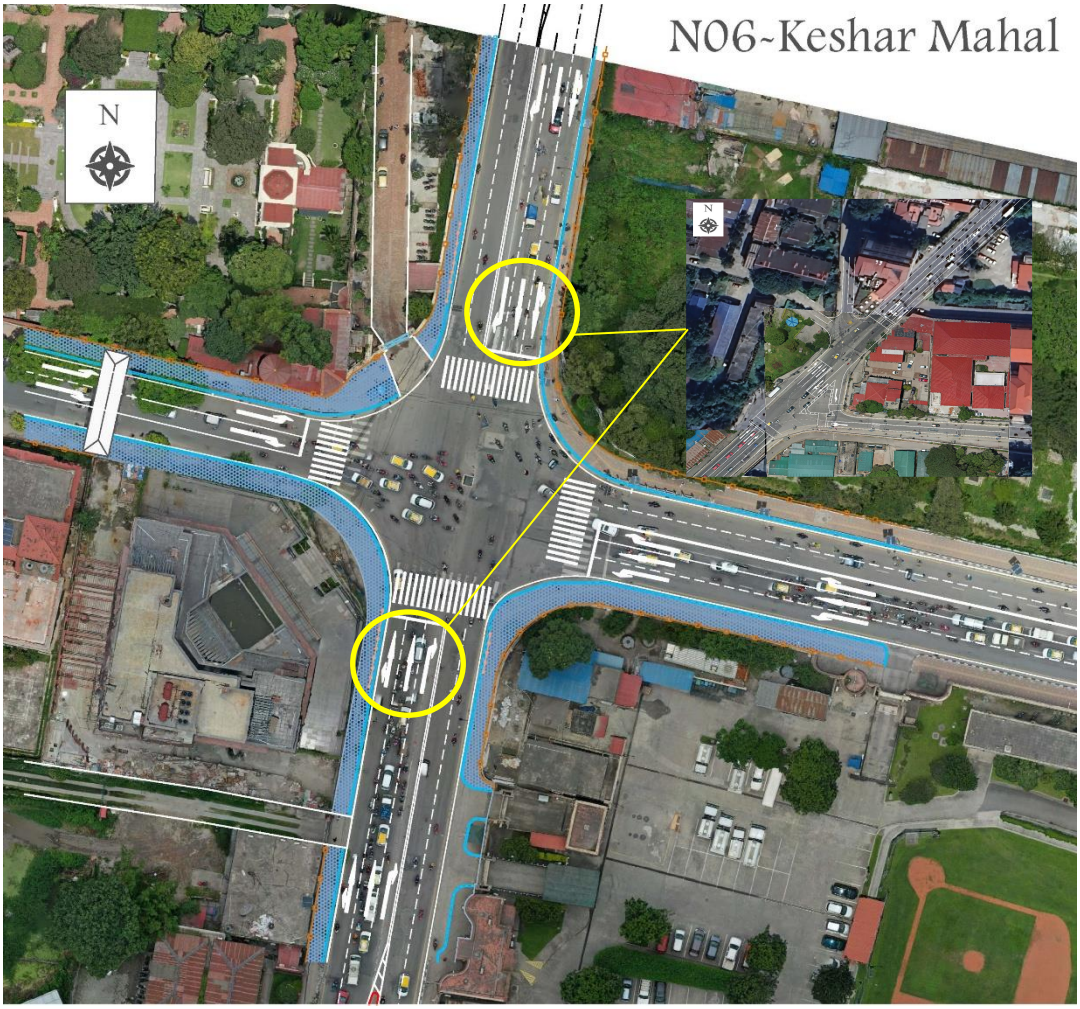
Figure 5-28 shows the proposed improvement plan for the Khani Bibhag intersection, which was developed based on the Intersection Improvement Guidelines. The Khani Bibhag intersection is a staggered intersection, where the main road has a width of 13.5 meters but only a centerline was marked. Therefore, it was designed to operate as two T-intersections, and right-turn lanes were provided on the approaches of the main road to make full use of the 13.5-meter width. This improvement is expected to address the factors that previously caused a reduction in traffic capacity, while also enhancing overall intersection safety.



Source: JICA Expert Team

Figure 5-28：Proposed Improvements at Khani Bibhag Intersection

At the Kesha Mahal intersection, although the main road has a width of 13.5 meters, only a centerline is provided and no right-turn lanes are installed. As a result, the same problems as those observed at the Khani Bibhag intersection have occurred. As shown in Figure 5-29, the installation of right-turn lanes on the north–south main road approaches is expected to improve both safety and traffic flow efficiency.



Source: JICA Expert Team

Figure 5-29 : Proposed Improvements at Keshar Mahal Intersection

5.3.4 Activity 2-4 : Local Seminar & Training on the Guideline for Improvement of Intersection

(1) Purpose of Seminar/Training on Guidelines

The purpose of the seminar and training was to develop the capacity of relevant government agencies by sharing and acquiring knowledge and lessons learned on intersection improvement through technology transfer on the intersection improvement project in the pilot project and introduction of case studies from other countries. Furthermore, on-the-job training was conducted for the personnel of the Road Department, which is the main body of the intersection improvement project and is in charge of the pilot project implemented in Nepal, with the aim of improving their practical capacity in intersection improvement planning and design.

(2) Seminar and Training Plan on the Guidelines

Seminars, training, and on-the-job training on the guidelines were planned and implemented as follows, taking into account the progress of the pilot project (Table 5-3, Table 5-4, Table 5-5).

Table 5-13：Seminar Schedule and Their Contents

	Date	Contents
1st	September 7, 2023	Introduction of Intersection Improvement Guidelines (before Japanese Pilot Project) Guideline Problems and issues at existing intersections in Kathmandu Proposed Countermeasures to Address Issues
2nd	March 5, 2024	Update of Intersection Improvement Guidelines (after Japanese Pilot Project / Before Nepalese Pilot Project) -How to use the Guidelines in practice measures to address issues -Applying the guidelines to pilot projects on the Japanese side
3rd	July 28, 2025	Finalize intersection improvement guidelines (after completion of Japanese and Nepalese pilot projects)

Source: JICA Expert Team

Table 5-14：Training Schedule and Its Contents

	Date	Contents
1st	September 8, 2023	Application of Intersection Improvement Guidelines to Japanese Pilot Project (before Japanese Pilot Project) -Introduction and guidelines -Problems with existing intersections in Kathmandu countermeasures to the problems -Applying the guidelines to pilot projects on the Japanese side
2nd	March 5, 2024	Application of Intersection Improvement Guidelines to Japanese Pilot Project (before Nepalese Pilot Project) -Problems with the pilot project on the Nepalese side the problems of the pilot project on the Nepalese side -Applying the guidelines to pilot projects on the Nepalese side
3rd	September 12, 2024	Application of Intersection Improvement Guidelines -Intersection Design Criteria

Source: JICA Expert Team

Table 5-15：OJT Schedule and Its Contents

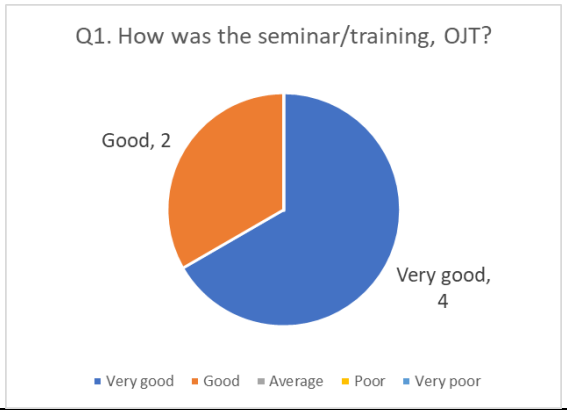
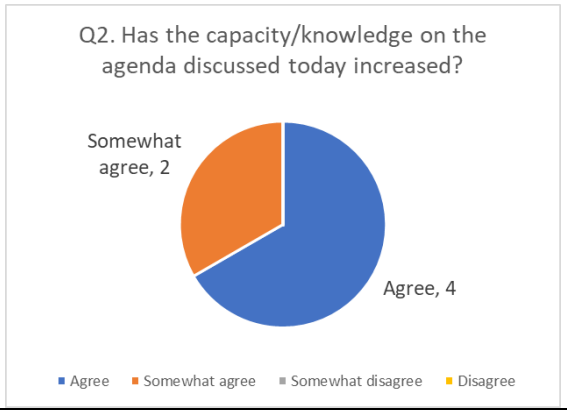
	Date	Contents
1st	March 5, 2024	Introduction and practice of key points of intersection improvement Current status, improvement points, and proposed improvements at Kalimati intersection Current status, improvement points, and proposed improvements at Kamal Pokhari intersection
2nd	August 22, 2024	Guidance on intersection improvement design for the pilot project in charge of Nepal side
3rd	September 12, 2024	Application of Intersection Improvement Guidelines -Intersection Design Criteria

Source: JICA Expert Team

(3) Conduct and Evaluate Seminars on the Guidelines

The purpose of the seminar on the guidelines, the content of the seminar and the evaluations from the attendees are shown.

Table 5-16：Content and Evaluation of the First Seminar

Meeting Information	
Type	☑Seminar , ☐Training , ☐OJT
Subject	Activity 2: Seminar for Intersection Improvement Activities at Naya Baneshwor intersection
Venue	Meeting room on 3rd floor at MOPIT
Date/Time	10:30～12:00 7/Sep/2023 (Nepal time)
Material from JICA Expert Team	・ Seminar material (ppt) with video data
Purpose	
・ The Seminar aims to introduce the intersection improvement activities in the pilot project and eventually, develop capacities of related government agencies by sharing the lesson learned from case studies of the other countries.	
Contents	
・ Introduction of intersection improvement guideline ・ Problem and issues of pilot project intersection ・ Introduction of countermeasures for pilot project	
Feedback from attendees	
◆ Questionnaire result  	

Pictures	
 Picture 1: Presentation and discussion	 Picture 2: Presentation and discussion

Source: : JICA Expert Team

Table 5-17 : Details and Evaluation of the Second Seminar

Meeting Information	
Type	☑Seminar , ☐Training , ☐OJT
Subject	Activity 2: Seminar for Improvement of Intersection
Venue	DOR meeting room
Date/Time	10:30～11:30 5 Mar, 2024 (Nepal time)
Material from JICA Expert Team	Seminar presentation material

Purpose

Updating of the Intersection Improvement Guideline (After Japanese Pilot Project /Before Nepalese Pilot Project)

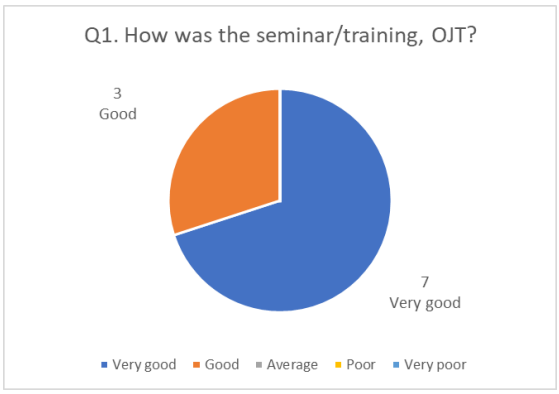
- How to use the Guideline in practice.
- Updated countermeasures to address the issues.
- Application of the Guideline to Japanese Pilot Project.

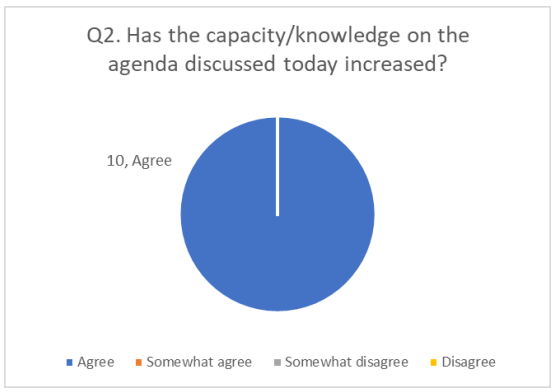
Contents

- Presentation of the Introduction of Intersection Improvement Guideline
  - ➢ Purpose of the Guideline
  - ➢ Contents of the Guideline
- Presentation of the Procedure for Intersection Improvement of Japanese Pilot Project
  - ➢ Basic Procedure
  - ➢ Preparatory Stage (Case Study: Pilot Project-1 Naya Baneshwor)
  - ➢ Preliminary Design (Countermeasures to Address Identified Issues)
  - ➢ Detailed Design
  - ➢ Road Safety Awareness Activities
  - ➢ Evaluation of Effectiveness after Improvement
- Q&A session

Feedback from attendees

◆ Questionnaire result





Pictures

Picture 1: Presentation and discussion

Picture 2: Presentation and discussion

Source: : JICA Expert Team

Table 5-18：Details and Evaluation of the Third Seminar

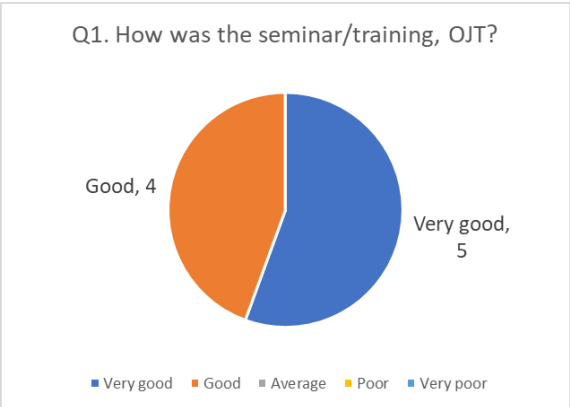
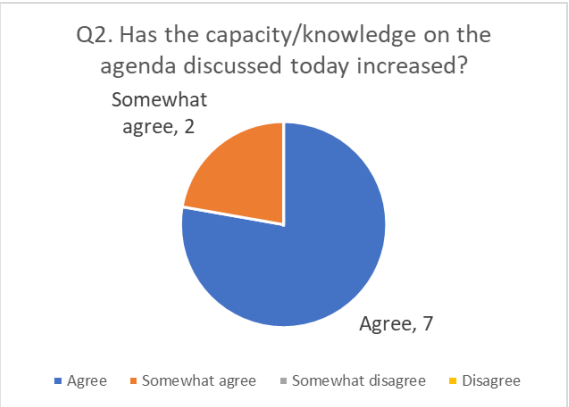
Meeting Information	
Type	☑Seminar , ☐Training , ☐OJT
Subject	Activity 2: Seminar for Improvement of Intersection
Venue	DOR meeting room
Date/Time	10:30～11:30 28 July, 2025 (Nepal time)
Material from JICA Expert Team	Seminar presentation material
Purpose	
・	
Contents	
・ Purpose of the Guideline ・ Contents of the Guideline ➢ Part1 Theoretical ➢ Part2 Case Study ➢ Part3 Applications ・ Q&A session	

Source: : JICA Expert Team

(4) Conduct and Evaluate Training on the Guidelines

The purpose of the training on the guidelines, the content of the training and the evaluations from the attendees are shown.

Table 5-19：Content and Evaluation of the First Training

Meeting Information	
Type	☐Seminar , ☑Training , ☐OJT
Subject	Activity 2: Training for Intersection Improvement Activities at Naya Baneshwor Intersection
Venue	Meeting room on 3rd floor at MOPIT
Date/Time	10:30～12:40 8/Sep/2023 (Nepal time)
Material from JICA Expert Team	・ Training material (ppt)
Purpose	
・ The Training aims to introduce the intersection improvement activities in the pilot project and eventually, develop capacities of related government agencies by sharing the lesson learned from case studies of the other countries.	
Contents	
Lecture ・ Problem and issues of pilot project intersection ・ Introduction of countermeasures for pilot project Site session at Naya Baneshwor intersection ・ Observation of problem and issues of plot project intersection ・ Introduction of countermeasures for pilot project	
Feedback from attendees	
◆ Questionnaire result  	

Pictures	
 Picture 1. Lecture and discussion	 Picture 2. Site session
 Picture 3. Site session	 Picture 4. Site session

Source: : JICA Expert Team

Table 5-20：Details and Evaluation of the Second Training

Meeting Information	
Type	☐Seminar , ☑Training , ☐OJT
Subject	Activity 2: Training for Improvement of Intersection
Venue	DOR meeting room / Pilot project site
Date/Time	12:30～14:00 5 Mar, 2024 (Nepal time)
Material from JICA Expert Team	Training presentation material
Purpose	
・ Updating of the Intersection Improvement Guideline (After Japanese Pilot Project / Before Nepalese Pilot Project) ➢ Problems of Nepalese Pilot Project ➢ Countermeasures to address the problems of Nepalese Pilot Project ➢ Application of the Guideline to Nepalese Pilot Project	
Contents	
・ Introduction of Intersection Improvement Guideline ➢ Purpose of the Guideline ➢ Contents of the Guideline ・ Procedure for Intersection Improvement Pilot Project-2, Lainchaur ➢ Basic Procedure ➢ Preparatory Stage (Case Study: Pilot Project-1 Naya Baneshwor)	

- Preliminary Design (Countermeasures to Address Identified Issues)
- Detailed Design
- Road Safety Awareness Activities
- Evaluation of Effectiveness after Improvement

・ Basics of Geometric Design

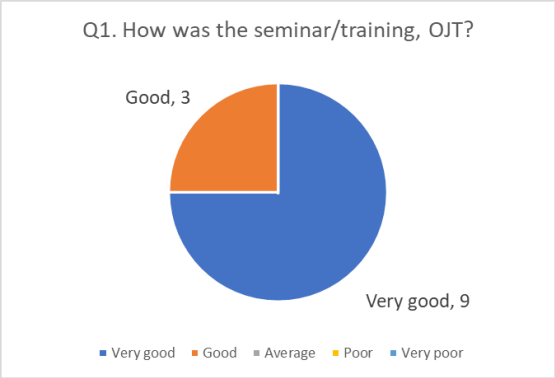
- Introduction of Lane Shift and Right- turn Lane
- Introduction of Channelization
- Fixing of Stop Line Location

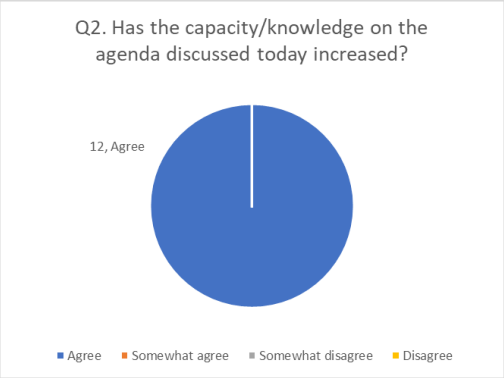
・ Site Visit to Lainchaur intersection

・ Q&A session

Feedback from attendees

◆ Questionnaire result





Pictures

Picture 1. Lecture and discussion

Picture 2. Lecture and discussion

Picture 3. Site session

Picture 4. Site session

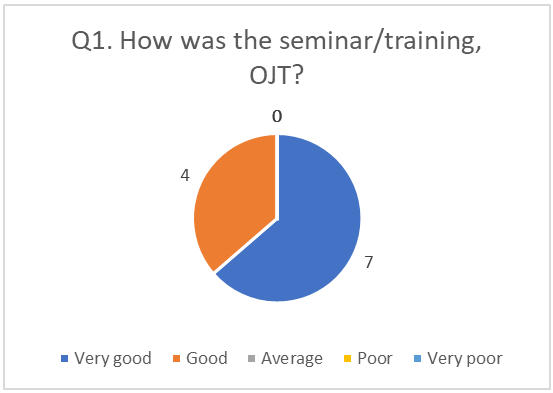
Source: : JICA Expert Team

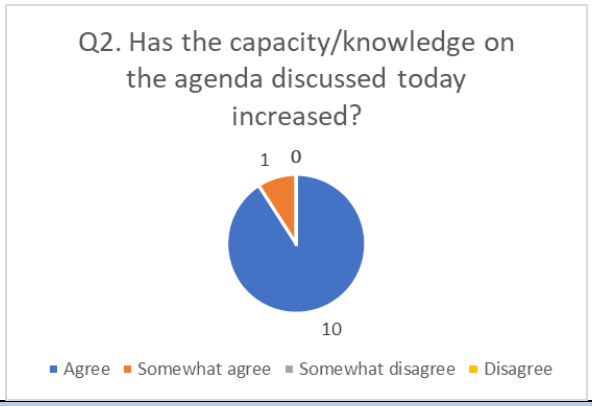
Table 5-21 : Contents and Evaluation of the Third Training Session

Meeting Information	
Type	☐Seminar , ☑Training , ☐OJT
Subject	Activity 2: Intersection Improvement
Venue	DOR, DPTC Meeting Hall
Date/Time	10:30～12:00 12/09/2024 (Nepal time)
Material from JICA Expert Team	・ PPT material about Intersection Improvement Guidelines
Purpose	
・ The purpose of the training is to share the proposed Intersection Improvement Guideline with the Nepalese counterparts and get their feedbacks.	
Contents	
➢ Introduction of Intersection Improvement Guideline ➢ Purpose of the Guideline ➢ Contents of the Guideline ➢ Basics of Planning and Design (Chapter 4: Intersection Design Standards) ➢ Design Traffic Parameters ➢ Cross Sectional and Approach Elements ➢ Design of Right- turn Lanes ➢ Installation of Right- turn Lanes ➢ Design of Channelization ➢ Pedestrian Crossing ➢ Traffic Control ➢ Traffic Safety	

Feedback from attendees

◆ Questionnaire result





Pictures

Picture 1. Presentation

Picture 2. Sharing some examples from Japan

Source: : JICA Expert Team

(5) Implementation and Evaluation of On-the-Job Training on the Guidelines

Indicate the purpose of the OJT regarding the guidelines, the content of the OJT and the evaluations from the attendees.

Table 5-22：Content and Evaluation of the First OJT

Meeting Information	
Type	☐Seminar , ☐Training , ☑OJT
Subject	Activity 2: OJT for Improvement of Intersection
Venue	DOR meeting room
Date/Time	15:00～16:00 5 Mar, 2024 (Nepal time)
Material from JICA Expert Team	OJT material

Purpose

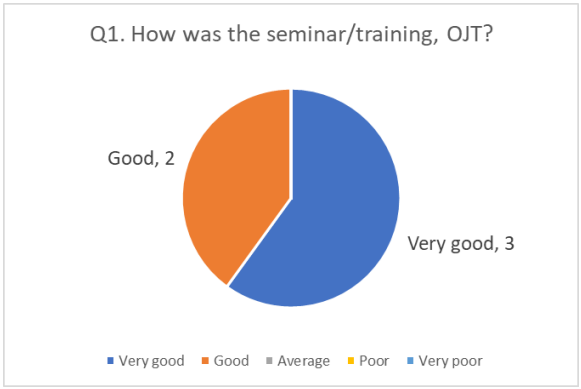
- How to use the Guideline in practice.
  - ➢ To consider improvement points for exact intersections using Guideline in practice.

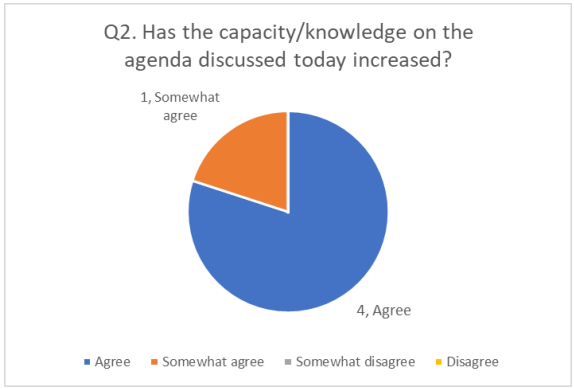
Contents

- Current situation of Kalimati and Kamal Pokhari intersections.
- Consideration of Improvement Points for Kalimati and Kamal Pokhari intersections using Guideline.
- Preliminary Improvement Plans.

Feedback from attendees

◆ Questionnaire result



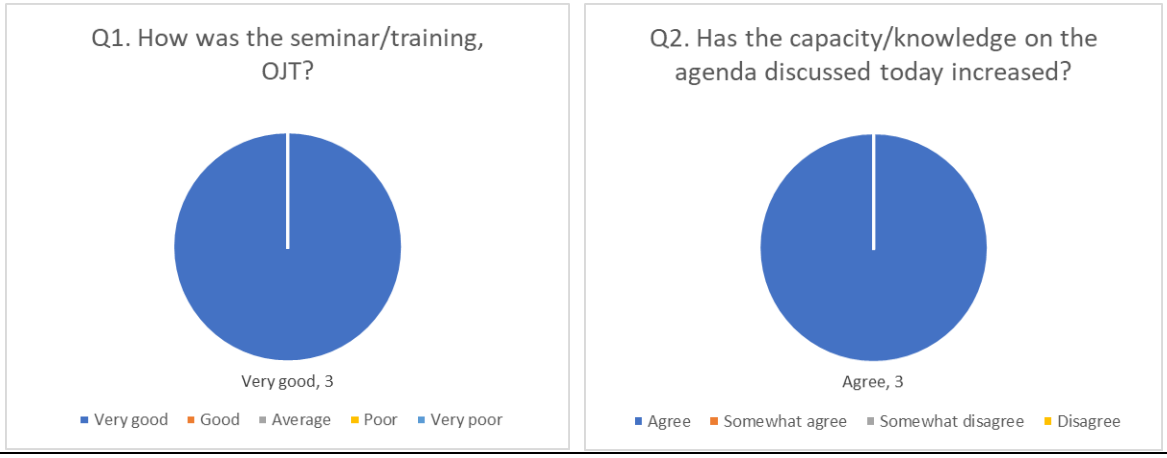


Pictures	
	
Picture 1. Lecture and discussion	Picture 2. Lecture and discussion

Source: : JICA Expert Team

Table 5-23 : Details and Evaluation of the Second OJT

Meeting Information	
Type	☐Seminar , ☐Training , ☑OJT
Subject	Activity 2: Detail Explanation of drawing for second pilot project at Lainchaur Intersection
Venue	JET Office
Date/Time	14:00～15:00 22/08/2024 (Nepal time)
Material from JICA Expert Team	・ Updated drawing of second pilot project at Lainchaur Intersection
Purpose	
・ To discuss the detail drawing of second pilot project of Lainchaur intersection.	
Contents	
・ Updates on the design of Lainchaur Intersection Pilot Project as per the comments given by the participants of 5th JCC meeting.	
Feedback from attendees	
◆ Questionnaire result	



Pictures	
	
Picture 1. Explanation of the drawing to RSTU by JET	Picture 2. Explanation of drawing of Naya Baneshwor Intersection for reference.

Source: : JICA Expert Team

Table 5-24：Contents and Evaluation of the Third OJT

Meeting Information	
Type	☐Seminar, ☐Training, ☑OJT
Subject	Activity 2: Intersection Improvement
Venue	DOR, DPTC Meeting Hall
Date/Time	12:30～14:00 12/09/2024 (Nepal time)
Material from JICA Expert Team	・ PPT material about Intersection Improvement Guidelines

Purpose

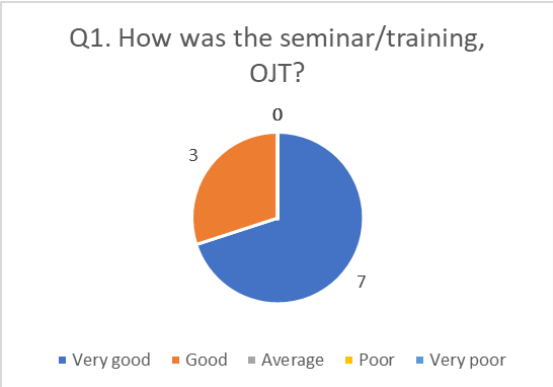
・ The purpose of the OJT is to share with the participants the Application of Intersection Design Standard.

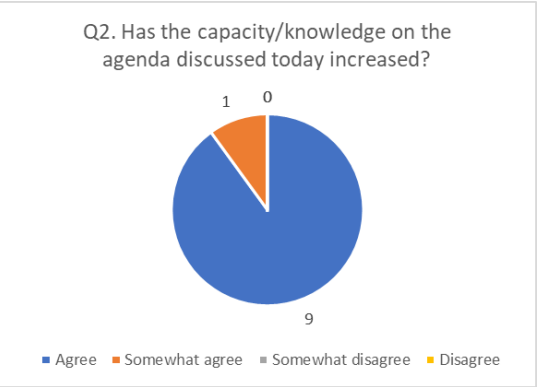
Contents

1. Intersection Improvement Methods in Planning Aspects
   - ➢ Improvement of Shape and Configuration
   - ➢ Improvement in Spacing between Intersections
2. Intersection Improvement Methods in Design Aspects
   - ➢ Improvement in Cross Sectional and Approach Elements
   - ➢ Methods of Installing Right- turn Lanes
   - ➢ Improvement by Channelization
   - ➢ Improvements in Pedestrian Crossing and Footpaths
   - ➢ Improvement in Traffic Controls
   - ➢ Traffic Safety Measures

Feedback from attendees

◆ Questionnaire result





Pictures

Picture 1. Presentation from JET

Picture 2. Discussion

Source: : JICA Expert Team

5.3.5 Activity 2-5 : Development of Intersection Improvement Plan by Utilizing the Guideline for Intersection Improvement

(1) Selection of Intersections to Be Improved

Selected intersections in 4.3.4 (2)5) were the subject intersections of the intersection improvement plan.

(2) Prioritization of Intersections to Be Improved

Prioritization of the subject intersections of the intersection improvement plan was discussed in 4.3.4 (2) 6).

(3) Preparation of Intersection Improvement Implementation Plan

Intersection improvement plans were prepared for high priority intersections.

6. Output-3: The Manual for Improvement of Operation and Kanagement of Traffic Lights Is Developed and the Plan for Installation and Improvement of Traffic Lights Are Formulated

6.1 Overview

For Output-3, four activities were implemented in PDM with the Objectively Verifiable Indicators shown in Table 6-1.

Table 6-1：Objectively Verifiable Indicators for Output-3

1. The manual for improvement of operation and management of traffic lights is formulated.
2. Training and/or seminars on the manual for improvement of operation and management of traffic lights are conducted at least 3 times.
3. A plan for installation and improvement of traffic lights in Kathmandu Valley is formulated.

Source: JICA Expert Team

6.2 Record of Meetings

Table 6-2 shows the results of discussions with each organization.

Table 6-2：Record of Meeting Related to Output-3

Date	Organization	Agenda
September 5, 2022	RSTU	・Traffic light maintenance in the Kathmandu Valley
September 12, 2022	KVTPO	・Operation of the control center (CCTV, traffic lights, etc.)
December 13, 2022	Paaila Technology	・Maintenance structure and implementation status ・Technical specifications and management system ・Parts procurement and cause of malfunctions
December 23, 2022	KVTPO	・Utilization of CCTV for traffic monitoring
February 28, 2023	Paaila Technology	・Installation of traffic lights at the pilot project intersection
March 1, 2023	KVTPO	・Operation of traffic signals at the pilot project intersection
October 10, 2023	Paaila Technology	・Issues and countermeasures related to traffic lights at the pilot project intersection ・Information sharing on other traffic lights in the Kathmandu Valley
August 7, 2024	RSTU	Traffic signal synchronization between the pilot project intersection and adjacent intersections.

Source: JICA Expert Team

6.3 Details of Activities

6.3.1 Activity 3-1 : Clarification of Issue & Solution Related to Operation of Traffic Lights Which Have Already Installed

(1) Current Status and Issues of Traffic Light Operation

1) Current Status

Traffic lights in Kathmandu Valley are installed by various entities, including the DOR, local government, private companies, and donor countries. These traffic lights are managed based on the installation list, and their operational status (normal/failed) is also known. However, in some cases, the reason for the suspension of operation was unknown for the traffic lights that were out of service. In addition, there were cases where no restoration plans, such as repair of malfunctions, had been established.

Signal control is provided from the KVTPO traffic control room (Figure 6-1: left) at about 30 intersections in the Kathmandu Valley.Signal indications and cycle lengths are set in advance for each intersection at different times of the day, and these are automatically switched. However, when traffic congestion occurs due to an increase in traffic volume that cannot be controlled by traffic light operation, the signal indication is changed to flashing yellow and traffic police stationed at the intersection use manual traffic control to handle traffic (Figure 6-1: right).

Currently, traffic police are stationed at many intersections, including those with traffic lights, to control traffic. At night, however, there are no police officers assigned and no traffic control is in place. Therefore, when traffic volume increases at night, this may cause problems in terms of traffic safety and smoothness.

KVTPO Traffic Control Room

Manual Traffic Control by Traffic Police

Source: JICA Expert Team

Figure 6-1 : Current Status of Traffic Light Operation

2) Issues

The current traffic environment and issues related to it are as follows.

- Left turns are always possible at intersections, regardless of traffic lights.
- Many traffic lights are not in operation due to malfunction or failure.
- Traffic police officers use manual traffic control to direct traffic instead of traffic lights.
- Even at intersections with working traffic lights, police officers may turn off or flash the lights and manual traffic control.
- There is no “All Red” time when the signal phase switches.

- Pedestrian signals change directly from green to red (there is no “flashing green” as in Japan).
- Signal cycles (one display cycle) are very long, taking more than 5 minutes even during the daytime at many intersections.
- Pedestrians cross the road freely regardless of whether there is a traffic light or not, and the risk of crossing with pedestrians is particularly high because left turns are always permitted at intersections.
- Pedestrians cross the road even in busy areas or on roads with wide lanes, making it difficult to ensure their safety.
- There are many vehicles that cross the center line and drive in the opposite lane.
- Drivers (especially motorcycles) do not follow the lane for each direction of travel. For example, there are cases in which vehicles going straight ahead enter the right-turn lane and are unable to turn right even when there is a right-turn signal.
- In some cases, vehicles do not follow the traffic laws and there is a risk of collision with pedestrians while crossing the street. There is a strong sense of vehicle priority and a lack of safety awareness.
- The traffic volume of motorcycles is extremely high, and they are heavily used even during rainy weather.
- If there is even a small distance between vehicles, other vehicles tend to force their way in.

Based on the current situation described above, it is necessary to formulate a realistic and effective policy for the installation of traffic lights that takes these issues into account.

As the population and number of vehicles continue to grow, the number of intersections requiring traffic control is expected to increase further. In light of this, it is important to re-evaluate the necessity of traffic lights, set priorities for installation, and develop concrete implementation plans, including repair, update, and new installation for high-priority intersections. This also applies to traffic lights installed through donations from private companies. The government needs to establish a unified management system that includes monitoring their operational status.

When installing new traffic lights, whether by public or private entities, standardization is essential in areas such as traffic signal controller specifications, signal lamp placement, display content, signal timing, and communication methods for linking with the traffic control center. To achieve this, it is important to develop and clarify guidelines for the installation of traffic lights.

(2) Measures for Improving the Operation of Traffic Lights

1) Safety Measures for Permitting Left Turns at Intersections at All Times

In the Kathmandu Valley, vehicles turning left at intersections are generally permitted to do so at any time and are not required to follow traffic lights. While some countries also implement systems that permit left turns at all times, many place conditions on such turns through traffic regulations, such as signposts indicating specific rules. These may include a requirement to stop completely and confirm safety before proceeding, as part of efforts to prevent traffic accidents.

Figure 6-2 shows an example of a traffic sign used in the United States indicating “No Right Turn on Red”. Since traffic in the United States follows right-hand driving, a right turn in that context corresponds to a left turn in the Kathmandu Valley.

Source: https://dmv-permit-test.com/road-signs/

Figure 6-2：Example of Traffic Sign (No Right Turn on Red)

In the Kathmandu Valley as well, it will be necessary to implement measures from a traffic safety perspective to protect vulnerable road users at intersections, such as persons with disabilities, the elderly, and children. For example, left-turning vehicles should yield to pedestrians who are crossing at a crosswalk in accordance with the traffic lights. To achieve this, it is advisable to consider implementing countermeasures in phases, as illustrated in Table 6-3.

Table 6-3：Contents of the Phased Measures

	Contents
Phase 1	Clearly distinguish between intersections where left turns are always permitted and those where drivers are required to follow traffic lights when turning left.
Phase 2	Gradually increase the number of intersections where left turns must follow the traffic light, from a traffic safety perspective.
Phase 3	Actively introduce left turn lanes and traffic islands, and implement always permitted left turns in a way that is easy for drivers to understand and prioritizes safety.
Other	Public awareness and education are essential when implementing the above measures.

Source: JICA Expert Team

2) Shortening of Traffic Light Cycle Lengths

Many of the traffic lights currently in operation in the Kathmandu Valley have cycle lengths exceeding five minutes during the daytime. At intersections where traffic police are managing the flow, the tendency is to continue allowing each direction to pass until there is a break in traffic, which also leads to longer cycle lengths.

The disadvantages of long cycle lengths include the following:

- Extended green times lead to increased gaps between vehicles, resulting in inefficient use of green time.
- Long queues during red signals cause significant delays in vehicle departures.
- Some vehicles, especially motorcycles, may ignore the signal due to impatience.
- At downstream intersections where vehicles have entered during a green signal, congestion may occur, resulting in downstream blockage. This is especially likely when there is no coordination between adjacent traffic lights, which can cause the impact to spread along the corridor.
- Longer signal waiting times increase driver frustration.

Given these disadvantages, it is necessary to shorten the cycle lengths of traffic lights currently operating with excessively long cycles.

3) Change in Communication Method Between Traffic Lights and the Traffic Control Room

The traffic lights currently operating in the Kathmandu Valley are connected to the traffic control room via communication lines, allowing for operational changes to be made based on instructions from the control room.

However, the existing communication lines use an outdated 2G (second-generation mobile network) system, which often results in unstable connections and frequent offline conditions.

At present, 4G (fourth-generation mobile network) systems are commonly used in the Kathmandu Valley and offer more stable communication. Therefore, to improve the operation of traffic lights, the communication method should be upgraded from 2G to 4G.

4) Review of the Operation of Pedestrian Signal Lights

Most of the pedestrian signal lights currently in operation in the Kathmandu Valley are turned off and not functioning. Among those that are operational, the system switches directly from a green signal to a red signal. However, for pedestrians to cross the road safely, they must be able to complete the crossing before the signal changes from green to red.

To support safe crossing, the common approach is to include a flashing green phase after the steady green signal to alert pedestrians, followed by a red signal. This type of signal can be further classified into two types based on the duration of the steady green and flashing green phases, as shown in Table 6-4. In the case of the Kathmandu Valley, the installation and operation of Type B is recommended.

Table 6-4：Signal Type

Type	Signal duration	Remarks
A	The duration of the steady green signal is longer than that of the flashing green signal.	If a pedestrian begins crossing near the end of the steady green signal, they may not be able to complete the crossing within the flashing green phase.
B	The duration of the flashing green signal is longer than that of the steady green signal.	If a pedestrian begins crossing during the steady green signal, the timing is adjusted so that they can safely complete the crossing during the flashing green phase.

Source: JICA Expert Team

5) Introduction of the All Red for Vehicle Traffic Lights

The vehicle signal lights currently in operation in the Kathmandu Valley follow the typical traffic light pattern of green → yellow → red. However, the system is configured such that the green signal for one direction is displayed simultaneously with the red signal for the opposing direction, without providing an All Red phase (a period during which all directions display a red signal) when the signals switch.

In Japan, the All red signal system has been implemented since 1970. Under this system, a red signal is displayed for all directions for a short period after the yellow phase, allowing vehicles that have entered the intersection during the yellow signal to safely clear the intersection before another direction receives a green signal. This approach is also commonly used in Europe and North America.

Without an All Red phase, there is a risk that a vehicle entering the intersection at the end of the yellow signal could collide with a vehicle entering from another direction under a green signal. If the vehicles are traveling at high speed, such a collision could result in a serious accident. Therefore, it is recommended that the Kathmandu Valley adopt an All Red signal system, which offers greater safety.

6) Review of Signal Control During Nighttime Hours

Not limited to the Kathmandu Valley, traffic volume during nighttime and late-night hours tends to decrease significantly compared to daytime hours. As a result, if traffic signals are operated using the same cycle and split as during daytime hours, unnecessary green time (when the green light is displayed for an extended period even though no vehicles are passing) occurs, and signal waiting time (the time until the signal changes) also increases. Therefore, it is necessary to understand the trends in traffic volume throughout the day, distinguish changes in traffic volume by time of day, and adjust signals accordingly. This approach to signal adjustment also applies to morning and evening commuting hours.

7) Introduction of Push Button Traffic Lights

In the Kathmandu Valley, the development of main roads is actively progressing. At many of these roads, traffic lights are installed at intersections, resulting in relatively long intervals between signalized crossings. As a result, pedestrians have limited options for safe road crossing, and those who wish to reach the opposite side often cross at undesignated locations. These pedestrians typically navigate through gaps in traffic, crossing one lane at a time while checking for vehicles, often pausing near the median before proceeding across the remaining lanes in a similar manner.

Waiting near the median to cross is extremely dangerous on roads with heavy traffic volumes. Therefore, from the perspective of preventing traffic accidents, installing push button traffic lights at locations with high pedestrian traffic or frequent pedestrian-related accidents is highly effective. In particular, special attention should be given to areas where there are many elderly people or children crossing the road.

Unlike the traffic lights installed at intersections, push button traffic lights are generally more affordable to implement, as they require fewer poles and devices and do not involve complex signal control systems. Since the installation of push button traffic lights has already begun in the Kathmandu Valley, further expansion should be considered.

8) Traffic Flow Improvement Measures Through Synchronization of Multiple Traffic Lights

In urban areas where many main roads intersect, traffic lights may be installed in close proximity to one another. When multiple traffic lights are positioned along the same corridor and their green signals are not synchronised, vehicles may be forced to stop at each signal individually. To prevent this and improve traffic flow, it is necessary to coordinate multiple traffic lights so that vehicles can pass through several intersections during green signals.

The methods for synchronizing multiple traffic lights are shown in Table 6-5.

Table 6-5：Methods for Synchronization of Multiple Traffic Lights

	Item	Synchronization Method
1	Remote operation of controllers from the traffic control room	A method in which the central system of the traffic control room is connected to individual controllers via communication lines, allowing the traffic lights to be remotely operated from the traffic control room.
2	Adding coordination functionality to the controller	A method that involves introducing and installing controllers equipped with internal clock functions (such as GPS) to synchronise their time settings. These controllers allow for configuration of the exact number of seconds after a reference time at which the green signal should be displayed, with the ability to set different timings for multiple time periods.

Source: JICA Expert Team

6.3.2 Activity 3-2 : Development of the Manual for Improvement of Operation and Management of Traffic Lights

A draft manual for Improvement of Operation and Management of Traffic Lights, as shown in Table 6-6, was prepared and distributed to relevant organizations during the 6th JCC meeting held in March 2025. Comments on the draft was collected.

Table 6-6：Overview of the Manual for Improvement of Operation and Management of Traffic Lights

目次	記載概要
1. Introduction	
1.1 Background	Challenges in traffic light operation and maintenance in the Kathmandu Valley and the need for solutions
1.2 Purpose and Scope of this Manual	Purpose and scope of this manual
2. Traffic Light Operation Manual	
2.1 Basics of Traffic Control at Intersections	Types of traffic control methods and selection
2.2 Basics of Traffic Lights	Roles and functions of traffic lights, the need for traffic control, and signal control parameters
2.3 Traffic Control in the Kathmandu Valley	Current status, challenges, and improvement measures for traffic light operation
2.4 Installation and Operation of Traffic Lights	Development of traffic light installation plans and operational strategies
2.5 Design of Signal Control at Intersections	Signal control design procedure, signal indication design, and cycle length consideration
3. Traffic Light Maintenance Manual	
3.1 Traffic Light Facility Management	Basic concepts of traffic signal facility management and the preparation and updating of installation drawings
3.2 Maintenance and Inspection of Traffic Light Facilities	Purpose, scope, types, items, and result management of Inspections
3.3 Examples	Examples of inspection photos, inspection record sheets, and inspection reports
4. Examples of Operational Manuals Used in the Project	
4.1 New Baneshwor Intersection	Case study on traffic light operation at Naya Baneshwor intersection
4.2 Lainchaur Intersection	Synchronization of three intersections including Lainchaur intersection

Source: JICA Expert Team

6.3.3 Activity 3-3：Local Seminar & Training on the Manual for Improvement of Operation and Management of Traffic

Seminars, training, and on-the-job training in the Manual were planned and implemented as follows, taking into account the progress of the pilot project (Table 6-7, Table 6-8, Table 6-9).

Table 6-7：Seminar Schedule and Their Contents

	Date	Contents
1st	September 19, 2023	・Identification of Traffic Signal Issues ・Basics of Signal Control ・Suggestions for Signal Operation Improvement ・Signal Operation Methods at the Pilot Intersection

		・Simulation of Signal Cycle
2nd	May 9, 2025	・Explanation of traffic signal synchronization at the pilot intersections ・Introduction to traffic signal operation methods at the pilot intersections

Source: JICA Expert Team

Table 6-8：Training Schedule and Its Contents

	Date	Contents
1st	September 26, 2023	・Objectives and Overview of Signal Operation at the Pilot Intersection ・Introduction to Signal Operation Methods ・Practical Training Using CCTV for Signal Operation
2nd	November 29, 2023	・Objectives and Overview of Signal Operation at the Pilot Intersection ・Introduction to Signal Operation Methods ・Practical Training Using CCTV for Signal Operation
3rd	March 21, 2025	・Overview and operation of traffic signal control ・Explanation of traffic signal operation by traffic police officers

Source: JICA Expert Team

Table 6-9：OJT Schedule and Its Contents

	Date	Contents
1st	November 30, 2023	・Practical training on traffic signal operation using CCTV cameras at the traffic control room
2nd	December 8, 2023	・Practical training on traffic signal operation using CCTV cameras at the traffic control room
3rd	August 7, 2024	・Sharing the latest design updates of the pilot intersection ・Discussion on traffic signal synchronization
4th	May 19, 2025	・Explanation of traffic signal synchronization at the pilot intersection ・Practical training on traffic signal operation
5th	May 20, 2025	・Explanation of traffic signal synchronization at the pilot intersection ・Practical training on traffic signal operation
6th	May 21, 2025	・Explanation of traffic signal synchronization at the pilot intersection ・Practical training on traffic signal operation

Source: JICA Expert Team

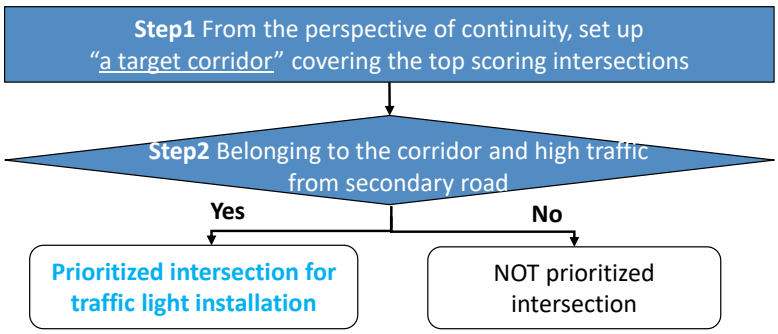
6.3.4 Activity 3-4：Development of a Plan for Installation and Improvement of Traffic Lights

(1) Process for Selecting Locations for Traffic Light Installation

During the pilot project conducted at the Naya Baneshwor intersection in December 2023, congestion was alleviated as a result of both intersection improvement and proper traffic light operation.

Building on this outcome, for intersections identified as high-priority in the intersection improvement plan developed under Activity 1-4 (4.3.4 Activity 1-4: Development of Urban Transport Management

Plan), new traffic lights will be installed and operated appropriately.In addition, a corridor that includes the selected intersections will be designated, and area-wide signal control will be implemented along that corridor to improve traffic flow more efficiently and effectively. To support this, intersections along the corridor other than those already selected will be assessed using traffic volume data for both main and minor roads in order to identify additional locations where traffic lights are needed.The process for selecting traffic light installation locations is illustrated in Figure 6-3.



Source: JICA Expert Team

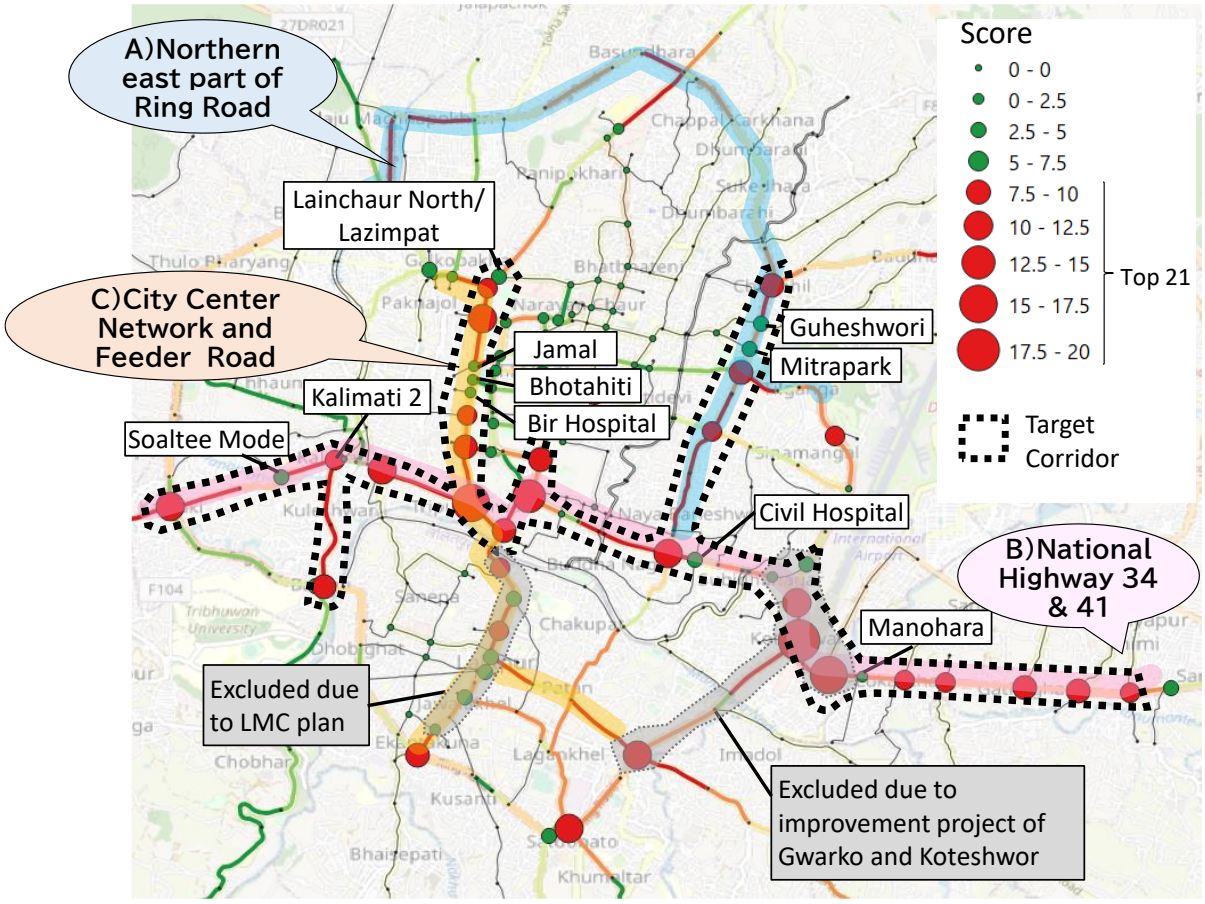
Figure 6-3：Process for Selecting Locations for Traffic Light Installation

(2) Designation of Target Corridor

The target corridors were identified by overlaying the three road sections with the highest traffic congestion loss times (as identified in Section 4.3.3 and shown in Table 4-18) with the intersections requiring improvement (as identified in Section 4.3.4 and listed in Table 4-21). The result is shown in Figure 6-4. The black dashed lines indicate the designated corridors, where the implementation of area-wide signal control is proposed.

Area-wide signal control is a traffic management approach that treats traffic signals as an integrated network, aiming to control traffic flow over a broad area more effectively. By coordinating multiple traffic lights, this system improves traffic conditions across an entire city or within a specific region.

To implement area-wide signal control, it is necessary to examine the need for signalising intersections along the target corridors that are not among the top 21 intersections requiring improvement (indicated by green circles in Figure 6-4).



Source: JICA Expert Team

Figure 6-4 : Target Corridors Including the Top 21 Priority Intersections

(3) Priority Intersections for Traffic Light Installation

For intersections located along the target corridors that are not among the top 21 priority intersections requiring improvement, the ratio of traffic volume between the main road and the minor road was reviewed to determine the priority for converting these locations into signalised intersections. The results are presented in Table 6-10 and Figure 6-5.

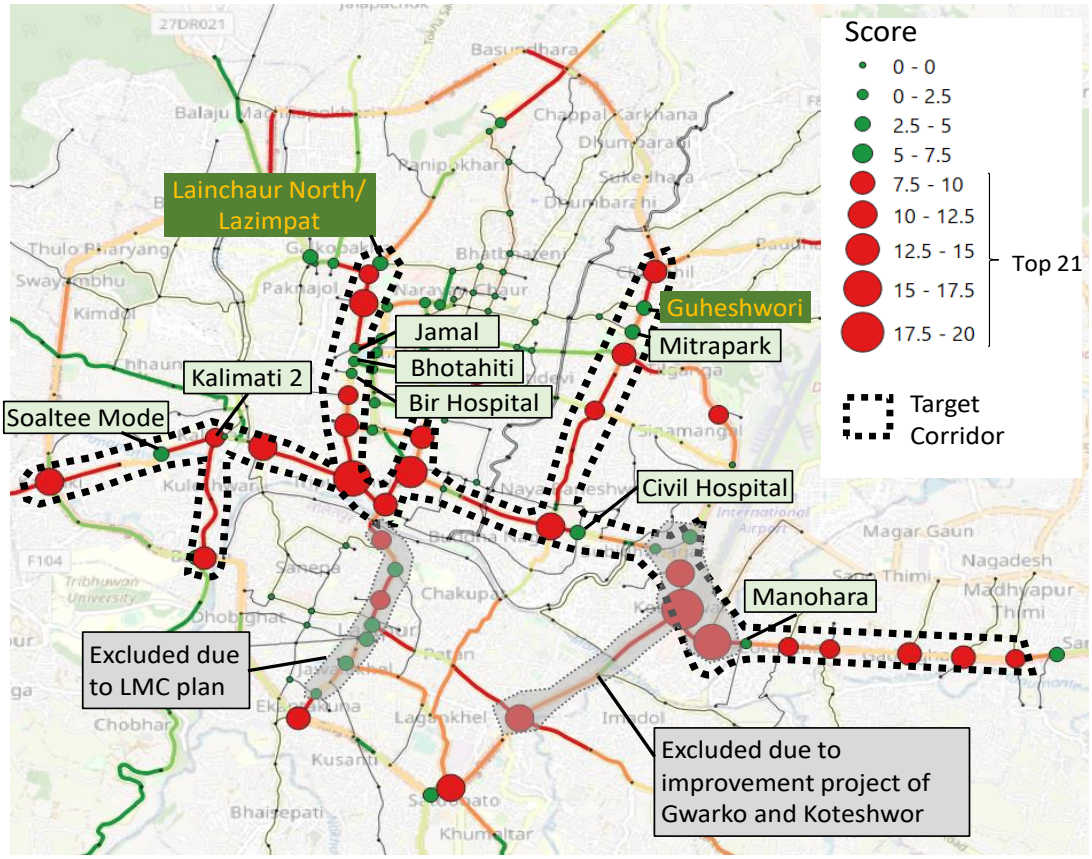
At two of the intersections, the traffic volume on the minor road was found to be relatively high, making them priority candidates for traffic light installation.

Table 6-10 : Priority Intersections for Traffic Light Installation

No	Name	Traffic Volume Ratio (Secondary Road / Main Road)	Remark
E02	Soaltee Mode	13.6%	-
E04	Kalimati 2	1.6%	-
E09	Civil Hospital	13.6%	-
E12	Manohara	6.4%	-
N04	Lainchaur North/Lazimpat	39.8%	Prioritized intersections for Traffic Light Installation
N07	Jamal	0.0%	-
N08	Bhotahiti	9.9%	-
N09	Bir Hospital	9.7%	-

R14	Mitrapark	8.0%	-
R15	Guheshwori	61.5%	Prioritized intersections for Traffic Light Installation

Source: JICA Expert Team



Source: JICA Expert Team

Figure 6-5 : Priority Intersections for Traffic Light Installation

7. Output-4: Capacity to Plan and Implement Road safety Awareness Will Be Strengthened

7.1 Overview

For Output-4, three activities were implemented in PDM with the Objectively Verifiable Indicators shown in Table 7-1

Table 7-1：Indicators for Output-4

1.	70% of trainees/evaluators identify that knowledge and skills in planning road safety awareness activities have improved.
2.	Road safety awareness activity plans and reports on the implementation of the activities have been prepared.
3.	More than 70% of respondents answer that their road safety awareness levels have improved.

7.2 Record of Meetings

Table 7-2 shows the results of discussions with each organization.

Table 7-2：Record of Meeting Related to Output-4

Date	Organization	Agenda
September 12, 2022	KVTPO	・Past Implementation of Traffic Safety Awareness Activities ・Consideration of Campaign Goods
March 7, 2023	KVTPO	・Progress of Traffic Safety Awareness Activities ・Future Work Plan
March 14, 2023	RSS（Road Safety Society Nepal）	・Discussion on the Content of Traffic Safety Awareness Activities ・Traffic Safety Awareness Activities Using Media
April 10, 2023	KVTPO、RSTU、KVDA、DOTM	・Consensus Building on the Objectives and Activity Plan of WG4 ・Presentation and Approval of the 2023 Activity Plan ・Safety Measures During Construction at the New Baneshwor Intersection ・Traffic Safety Awareness Campaign Activities under the Pilot Project
April 17, 2023	SSTN（Safe & Sustainable Travel Nepal）	・Selection of Partners ・Procurement of Campaign Goods ・Questionnaire Survey

Source: JICA Expert Team

7.3 Details of Activities

7.3.1 Activity 4-1: Campaign Activities for Compliance with Traffic Laws and Road Safety at Intersections to Be Improved in Activity 2-3

In Kathmandu, low awareness of road safety among drivers and pedestrians is a critical issue. It is essential to conduct road safety awareness activities so that road users recognize they could be either

perpetrators or victims of traffic accidents, enabling them to take concrete actions and understand the causes of traffic accidents as their responsibility. Implementing road safety awareness activities is necessary to help road users realize their potential roles as perpetrators or victims of traffic accidents. Even if measures are taken to improve intersections and signal operations, if road users do not adhere to road safety laws and regulations, no positive effects can be expected, such as improvement in traffic flow and reduction of congestion. To enhance road users' awareness of road safety, it is crucial to ensure they correctly understand the risks of traffic accidents and voluntarily avoid problematic actions. Therefore, road safety awareness campaigns should follow these steps: (1) organize and analyze traffic accident data for each intersection, (2) identify risks at intersections, (3) identify problematic behaviors that pose risks, and (4) examine PR methods and content to address problematic behaviors. In considering step (4), JET suggests incorporating devices that attract the attention of road users, such as thought-provoking catchphrases and visually appealing, easy-to-understand media, instead of direct appeals to the public.

The campaign was successfully implemented, with each step of the PDCA cycle being followed according to the work plan (Table 7-3).

Table 7-3：Output 4 Related Activities

Phase of activities	Work	Plan	Actual activity
Preparation of an activity plan (Plan)	Review of road safety activities	• Confirmation of measures for road safety activities and roles of related organizations in related laws and regulations, and higher-level plans (including the Road Safety Bill and Nepal Road Safety Action Plan in the process of enactment) • Identification of existing road safety activities of related organizations, such as C/Ps and WGs	• Conducted as described at left.
	Analysis of traffic accidents at intersections	• Identification of status and characteristics of traffic accidents at intersections in collaboration with WG1 • Identification of problematic behaviors of road users that cause and characterize accidents at pilot project intersections	• Collected traffic accident information near intersections in collaboration with WG1, organized accident characteristics, etc. • Since no traffic accident data was recorded at the intersection of the pilot project, problematic behaviors of road users were identified through field observations and interviews with KVTPO, which is in charge of traffic management at the intersection.
	Study of the contents and methods of the road safety	• Identification of changes in traffic rules and proper road usage (including from the gender perspective) in	• Identified appropriate road usage from the perspective of inclusivity, since there is a pedestrian crossing for PWDs at the Naya Baneshwor intersection.

Phase of activities	Work	Plan	Actual activity
	awareness campaign at pilot project	conjunction with Naya Baneshwor intersection improvements and signal improvements. • Study on how to provide information to encourage appropriate road usage. • Study of the contents and methods of providing road and construction information to ensure safety during pilot project construction. • Examination of information dissemination methods to encourage behavior change to curb the problematic behavior of road users at pilot project intersections.	• In reviewing the method of providing information, KVTPO provided points to keep in mind. JET reviewed the information provision methods in accordance with KVTPO's points. • Safety measures during the construction period were considered and included in the intersection construction TOR. • Examined possible means of publicity that could be implemented at pilot project intersections and presented the same at the seminar.
Implement campaign activities (Do)	Collaboration with related agencies	• Application for permission from road administrators, government, police, etc. as necessary to implement road safety campaigns. • Announcement of the campaign by utilizing existing efforts, such as MTPD's road safety education programs and coordination with FM radio stations, and jointly implement the campaign with other organizations. • Management of re-contractors and volunteers. • Dissemination of information about the campaign through social network and other media.	• Since KVC is the road manager near the Naya Baneshwor intersection, JET coordinated with KVTPO and KVC to obtain the necessary permits to install banners and information boards. • The Awareness and Training Section is in charge of road safety education. In collaboration with the FM Radio Section, the pilot project was publicized during its construction and implementation. • The procurement of campaign goods and the survey were re-commissioned and completed without problems. • The KVTPO website was used to disseminate information for SNS as part of the campaign.
Evaluation (Check)	Survey on road safety awareness	• Design of questionnaire to understand the effects of the pilot project	• The survey was conducted as described at left.

Phase of activities	Work	Plan	Actual activity
		(questions to understand the impacts of intersection improvements and signal operation improvements, and the effect of public awareness of the campaign) • Tabulation and analysis of results.	• A questionnaire survey was re-commissioned, tabulated, and analyzed.
Reflection in the next plan (Action)	Campaign in the pilot project funded by Japan	• Revision of the campaign plan based on the effectiveness analysis and evaluation of the Japan-funded pilot project.	• Since KVTPO did not have the budget to implement the pilot project road safety campaign, JET procured the campaign goods and conducted the questionnaire survey. However, the campaign plan and content (slogan, etc.) based on the results of the campaign at the Naya Baneshwor intersection were primarily prepared by KVTPO.

Source： JICA Expert Team

(1) Safety Measures during Naya Baneshwor Intersection Improvement

Safety measures during the improvement of the Naya Baneshwor intersection were prepared and added to the construction order specifications. The measures were based on customary practices in Nepal and Japan. In Nepal, it is often observed that rules are in place but not followed, so instructions for the construction management company were prepared to effectively manage the construction contractor. Below is the scope of work and the safety measures implemented.

- Construction signs were placed on the side of the road, both before the construction site and before the lane reduction point, to encourage road users to make detours and lane changes (Figure 7-1).

Source： JICA Expert Team

Figure 7-1：Construction Signs Image

- Since construction work was carried out at night, construction signs were illuminated, and other measures were taken to ensure they were easily visible to drivers.
- Considering that the construction work was to be carried out with JICA assistance, information boards were installed displaying construction information in both Nepali and English, including the duration and schedule of the civil works, as well as the project's contact information in case of any issues.
- Barricades were installed to separate the road from the work site, ensuring the safety of road traffic. Since the construction work was to be conducted at night, the barricades were equipped with lighting to provide visibility for drivers.
- Traffic guides were deployed near the construction site to stop vehicle traffic and encourage lane changes as necessary. As in Japan, traffic guides were required to wear helmets, reflective vests, and other essential equipment. JET also requested that plans for the deployment of traffic guides should consider the safety of pedestrians.
- Information boards were installed to inform the public about the movement of bus stops during the construction period. The instructions emphasized the need for traffic guides to properly direct people, especially the visually impaired and elderly, to the bus stops and the project enforcement officials were asked to take appropriate measures.
- The instructions required the project operator to give prior notice of the construction work to nearby residents who live or work within a 200-meter radius of the intersection.
- Materials and equipment for civil engineering work were instructed not to be left unattended near the construction site but to be stored in a location that does not impede pedestrian and vehicular traffic. Construction management contractors were asked to confirm that they stored the materials and equipment properly.

(2) Traffic safety campaign at the Naya Baneshwor Intersection

JET and KVTPO discussed and agreed on the content of the campaign that would be implemented and re-commissioned the procurement of campaign goods and other items.

- Banners: Pilot project banners were placed on the pedestrian bridge at the Naya Baneshwor intersection before and during the pilot project implementation. In addition, one banner was placed on the road leading to the intersection. The banner displayed the name of the pilot project, the fact that it was a JICA GIPRO project, and the logo of each organization, with the approval of JICA and the relevant organizations (Figure 7-2).

Source： JICA Expert Team

Figure 7-2： Banners installed on the pedestrian bridge at the New Baneshwor intersection

- Information boards on the sidewalk: Traffic safety information boards for pedestrians and drivers were installed on the sidewalk. The content of the information boards was drafted based on observations of road user behavior at the Naya Baneshwor intersection and decided in consultation with KVTPO. The same information boards were installed in multiple locations, with a total of 15 boards featuring eight different contents. As with the banners, the project name and the logos of the organizations involved were used (Figure 7-3).

Installed on the sidewalk before the left-turn road

Installed near the pedestrian bridge near the bus stop

Installed near the bus stop

Installed at the crosswalk for wheelchair users

Installed before the crosswalk

Installed in the median strip

Source： JICA Expert Team

Figure 7-3：Location of Information Boards

- Slogans on information boards (Figure 7-4 left to right a–h)

  a. Left-turning vehicles should stop temporarily while pedestrians are crossing.

  b. Do not get on and off the bus unnecessarily, and get on and off at the designated bus stop.

  c. Do not get on and off the bus unnecessarily.

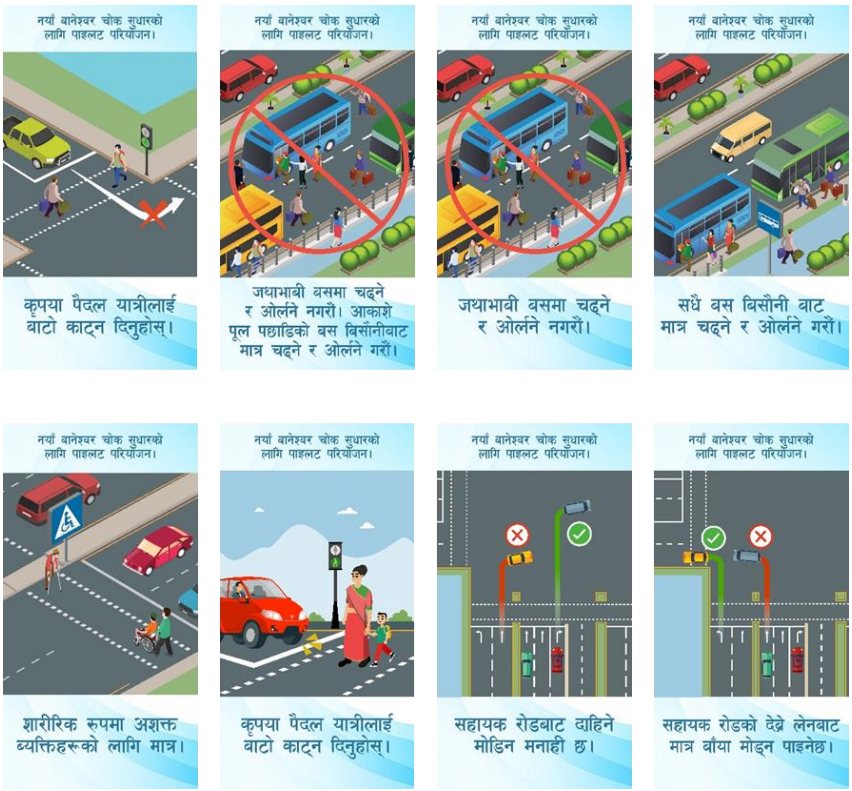
  d. Always get on and off the bus at the bus stop.

  e. This is a pedestrian crossing for the physically challenged.

  f. Pedestrians have priority. Please let pedestrians cross the crosswalk first.

  g. Right turns from side streets are prohibited.

  h. Left turns are only allowed from the left lane of side streets.



Source: JICA Expert Team

Figure 7-4：Content of Information Boards

- Posters: Two types of posters were created and posted in stores, businesses, and schools around the Naya Baneshwor intersection. The posters used the slogan and design of the information board (Figure 7-5).

Source: JICA Expert Team

Figure 7-5: Posters

- Flyers: Like the posters, flyers were distributed at road safety classes (delivery classes) conducted by KVTPO at schools, communities, and civil organizations, as posting or distributing them outdoors is prohibited by KMC ordinances. In addition to the left-hand column, KVTPO also enclosed it in a rough gift to be given to those who responded to the survey to help promote road safety awareness (Figure 7-6).

Source: JICA Expert Team

Figure 7-6：Flyer (Left: Front, Right: Back)

(Contents on the front side of the flyer) Follow the traffic rules!

In the Kathmandu Valley, the population and the number of vehicles continue to increase, and serious traffic congestion and frequent traffic accidents are urgent issues.

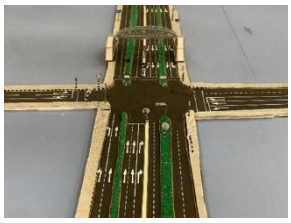
To address this problem, the Government of Nepal, with support from Japan, has launched a four-year technical cooperation project, "Kathmandu Valley Urban Traffic Management Introduction Project," starting in February 2022.

This project aims to contribute to alleviating traffic congestion and promoting road safety in the Kathmandu Valley by strengthening the capacity of relevant agencies of the Nepalese government to implement appropriate traffic management through the development of a traffic management plan that focuses on promoting efficient road traffic, improving intersection improvements, improving the operation and maintenance of traffic signals, and raising road safety awareness. The project's objective is to contribute to the alleviation of traffic congestion and the promotion of road safety in the Kathmandu Valley.

The JICA expert team, in collaboration with MOPIT, KVTPO, KVDA, KVC, and LMC, implemented the improvement works at the Naya Baneshauw intersection. A pilot project is underway at the intersection, combining traffic management with a new signal system and road safety awareness activities.

- Crossing flags and road safety vests: JET observed the presence of traffic volunteers (students and community members), assisting pedestrians in crossing the street at the crosswalk. JET prepared crossing flags and safety vests for them. However, since not enough traffic volunteers were not mobilized, the traffic volunteer activity was cancelled midway through the pilot project, and the crossing flags and vests were transferred to KVTPO for use in other road safety activities[1].
- Hats: Unisex, adjustable-size hats were procured for distribution as campaign goods at traffic volunteer events and road safety classes.
- Miniatures of intersections: Four miniatures were created, including one of the Naya Baneshwor intersection. The other three miniatures were made to resemble typical intersection shapes. The intersection miniatures were designed for use in road safety classes (Figure 7-7).

[1] Student volunteers were expected to participate, but the reality was that they were volunteering to earn extracurricular credits, and when the PP did not attract as many volunteers as expected, the activity was canceled.



Miniature of Naya Baneshwor Intersection

Explanation at NB Business Association

Explanation at Suryodaya Secondary Boarding School

Source: JICA Expert Team

Figure 7-7 : Miniatures of the Intersection

- Traffic sign models: Traffic sign models were produced for use in road safety classes (Figure 7-8).

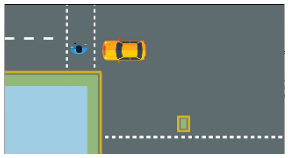
A Set of Traffic Sign Models

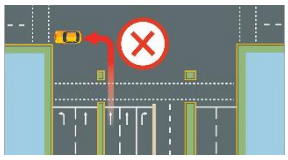
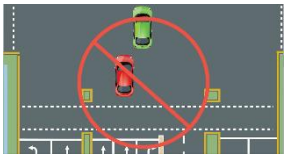
Used at Mother's Pride School

Source: JICA Expert Team

Figure 7-8 : Traffic Sign Models

- Social Media (SNS): In addition to road users at the Naya Baneshwor intersection, JET and KVTPO utilized social media (KVTPO website and Facebook page) to disseminate road safety information to the general public. Ten videos were produced: nine 30-45 second videos and one video introducing the importance of road safety and Figure 7-9 shows the videos produced.
- Road Safety Classes: KVTPO took the lead in conducting road safety classes at schools and for NB business associations, where presentations on road safety prepared by KVTPO and this JICA project were presented. During the classes, a miniature of Naya Baneshwor intersection was used to explain the project, and campaign materials were effectively utilized.

			
On the importance of road safety and introducing the Technical Cooperation	On using pedestrian bridges	On using pedestrian crossings	On pedestrian priority at crosswalks

			
On using wheelchair-accessible crosswalks for wheelchair users and PWDs	On using bus stops	On getting on and off at bus stops	On left turns on left turn lanes on side streets
			
	On wearing helmets among drivers, passengers	On lane changes	

Source: JICA Expert Team

Figure 7-9：Promotional Videos on Road Safety

When the pilot project was completed, the campaign goods were transferred to KVTPO (Table 7-4, Figure 7-10).

Table 7-4：List of Campaign Items Transferred to KVTPO

Name	Quantity
Posters	180 pieces
Flyers	650 pieces
Banners	9 pieces
Safety vests	30 pieces
Miniature model of intersection	4 pcs.
Traffic sign model	115 pcs.
Traffic signal model	15 pcs.
Reflective cross belt jacket	50 pcs.

Source: JICA Expert Team

	
Transfer ceremony (1)	Transfer ceremony (2)

Source: JICA Expert Team

Figure 7-10：Transfer Ceremony

(3) Survey on Changes in Road Safety Awareness and Behavior

Even if measures are taken to improve intersections and signal operation to improve road safety, if road users do not comply with road safety laws and rules, it will not be possible to expect any benefits, such as rectification of traffic flow and improvement of traffic congestion. Based on this recognition,

one of the activities of JET was to conduct a road safety awareness campaign to increase drivers' and pedestrians' awareness of the risks of traffic accidents and to encourage them to voluntarily not engage in problematic behavior, the above-mentioned road safety awareness campaign was implemented in the Naya Baneshwor intersection pilot project. Besides road safety awareness campaigns, multifaceted and long-term efforts, such as strict enforcement of traffic laws and revisions of traffic laws, are widely recognized in raising road users' awareness of road safety and in changing their behavior. Therefore, the main objective of this pilot project was to promote a change in road safety awareness among road users.

Among road users, pedestrians and bus drivers/conductors were surveyed on their road safety awareness.

- Survey method: Face-to-face and non-face-to-face methods were used, and the questionnaire was administered in a choice-answer format (with some multiple-answer questions). Since the purpose of the survey was to investigate whether there was a change in the respondents' awareness levels as a result of the road safety campaign, the same respondents needed to be surveyed both before and after the campaign. To maximize the efficiency of the survey, the pre-survey was conducted in person. In contrast, the post-survey was conducted in person or by telephone, at the discretion of the subcontractor. Two types of questionnaires were prepared: one for road users and the other for bus drivers and conductors.

- Period of implementation: The survey was conducted before and after the pilot project implementation period.

- Scope of survey: The survey targeted schools, businesses, stores, residents, etc., within a 300-meter radius of the Naya Baneshwor intersection. In reality, the survey was conducted at schools slightly outside this area, as KVTPO also recommended schools where it had previously conducted road safety classes.

- Survey population: A minimum of 200 valid responses was required for the survey to be tabulated. Considering the possibility that the number of respondents might be reduced in the post-survey due to a lack of contact or other reasons, JET instructed the contractor to obtain a minimum of 300 respondents for the pre-survey; the contractor was able to get responses from more than 300 respondents.

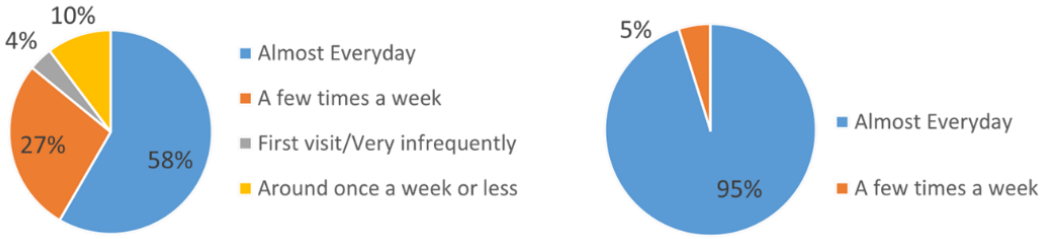
  The number of valid responses after the post-survey was 303. Of these, 263 were pedestrians (including students, workers, shopkeepers, and neighborhood residents) and 40 were bus drivers and conductors. The sex ratio (50/50%) and age group ratio (teens: 20%, 20s: 25%, 30s: 20%, 40s: 15%, 50s and above: 20%) were determined based on the demographic structure of the Kathmandu Valley. However, the actual respondents were 77% male and 23% female, with male pedestrians at 73% and females, 27%. The two reasons for this skewed sex ratio are that bus drivers and conductors are mostly male, and men were more cooperative in the face-to-face survey. At the same time, it was easier to obtain responses from professionals, such as public servants and teachers, but harder to get cooperation from homemakers, who are mostly females. The age group ratio was almost as planned, and responses were obtained from all age groups.

- Questionnaire tabulation: The questionnaire was divided into questions about attributes, road safety campaigns, and attitudes toward road safety. The questionnaire for bus drivers and conductors also asked about the safety of bus passengers boarding and exiting near intersections and making left turns at intersections. The results of the responses were cross-tabulated and organized by gender and age group.

- Survey results: The survey contractor compiled the survey results into a report and submitted the tally sheets in Excel and response forms to JET.

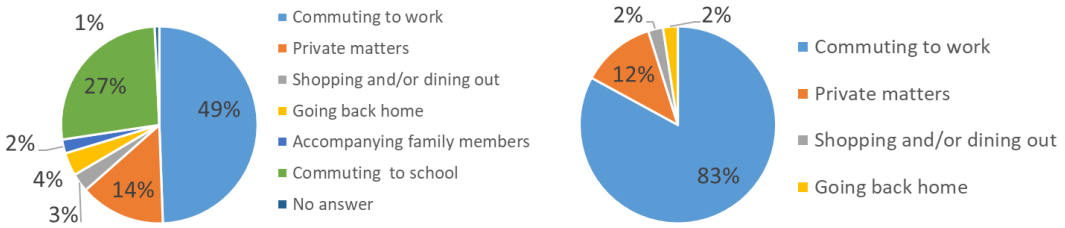
The following is an excerpt from the respondents' demographics.

As the above figures show, more than half of the pedestrians use the intersection every day, and 85% use it several times a week. Since almost all drivers and conductors indicated that they pass through the intersection daily, it can be concluded that the respondents' frequent use of the intersection is met, suggesting that their responses to the survey are valid. As indicated by the attributes of the respondents, the main trip purposes for pedestrians, driver and conductors were commuting to work and school.



Source: JICA Expert Team

Figure 7-11：Frequency of Passing through the Intersection (Left: Pedestrians, Right: Drivers and Conductors)



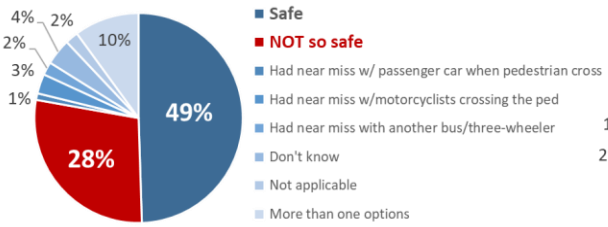
Source: JICA Expert Team

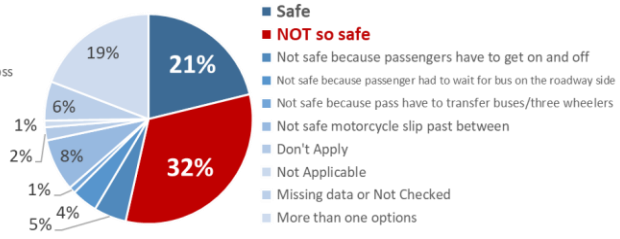
Figure 7-12：Trip Purposes (Left: Pedestrians, Right: Drivers and Conductors)

The following are excerpts from the pedestrians' responses:

Figure 7-13 shows that approximately 50% of pedestrians felt that the Naya Baneshwor intersection was safe, while about 32% said that it was not so safe. They felt relatively safe because of the existence of a pedestrian bridge crossing the main street at the Naya Baneshwor intersection, but they felt unsafe when using the pedestrian crossing on the main street due to near misses with cars and motorcycles. Figure 7-14 shows that while 20% of the respondents replied that it was safe to get on and off buses near the intersection, the remaining 80% of the respondents stated that it was unsafe due to near misses with motorcycles, among various reasons.

Figure 7-15 shows that approximately 74% of respondents were aware of the road safety campaign, with almost 90% (Figure 7.16) stating that the campaign had changed their awareness (i.e., 60% fully agreeing and 30% somehow agreeing). This suggests that the objectives of the campaign were achieved and that the campaign was beneficial. However, it is generally recognized that the change in awareness has a certain effect immediately after some intervention but decreases over time before finally returning to old practices.

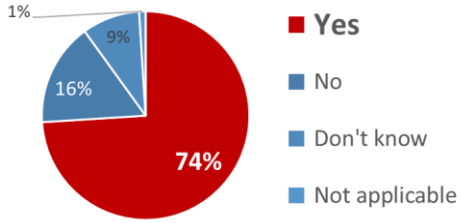


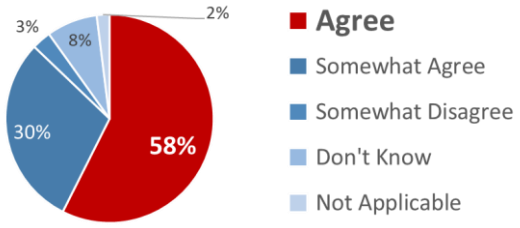


Source: JICA Expert Team

Figure 7-13：Safety Levels at Naya Baneshwor Intersection

Figure 7-14：Safety Levels When Getting On and Off Buses





Source: JICA Expert Team

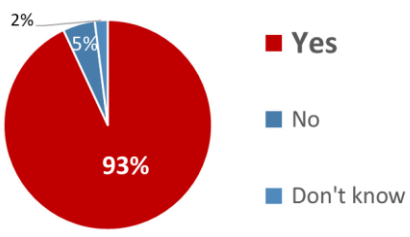
Figure 7-15：Level of Awareness of Road Safety Campaign

Figure 7-16：Road Safety Campaign and Awareness Change

The following are excerpts from the responses of drivers and conductors:

Figure 7-17 shows that almost all bus crew respondents indicated that traffic conditions around Naya Baneshwor intersection are unsafe. It is worth noting that 90% of bus conductors considered the area around the intersection to be unsafe, compared to about 32% (Figure 7-14) of pedestrians who reported it as not so safe to get on and off the buses in the vicinity.

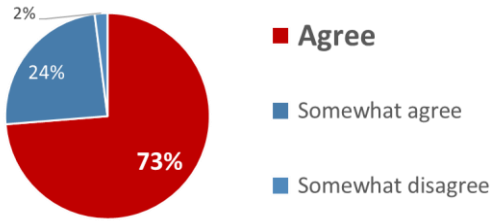
Only 5% of respondents said they had never heard of a road safety campaign, while almost all respondents were aware of such a campaign (Figure 7-18). Ninety-eight percent (98%) of the respondents reported that the road safety campaign had changed their awareness of road safety (Figure 7-19). The campaign for Naya Baneshwor intersection was also well-received by bus riders. Additionally, bus conductors were asked about lane changes made in conjunction with the Naya Baneshwor intersection improvement. Of the more than 80% who said the improvements were good, about 44% were certain about it (Figure 7-20).

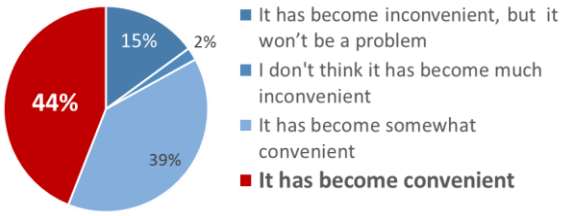


Source: JICA Expert Team

Figure 7-17：Safety Levels Around Naya Baneshwor Intersection

Figure 7-18：Awareness of Road Safety Campaign





Source: JICA Expert Team

Figure 7-19 : Road Safety Campaign and Awareness Change

Figure 7-20 : Lane Change Restriction around the Intersection

Reflections and Lessons from the Road Safety Campaign

As part of the Naya Baneshwor intersection improvement, sidewalk guardrails were installed near the intersection to prevent passengers from boarding and alighting at locations other than bus stops. Still, opposition from some store owners resulted in one opening on the north side and two openings on the south side. Ropes were temporarily installed, but their effect was limited, as people were seen climbing over them. For a certain period after the campaign, many buses allowed passengers to board and alight at a slight distance from the intersection, indicating that bus drivers had some change in their awareness of road safety.

The road safety team at KVTPO headquarters acknowledged the significance of the pilot project. However, this concept has not fully resonated with field officers. There has been an impressive increase in road safety awareness among bus drivers. However, KVTPO officers positioned at intersections seem to focus primarily on alleviating traffic congestion instead of prioritizing the safety of pedestrians and safe boarding and alighting of passengers. As a result, pedestrian safety tends to be overlooked during these times. While informing road users about road safety is valuable, it's just as crucial to address the need for changing the attitudes of police officers in the field.

As stated in the scope of work of the project, the results, issues, and lessons from past JOCV and senior overseas volunteers' awareness-raising activity reports were reviewed and reflected in the road safety campaign. Additionally, since senior overseas volunteers were dispatched before the implementation of the second pilot project, their opinions were directly obtained and used as a reference for the development of the road safety campaign.

7.3.2 Activity 4-2: Local Seminars & Training Related to Activity 4-1

The plan was to hold five seminars and training sessions mainly to related organizations to ensure their understanding of the implementation of the pilot project and obtain their cooperation in the campaign. The timing and objectives of the seminars and training sessions were: 1) to introduce the campaign at the time of formulating the campaign plan, 2) to let them fully understand the purpose of the campaign, points to consider, people and actions targeted by the campaign, and expected effects before the campaign started, 3) to discuss problems and issues the campaign might encounter and to consider methods to verify the effects of the campaign, and (4) before the second campaign, to decide on the content of the campaign and examine methods for verifying the effectiveness of the campaign. Those mentioned above (1) were conducted at WG meeting #4, not in a seminar, and were agreed upon by all parties. Therefore, the content of the seminar started from (2) above.

The first two sessions were planned to be led by the JICA Expert Team, while the last two were supposed to be led by KVTPO with the support of JET . However, frequent changes in KVTPO's staff responsible for traffic safety awareness activities hindered the accumulation of knowledge and experience in an organized manner. Since only one staff member was in charge and he was busy with his primary responsibility for traffic management, the third and fourth sessions were not carried out as

planned. The JICA Expert Team led the third and fourth sessions, and KVTPO was merely asked to present on the road safety awareness activities in Nepal and to discuss the campaign for the second pilot project at the workshop.

(1) First Seminar (August 30, 2023)

The main objective of the first seminar was to build consensus with stakeholders on the content of the traffic safety campaign and questionnaire survey for the Naya Baneshwor intersection Pilot Project. During the seminar, examples of traffic safety awareness activities in Nepal, Japan, and other countries were presented. In addition, JET presented awareness activities from a gender perspective. Participants were from KVTPO, KMC, and traffic police stations (Baneshwor, Singhadurbar, Koteshwor, etc.).

Five presentations were given at the seminar:

- Overall overview of the Kathmandu Urban Traffic Management Implementation Project
- Road safety campaign in the pilot project
- Status of road safety awareness in Kathmandu Valley and Nepal (presented by KVTPO)
- Introduction of road safety awareness activities in other countries, including Japan
- Importance of incorporating gender perspectives into road safety awareness activities

Question and answer session

During the Q&A session, participants raised a wide range of practical issues, and constructive discussions were held with the JICA Expert Team. They are summarized below.

- **Lack of Awareness and Understanding of Road Markings**

Participants pointed out that road markings are not well understood by road users in Nepal, including those in the Kathmandu Valley. Historically, road signs were often viewed as mere decorations, and even today, many citizens lack a clear understanding of their meaning. Therefore, it is necessary to widely disseminate the meaning and importance of road markings through educational activities.

- **Lack of Safety Standards at Construction Sites**

KVTPO and the JICA Nepal Office expressed concern that there are many cases where minimum safety measures are not taken at road construction sites, with inadequate signage and neglected dangerous work zones being the primary causes of traffic accidents. In the future, KVTPO should lead the development of road safety standards for road construction in cooperation with contractors and road administrators, ensuring that these standards are followed.

- **Handling Traffic Violators and System Operation Issues**

The Road Traffic Management Act of 1993 stipulates that traffic violations are subject to a six-month license suspension for five or more violations. However, this system is currently not strictly enforced; KVTPO has adopted a management software to record traffic violation history and tally the number of violations but has yet to suspend a license (Table 7-5). This is partly because the actual authority to suspend licenses lies with the DOTM, and the lack of a coordinated system for disposition has been identified as a contributing factor to this issue.

Table 7-5 : Traffic Violators (from KVTPO Data)

Number of Violations	Number of Violators
Less than 10 times	963,946
11 - 20 times	10,047
21 - 50 times	42,140
51 - 100 times	735
101 - 200 times	55
201 - 270 times	4

Source: KVTPO

- **Use of Digital Technology and Promotion of Traffic Safety Apps**

KVTPO explained the "Nepal Police App" and "Traffic Police App" that are currently being introduced. In the event of an emergency, the feature enables automatic notification to a nearby police station by simply opening the app and shaking the phone three times. While these digital tools are beneficial, it was pointed out that citizens' awareness of these tools is low, and there is a lack of promotional activities.

- **Traffic Behavior from a Gender Perspective**

In response to a question regarding female drivers, KVTPO opined that women tended to comply with traffic rules more than men. In the past, there was strong opposition to requiring rear seat passengers to wear helmets. However, it is now reported that female riders themselves are actively wearing safety equipment, and awareness is changing.

Evaluation of the Seminars and Participants' Level of Understanding

Most participants stated that the seminar content was relevant to their work, indicating a high level of satisfaction with the relevance and usefulness of the content. Many participants also stated that they "improved their knowledge" and "gained new perspectives" through the seminar, indicating that they felt they had enhanced their ability to perform their work. In particular, many comments highlighted that the seminar provided a fresh and valuable perspective on gender issues and the use of digital technology, topics with which they did not have much prior opportunity to engage.

A questionnaire administered after the seminar provided valuable feedback on the participants' areas of interest, level of understanding, and future training needs. Below are the main trends and analysis.

- **Traffic Safety Work Content**

It was clear that most participants are engaged in traffic control, law enforcement, educational activities, and accident response as part of their daily work, with a particular focus on violator apprehension and on-site safety instructions. Based on multiple responses, a certain number of participants were also involved in educational activities at schools and communities, indicating that KVTPO's regional collaboration efforts are making progress in some areas.

- **Traffic Behavior as a Problem**

The participants identified the following traffic violations as significant: reckless driving and speeding, ignoring traffic signals and running the wrong way, not wearing helmets and seat belts, not using crosswalks, and drivers ignoring pedestrian priority. These behaviors are seen daily, and more concrete measures are needed in future awareness-raising activities.

Topics of Interest

The topics of high interest in this seminar were successful examples of traffic safety awareness in other countries, enforcement methods to deter violations, and inclusive safety measures (including consideration for gender, the elderly, and children). Many participants highly appreciated the presentation of case studies from Japan, Thailand, Cambodia, and other countries, commenting that they are useful references in formulating improvement measures for Nepal.

Many participants expressed a desire for further details about the seminar content and case studies that apply to local issues. There were also some questions regarding tougher penalties for traffic violations and improving the effectiveness of the system.

The following suggestions were made as topics to be covered in subsequent sessions. It is evident that the participants strongly desire to acquire comprehensive knowledge and skills in all aspects of traffic management, not just in awareness-raising.

- How to manage traffic congestion in urban areas;
- Road design and measures to ensure pedestrian safety;
- Smart transportation systems and ICT-based traffic management;
- Institutional responses and practical coordination to prevent the recurrence of violations; and,
- Response manuals and accident analysis methods after traffic accidents.

Conclusions and Recommendations

This seminar provided a meaningful opportunity to raise awareness of traffic safety and to promote knowledge among local practitioners (Figure 7-21). It was a great success, as many participants openly shared their issues in the field and offered concrete suggestions for improvement, as follows:

- Increase public awareness of road markings and safety standards;
- Strengthen the linkage between violation records and the licensing system (coordination with DOTM);
- Expand traffic safety awareness with consideration of gender;
- Promote field support through the use of smart technology (e.g., apps); and,
- Conduct regular follow-up seminars.

Source: JICA Expert Team

Figure 7-21 : Photos of the First Seminar

(2) Second Seminar (December 19, 2024)

The purpose of this seminar was to enhance participants' knowledge of practical methods related to traffic safety. The seminar provided an opportunity to deepen their understanding of local traffic safety measures through lectures and exchanges of opinions based on Japanese and other countries' experiences.

The participating agencies were KVTPO, KMC Police Department, LMC Police Department, MOPIT, DOR RSTU, and KVDA.

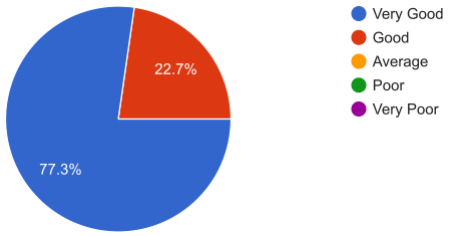
The seminar included the following topics:

- **Project Progress Report:** The JICA Expert Team reported that the project has achieved meaningful results so far and that a pilot project is underway in Lainchaur district.
- **Traffic Accident Analysis and Measures by KVTPO**: KVTPO reported the results of its analysis of traffic accidents over the past three years. Additionally, it explained the technology and ICT equipment being used by the police, road safety awareness activities, and the status of integrating the TVRS (Traffic Violation Recording System), including its integration with the Nagarik app.
- **Introduction of international findings:** The growing importance of traffic safety in Taiwan was explained. Additionally, a case study of Thailand's efforts to reduce traffic accident fatality rates was presented. Challenges and solutions in other countries were also explained, and references for building the Kathmandu model was shared.
- **Design Methodology and Case Studies of Traffic Safety Awareness Campaigns:** The presentation outlined the design and planning methodology of a traffic safety awareness campaign, detailing how it utilized a range of tools. The preparation for the pilot project at Lainchaur intersection was reported.

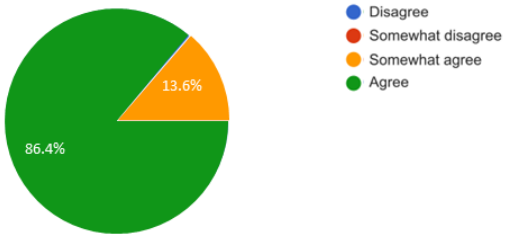
Evaluation

Many positive comments were received from participants, such as "It was a meaningful learning opportunity," "I learned a lot from comparative cases from other countries," "The presentation was clear and easy to understand," "I learned practical information on traffic safety implementation and awareness-raising activities," and "A longer session would be desirable." Some participants commented that "The verbal presentation was good," but there were also remarks that "there were some issues with the verbal presentation," which are points to improve on for future activities. Regarding the management of the conference, the participants noted that "overall, the conference was very good" and that "participation from other related institutions is expected in the future."(Figure 7-22)

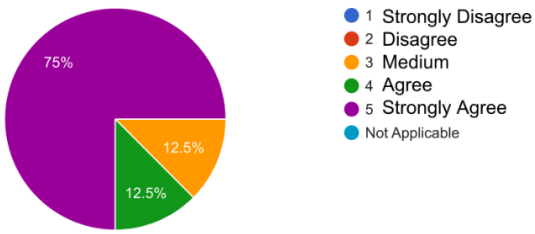
1. How is your evaluation of the seminar?



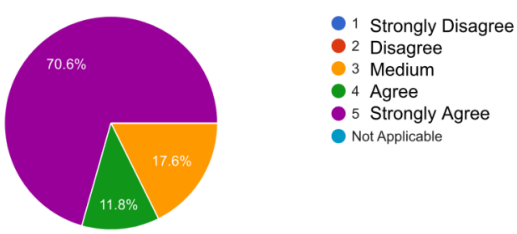
2. Do you think your competence/knowledge of the agenda has increased?



3.1 Is the content of the seminar relevant to your work?



3.2 Did the content meet your expectations?



Source: JICA Expert Team

Figure 7-22 : Evaluation of the Second Seminar

Comprehension Test Results

A total of 21 participants (9 women and 12 men) were assessed both before and after the seminar. The post-test results suggest that the seminar was effective, with nearly 90% of participants answering the questions correctly. Below is JET's analysis of the comprehension test results (Table 7-6).

- The post-event survey's correct response rate was 78.6%. Generally, when the percentage of correct responses exceeds 80%, participants are considered to have fully understood the content. Although the percentage of correct responses was slightly below 80%, it can be judged that participants generally understood the content. The seminar was conducted in English for both presentations and handouts, although some of the presentations were given in Nepali. JET had confirmed in advance that there would be no problem with presentations in English; however, in light of the need to explain the presentations in Nepali, it would have been better to have all the presentations and handouts in Nepali to further improve the participants' level of understanding.
- The lowest percentage of correct responses was 65.5%, while the highest was 89.7%. Compared to the pre-event survey, the number of "don't know" responses decreased by 68.4%, indicating that the participants learned from the seminar. However, incorrect answers to questions about PDCA, Problem Tree, and Logical Framework, which were new concepts for the participants, were notable.

Table 7-6：Results of Pre- and Post-Seminar Comprehension Tests

Item	Before Seminar	After Seminar
Correct answers (overall)	68.9%	78.6%
Correct answers (female)	70.4%	75.4%
Correct answers (Male)	67.9%	80.7%
Score Improvers	-	89.5% (19/21)
Decrease in "don't know" responses	-	68.4%

Source: JICA Expert Team

Topics of interest

When asked about the topics for future seminars, the participants showed interest in improving pedestrian safety; educating the public on road infrastructure, traffic signals, lanes, and more; gaining technical knowledge on traffic accident reduction and management for application in Kathmandu; providing safety education for specific groups, such as students, the elderly, and motorcycle drivers; learning about concepts on vehicle safety (Safer Vehicle) with international examples; and formulating effective safety measures applicable in urban and rural settings.

Challenges and Learning

- Increase the number of female participants: This year's event was attended by female police officers due to prior encouragement. It is necessary to promote their participation by considering gender balance.
- Consider base knowledge when introducing new concepts: New concepts such as PDCA, Problem Tree, Logic Framework, etc., should be explained carefully.
- Translate materials: Since the presentation materials and handouts were in English, it was difficult to fully understand them. In the future, materials and slide presentations should be prepared in advance to allow for translation/ interpretation to Nepali.

- Create a safe environment: The police are a strictly hierarchical body, and ordinary police officers are likely to be reluctant to speak up in the presence of superiors. It is necessary to devise ways to encourage a free exchange of opinions by using small group discussions.

Conclusions and Recommendations

JET believes that this seminar made a significant contribution to sharing knowledge and strengthening capacity in the area of traffic safety. In the future, it is desirable to promote ongoing efforts while keeping the following points in mind:

- Strengthen local language documentation and interpretation systems;
- Expand technical and practical topics;
- Strengthen safety awareness among diverse audiences (students, seniors, drivers, etc.); and,
- Expand opportunities to exchange opinions using smaller groups, etc.




Source: JICA Expert Team

Figure 7-23 : Photos of the Second Seminar

(3) First Training (February 26, 2024)

Once the Naya Baneshwor intersection Pilot Project was completed and the results of the awareness change survey compiled, a training was held to develop a plan for a second pilot project traffic safety awareness campaign with the participation of police officers who have jurisdiction over the Lainchaur intersection. The objectives and content of the training were as follows

- **Objective:** 1) To learn about the traffic safety awareness campaign of the Naya Baneshwor intersection Pilot Project. 2) To understand the effectiveness of the traffic safety awareness campaign and how road users' awareness of traffic safety changed after the implementation of the pilot project. 3) To learn the procedures for planning a traffic safety awareness campaign, identify traffic safety issues at intersections, and develop activities to address these issues.
- **Contents**: Overview of road safety awareness campaign at Naya Baneshwor intersection, results of awareness change questionnaire survey, road safety activities of Nepal's National Road Safety Action Plan, how to plan a road safety awareness campaign, group work, and presentation

  The workshop was designed to help participants plan a traffic safety awareness campaign for the Lainchaur intersection through group work, following a four-step process. Still, due to insufficient time for group work, participants only presented the issues they had identified to each group and did not develop a plan. However, due to insufficient time for group work, the group only identified issues and presented them to each group, and did not develop a plan.

Excerpts from Group Work Presentations

- Thirteen organizations are involved in road safety. The lack of clarity and overlap of roles among the organizations has created a situation in which each organization ignores the role it is supposed to play, thinking that other organizations will take care of it. This duplication of roles causes the implementation of road safety activities to be neglected.

- One of the main challenges for traffic safety activities is the lack of budget; KVTPO has no budget related to traffic safety for the current year and no campaign goods for its activities.
- Police officers in charge of traffic safety often have limited time to devote to traffic safety activities due to their primary duties.
- The National Road Safety Action Plan (2021-2030) aims to reduce road accidents by 50% by 2030; however, the reality is less optimistic: as of 2023, road accidents had decreased by only 5%.
- Road markings are unclear, and traffic signals are lacking.

Evaluation

Although the training was generally well-received by the participants, 30% indicated that the content was either not directly related to their work or did not meet their expectations. Additionally, most participants stated that they had little to no new insights from the awareness change questionnaire. Some participants felt that the group work was too brief, while 30% of the participants expressed that the group work was not relevant to their work.

Traffic safety awareness initiatives do not fall under the responsibilities of police officers directing traffic. This explains the high percentage of respondents who indicated that these activities are "not related to their work." It is understood that such initiatives are exclusively planned and executed by personnel in KVTPO's traffic safety awareness and training section, along with their direct supervisors, leading to undeniably low interest at the field level.

Source: JICA Expert Team

Figure 7-24：Photos of the First Training

Conclusions and Recommendations

Due to the late arrival of the participants, the first half of the presentation was significantly abbreviated. As a result, the participants might not have fully understood the content and did not gain new insights or discoveries because of the insufficient explanation of the road safety campaign's objectives, which aim to change attitudes, and the methods to be employed to achieve this goal. It should have been clearly explained that the survey was designed to evaluate road safety awareness activities. Although each group engaged in lively discussions, JET suggests that the time for group work be extended in future sessions.

Although police officers in the field are not directly involved in planning traffic safety awareness activities as part of their work, JET still sought their opinions because of their daily experiences in traffic control. JET believed that group work on traffic safety from the perspective of different road users could provide a great opportunity for lively discussions based on their respective experiences.

- Prepare and explain planning methodology materials in Nepali.
- Provide time for group work to allow practitioners to exchange opinions on road traffic and road safety in general, besides traffic safety campaigns.

(4) Second Training (March 24, 2025)

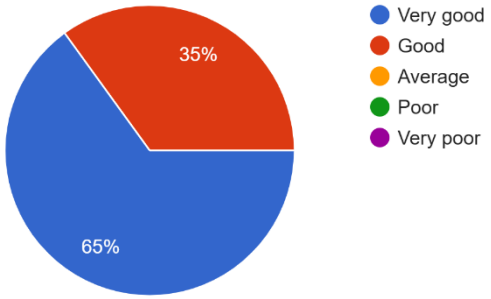
The training aimed to share knowledge on strengthening enforcement capacity and enhancing traffic safety, with an emphasis on achieving inclusive traffic safety that considers gender issues. More than 20 participants from KVTPO, DOR, and RSTU attended the training, which covered the following topics:

- **Enhanced Enforcement**: Practical enforcement methods and responses were presented, along with data on the correlation between increased enforcement and the number of traffic accidents. A session was organized to discuss effective responses to various traffic situations.
- **Gender Mainstreaming and Inclusive Road Safety:** An explanation was provided on the importance of a gender perspective in road safety, along with examples from other countries to enhance participants' understanding.

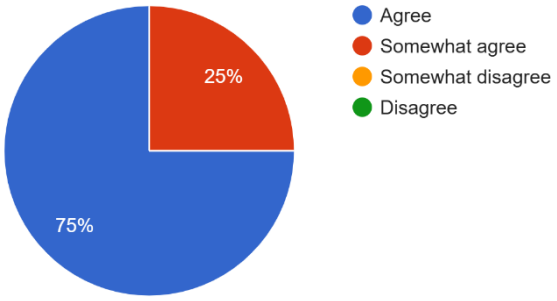
Evaluation

The participants provided the following feedback: "This type of training should be held in schools and universities," "It was very beneficial for the traffic police in Kathmandu," "The examples of traffic control from Japan and Thailand were valuable," "The lecturer's voice was difficult to follow," "The content related to gender was particularly engaging," and "The materials were clear and easy to comprehend." Additionally, regarding management, comments included: "The time allocation was suitable and the content meaningful," "The approximately 90-minute session was perfectly timed," and "Overall, the management was excellent." (Figure 7-25)

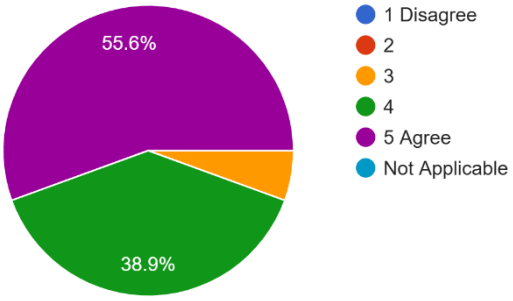
1. Evaluation of the training



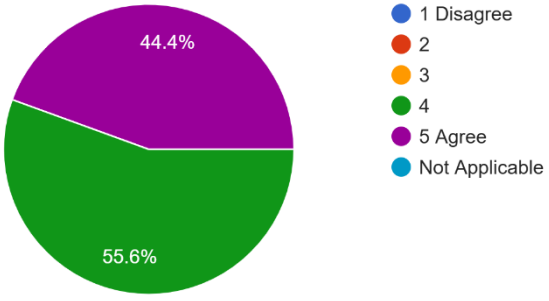
2. Do you think your knowledge and ability regarding the agenda have increased?



3.1 Do you think the content of the training is relevant to your work?



3.2 Did it meet your expectations?



Source: JICA Expert Team

Figure 7-25 : Evaluation of the Second Training

Participants' Level of Understanding

Many participants expressed interest in learning about the theory and practice behind traffic enforcement, the importance of balancing safety education with enforcement, the number of personnel

and methods required to enforce violations, and strategies for ensuring safety that consider socially vulnerable groups, including women, children, and the elderly. Additionally, they recognized the need for the active involvement of women in police activities. The most common responses are described below.

Topics of interest

There was considerable interest expressed about international comparisons of urban traffic management, examples of road safety equipment usage, a comparison of traffic user awareness between Japan and Nepal, and traffic management techniques that are more practical and involve informed choices. The training was shared on the official Facebook page of the Tomandu Traffic Police (Figure 7-26).

Source: JICA Expert Team

Figure 7-26：Photos of the Second Training

Conclusions and Recommendations

This training was conducted to improve knowledge and practical methods related to traffic safety. In particular, the practical methods of traffic enforcement and gender-sensitive perspectives provided significant suggestions for Nepal's traffic safety policies.

Recommendations include:

- Conduct educational activities involving the educational field and the local community;
- Create a work environment that encourages the participation of female police officers;
- Apply transportation policies based on the best practices in other countries; and,
- Further enrich the content by reflecting the opinions/ experiences of practitioners.

(5) Third Seminar (July 31, 2025)

This road safety awareness seminar marked the final event in the series of road safety awareness activities. The seminar featured the results of a questionnaire survey conducted after the second pilot project, along with examples of road safety campaigns in Japan that served as references for designing awareness activities in the Kathmandu Valley. Additionally, historical efforts to address Japan’s "traffic war" from the 1960s to the 1980s were introduced.

Participants primarily included personnel from the Kathmandu Valley Traffic Police Office (KVTPO) and several traffic volunteers from colleges and schools.

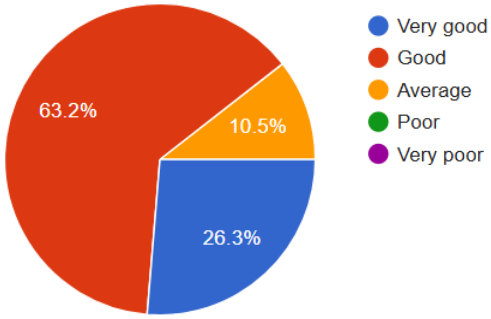
The seminar covered the following topics:

- **Lainchaur Intersection Improvement Pilot Project**: A presentation by Deputy Team Leader showcased the improved traffic flow following the intersection's redesign.
- **Observation of Road Safety Awareness Activities Post-Improvement**: The officer in charge at the Lainchaur intersection from KVTPO shared insights on their collaboration with the JET during the pilot project and the valuable lessons learned.
- **Questionnaire Survey Results and Implications**: Activities and achievements from the second pilot project were presented. An interview survey with pedestrians and drivers was conducted to assess the perceived improvements after the intersection upgrade, and the results were analyzed and discussed. Moreover, examples of road safety awareness campaigns were introduced.
- **Japan's Traffic War and Countermeasures**: In response to a request from KVTPO, JET presented the background and countermeasures of Japan's traffic crisis from the 1960s to the 1980s. Lessons from Japan highlighted the importance of safety education programs, strict law enforcement, institutional reforms, and the establishment of a traffic accident analysis organization to reduce fatalities and improve road safety.

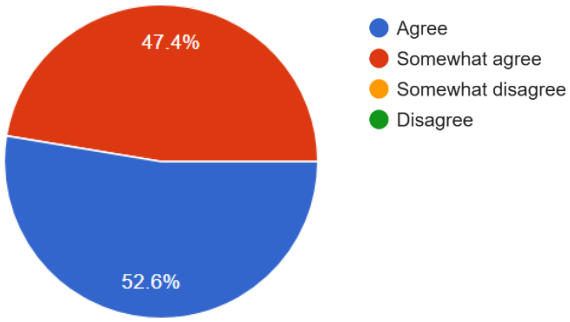
Evaluation

Overall participants show positive responses toward this seminar and found it useful for daily work in the future.

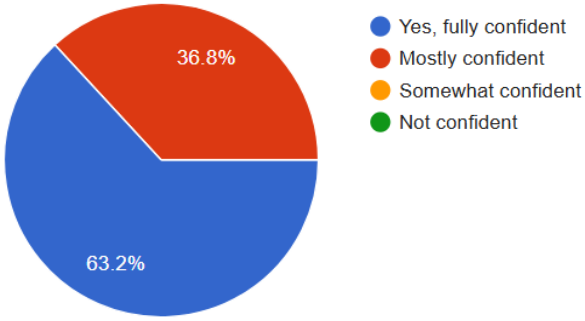
1. How was the seminar?



2. Has the capacity/knowledge on the agenda discussed today increased?



3. Do you feel confident to apply the safety measures discussed in your daily work?



Source: JICA Expert Team

Figure 7-27 : Evaluation of Third Seminar

Topics of interest

Participants expressed strong interest in topics such as road safety, road accident data, international case studies (especially Japan's traffic systems), and the role of individual responsibility in implementing

traffic rules. They appreciated the informative content of the seminar, including slides, graphs, and booklets, and found the sessions on road safety education, traffic coordination, and technological applications in traffic management particularly valuable. Many participants noted that Nepal's current traffic system is heavily reliant on the traffic police and lacks interdepartmental coordination, which contrasts with Japan's integrated approach.

Source: JICA Expert Team

Figure 7-28：Photos of the Third Seminar

Conclusions and Recommendations

Overall, the seminar was considered highly fruitful and educational. Participants recommended that a single organization should oversee all road safety and transport management projects in Nepal to avoid fragmented efforts. They also emphasized the need for regular public awareness campaigns, better communication during sessions, and inter-agency coordination. Adopting successful practices from countries like Japan, such as the use of technology and strong departmental collaboration, was seen as a roadmap for improving Nepal's traffic management system.

7.3.3 Activity 4-3: Expansion of Campaign Activities to Other Intersections

JET implemented a PDCA cycle for road safety awareness activities in the first pilot project. The second pilot project was planned to be led by KVTPO, which would conduct a road safety awareness campaign. However, due to resource constraints, JET provided financial and technical support for the campaign. To maintain KVTPO's self-sufficiency, KVTPO developed the campaign content and materials, which were then reviewed by JET before development.

(1) Road safety campaign at the Lainchaur Intersection

JET and KVTPO discussed and agreed on the content of the campaign that would be implemented and re-commissioned the procurement of campaign items. Due to the presence of important facilities in the vicinity of the Lainchaur intersection and the lack of space for installation, it was not possible to implement all of the campaigns carried out in the previous pilot project. The pilot project was conducted from May 11 to 21. Information boards were installed at the Lainchaur intersection during the pilot project period. Because of the ordinance stipulated by KVC, campaign items were not able to be handed out on footpaths. They were mainly distributed at shops, companies, and schools around the intersection. JET's subcontractor distributed 250 items during the pilot project period, and KVTPO distributed the remaining 750. KVTPO distributed them to drivers at the intersection and during road safety classes. JET made the following campaign items and handed them over to KVTPO. Some items are shown below.

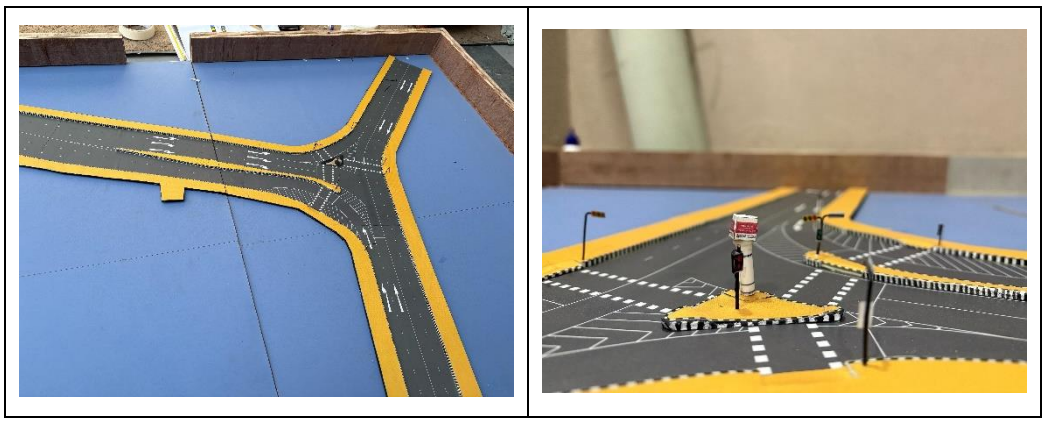
Table 7-7：Handed over Campaign Items

Item	Quantity
1. Miniature of Lainchaur intersection	1
2. Information boards	4

3. Go & Stop sign	10
4. Placard	10
5. Crossing flag	4
6. Reflective vest belt jacket	100
7. Safety vest	5
8. Promotion item (facial mask)	1,000
9. Can Badge	100
10. Novelty goods – safety vest	15
11. Novelty goods – desk calendar	125

Source: JICA Expert Team

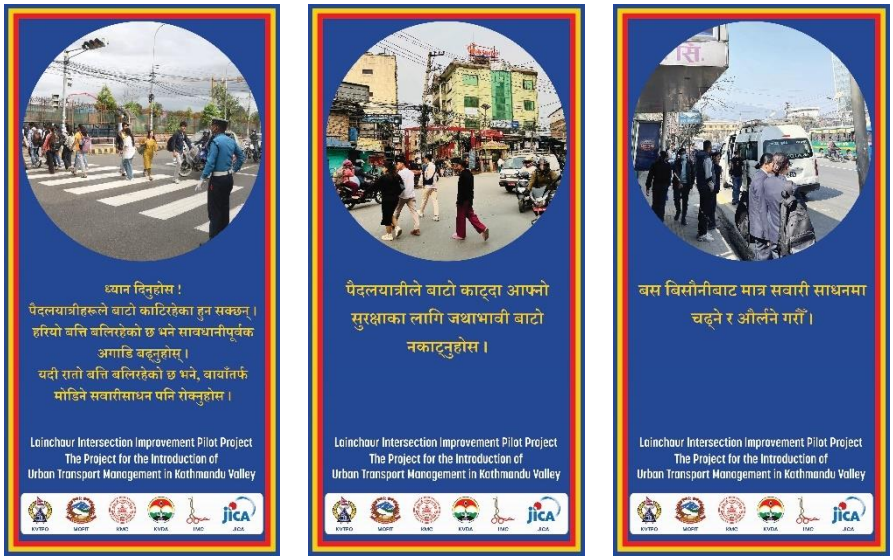
Miniature: The Lainchaur intersection miniature was created similarly to the ones made in the previous pilot project. The intersection miniature was designed for use in road safety classes.



Source: JICA Expert Team

Figure 7-29：Miniature of Lainchaur Intersection

Information boards on the footpaths: Road safety information boards for pedestrians were installed on the sidewalk. The content of the information boards was drafted based on the suggestions from KVTPO and observations of road user behavior at the Lainchaur intersection. The project name and the logos of the organizations involved were displayed at the bottom of the information boards.



Source: JICA Expert Team

Figure 7-30：Information Boards

Campaign items (facial masks): The distribution of campaign items is a common and effective method in Japan, including tissues, reflective bands, clear files, and awareness leaflets, aimed at a wide age range from children to seniors. These items feature road safety messages and educational characters, making them memorable and helping to promote ongoing safety awareness. In the Pilot Project, a campaign item shown in Figure 7-31 was produced, which contains one facial mask. KVTPO chose the slogans on the front, while the five images and slogans on the back were taken from the information boards in the first pilot project. The characters are inspired by Nepal's national bird and national animal, the tiger. The project name, five related organizations, and JICA logo are printed on the item.

Source: JICA Expert Team

Figure 7-31 : Campaign Item (with a facial mask inside)

(2) Survey on Changes in Road Safety Awareness

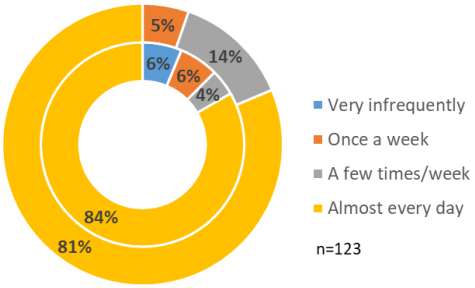
The survey was conducted over three days from May 23 to 25. It used the same method as the first pilot project. Based on lessons from the first survey, the questionnaire was administered only once after the campaign, rather than twice (before and after). The reasons for this decision included the short campaign duration, which was expected to ensure respondents still remembered the conditions prior to the intersection improvements when asked afterward; the campaign content was small-scale; and respondents were likely limited to people commuting to or from schools and businesses around the Lainchaur intersection. Therefore, it was determined that a single survey would provide sufficient results.

While the required survey population was at least 120 in total for pedestrians, bus drivers, and conductors, the number of valid responses reached 163. Among these, 123 were pedestrians (including students, workers, and shopkeepers), and 40 were bus drivers and conductors. The sex ratio (female: male) was 31% to 69%. As in the first survey, the main reason for this skewed sex ratio is that bus drivers and conductors are predominantly male occupations, and males were more cooperative during the face-to-face survey. Additionally, because of the area's characteristics, the surveyors were unable to locate residences for interviews.

As for bus drivers and conductors, it was not possible to carry out the questionnaire survey at the bus parking lot in Ratna Park, where most of the buses passing by the Lainchaur intersection depart from and arrive at. Based on a suggestion from a public transport operator, the survey was conducted at three alternative locations where public transport normally stops and where respondents could more easily provide answers: Manamaiju public micro bus stop, Thapa Guan Pul, and Suryadarshan Height micropark.

The following is an excerpt from the questionnaire survey.

Figure 7-32 and Figure 7-33 show the survey results from pedestrians. Regarding the frequency of intersection use, 95% of men (outer circle) and 88% of women (inner circle) responded that they use the intersection several times a week or daily. For both men and women, commuting to work was the most common trip purpose, followed by commuting to school.



Source: JICA Expert Team

Figure 7-32 : Frequency of passing the Intersection (pedestrians)

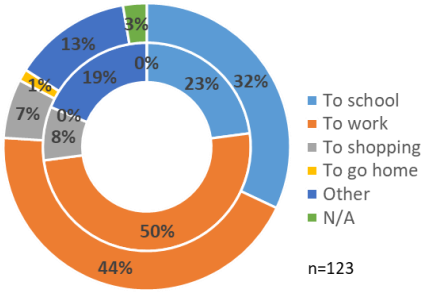
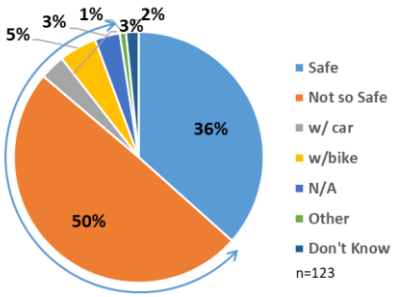


Figure 7-33 : Trip Purpose

The following are excerpts from the pedestrians' responses:

Figure 7-34 shows the responses to the safety of pedestrians around the intersection. Only 36% answered that the area was safe, while 62% answered that it was not safe and that they had experienced some kind of near-miss accident.

Figure 7-35 shows the responses to the safety of getting on and off buses at bus stops near the intersection. Only 16% of respondents answered that it was safe, while 63% answered that it was not safe. Among those who answered that it was not safe, 15% stated that it was unsafe because they had to get on and off buses on the road, but not from the footpath. Based on observations, many bus users get on and off buses at the bus stop; however, when buses arrive in succession, there are indeed situations where boarding or alighting on the road becomes unavoidable.



Source: JICA Expert Team

Figure 7-34 : Safety at Intersection (Pedestrians)

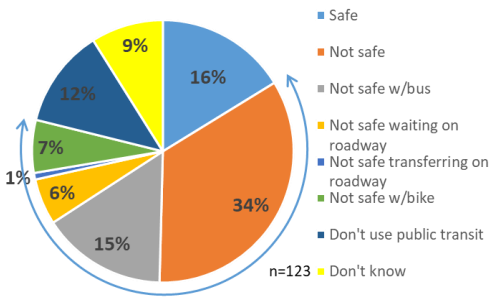
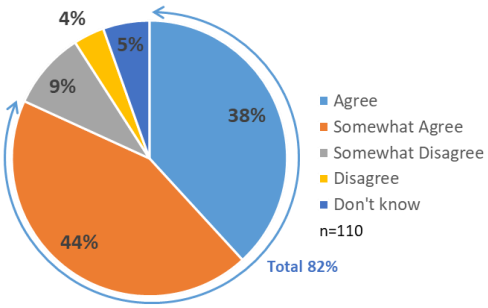


Figure 7-35 : Safety when Getting on and off Buses (Pedestrians)

The intersection improvement work included the construction of traffic islands and the relocation of pedestrian crossings. The pedestrian crossings are now shorter, and the introduction of traffic islands has created a place where pedestrians can wait if the traffic signal changes while they are crossing, making it safer for pedestrians to cross the road.

The survey result shows that 82% of respondents stated that crossing the intersection became better, indicating that most people have highly evaluated the intersection improvement work (Figure 7-36).

Pedestrian signals, which had not previously been installed, have been installed. The survey result shows that 82% of respondents think it has become easier to cross the road. In addition, pedestrians appear to feel safer crossing the road due to the pedestrian separation signal (Figure 7-37).



Source: JICA Expert Team

Figure 7-36 : Walkability of Crosswalks

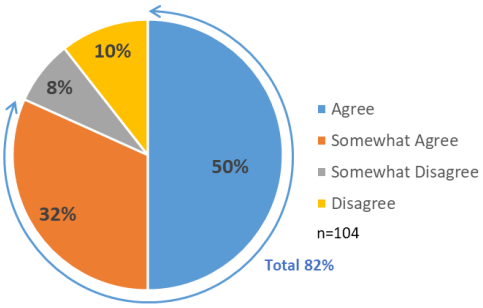
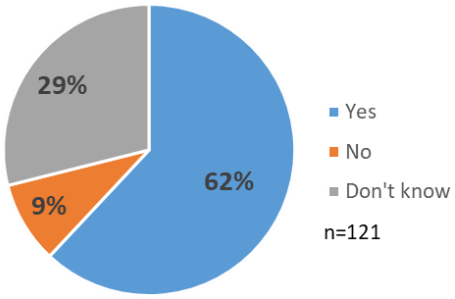


Figure 7-37 : Walkability of Crosswalks after the Signal Improvement

As shown in Figure 7-38, 62% of respondents stated that they have recognized the road safety campaign implemented at the intersection. In the second pilot project, campaign tools were limited. The only campaign tools visible to pedestrians were four information boards installed around intersections. Other than that, awareness promotion items were distributed at shops, companies, schools, and other locations. Despite the limited campaign tools and short pilot project period, more than 60% of respondents were aware of the road safety awareness activities, which exceeded expectations. Several respondents stated that their children participated in road safety classes at school, brought home campaign items they received, and told their parents about the road safety awareness activities.

Figure 7-39 shows the results of a question asking whether people's perspectives toward road safety changed after seeing or hearing about road safety campaigns. Almost all of those who responded that they had seen or heard about the campaigns said that their attitudes toward road safety had changed to some extent. After such campaigns, people often respond that their awareness has changed, but it has been pointed out that this awareness does not last. This questionnaire survey was conducted immediately after the pilot project, and it is believed that the results showing a change in awareness were obtained because the survey was conducted while people's awareness of road safety was still high.



Source: JICA Expert Team

Figure 7-38 : Recognition of Road Safety Campaign

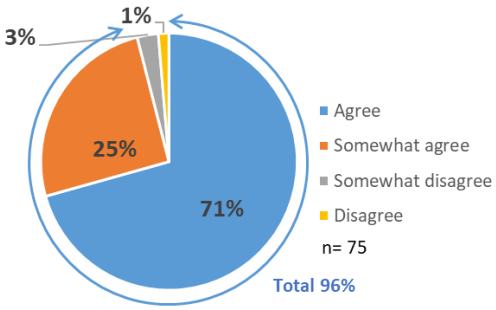
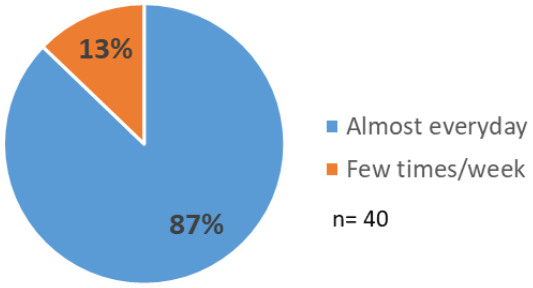


Figure 7-39 : Changes in Road Safety Awareness

The following are excerpts from the drivers and conductors' responses:

When including those who use this intersection several times a week, nearly all respondents indicated that they pass through or use this intersection. The purpose of using this intersection is work. Modes of transport include 65% using public transit, 20% using motorcycles, and 12% using cars.65% of public transit users indicated that they passed through this intersection for work, but when comparing the other modes of transport with their purposes, it appears that the interviewers and respondents did not fully understand the meaning of the question. Regardless, considering that drivers and conductors pass

through this intersection for work, it is reasonable to assume that their mode of transport is a bus. (Figure 7-40 and Figure 7-41).



Source: JICA Expert Team

Figure 7-40 : Frequency of passing the Intersection (Drivers & Conductors)

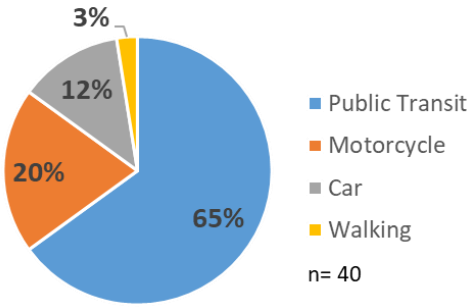
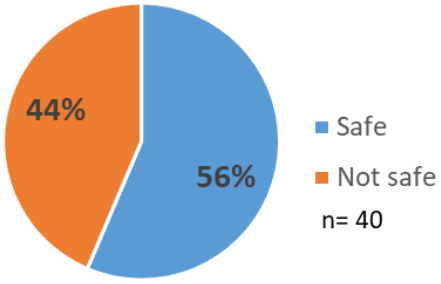


Figure 7-41 : Mode of Transport

As shown in Figure 7-42, 56% of respondents answered that the area around the intersection was safe when asked about safety from the driver's perspective. Nearly half of those who answered that it was not safe stated that they had had a near accident with a motorcycle. When observing traffic in Kathmandu, it is common to see motorcycles trying to squeeze between the footpath and passengers getting on and off buses. One reason for this is that when multiple buses stop at a bus stop, the buses that arrive later stop a little away from the footpath to allow passengers to get on and off.

Figure 7-43 shows questions regarding passenger safety as perceived by drivers. Only 26% of respondents answered that passenger boarding and alighting was safe.



Source: JICA Expert Team

Figure 7-42 : Safety at the Intersection (Drivers' Perspective)

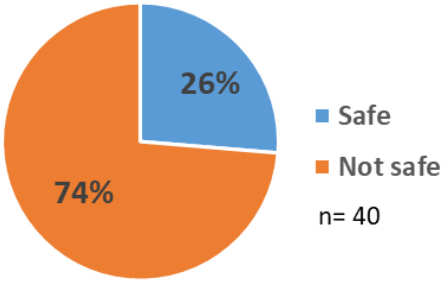
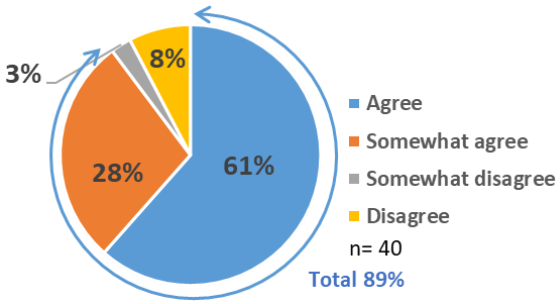


Figure 7-43 : Safety of Passengers Getting on and Off the Buses (Drivers' Perspective)

As Figure 7-44 shows, 89% of drivers, including those who answered that they somewhat agreed, responded that driving became smoother after the intersection was improved. As Figure 7-45 shows, 82% of drivers, including those who somewhat agreed, responded that driving had become smoother as a result of the synchronization of traffic signals at this intersection and surrounding areas. Based on these results, it can be concluded that the intersection improvement pilot project achieved its objectives.



Source: JICA Expert Team

Figure 7-44：Improved Traffic Flow at the Intersection

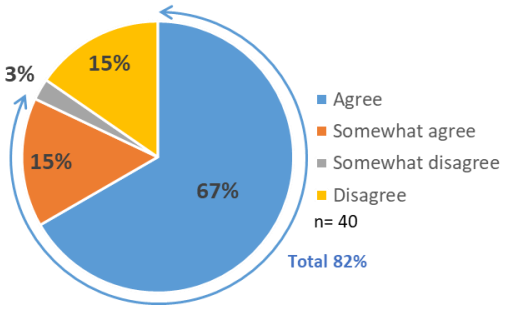
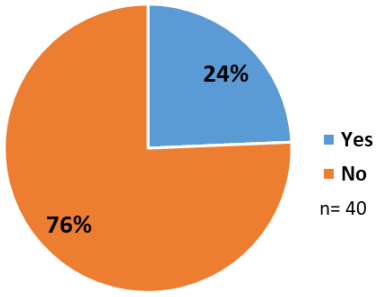


Figure 7-45：Improved Traffic Flow due to Traffic Signal Improvement

Figure 7-46 shows that only 24% of drivers and conductors were aware of the road safety campaign. In the second pilot project, it was not possible to implement the same campaign as in the first project, so the questionnaire results are considered to be reasonable. When asked which campaign they were aware of, the percentages of information boards, road safety classes, and campaign items were about the same. On the other hand, when asked if they thought their awareness of road safety would change if they knew about the road safety campaign, almost all respondents answered that they thought so.

From this, it was once again made clear that it is important to conduct road safety campaigns repeatedly to raise awareness of road safety among road users (pedestrians and drivers) and to embed this awareness in their minds.

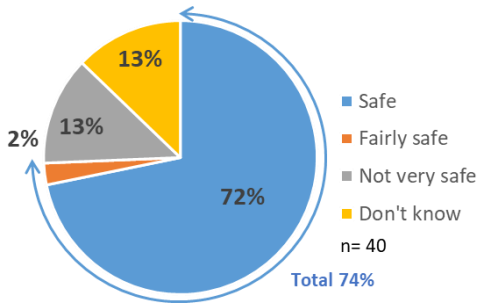


Source: JICA Expert Team

Figure 7-46：Recognition of Road Safety Campaign

Figure 7-47 shows the responses to the question of whether drivers feel that this intersection has become safer after the intersection improvement work. Including those who said it is quite safe, 74% of respondents answered that it is safer.

Figure 7-48 shows the responses to the question of whether drivers feel that the convenience of this intersection has improved. Including those who said it has become somewhat more convenient, 62% of respondents answered that it has become more convenient. A notable point is that 33% of respondents answered that the intersection had become inconvenient. Since there was no follow-up question asking what specifically had become inconvenient, the exact reasons are unclear. However, it is speculated that this may be due to the installation of left-turn signals where left turns were previously allowed. However, from the perspective of pedestrians, as mentioned earlier, many respondents answered that safety had improved. This indicates that safety should remain a top priority, and it will be important to ensure that drivers also understand this in the future.



Source: JICA Expert Team

Figure 7-47 : Safety of the Intersection after the Pilot Project

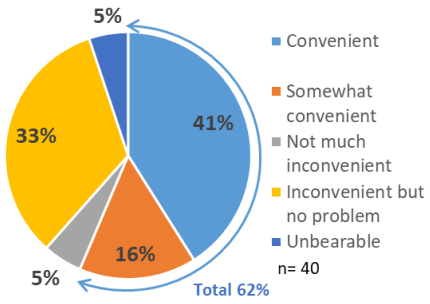


Figure 7-48 : Convenience of the Intersection after the Pilot Project

Reflection and Lessons from the Road Safety Campaign

The KVTPO took the initiative in the second pilot project's road safety campaign, which included a questionnaire survey. Everything from the campaign content and slogan to the design of the information boards and the contents of the novelty goods calendar was decided in consultation with the KVTPO. Although there was no active involvement in the first pilot project, this time there was active participation, with campaign items distributed to pedestrians and drivers. Road safety classes were also held. The KVTPO took the initiative in the second pilot project, utilizing campaign items, and the pilot project was completed in line with initial expectations.

Our impression from implementing the pilot project is that KVTPO is fully committed to promoting road safety awareness activities, but is frustrated by a lack of human and financial resources to do so. Although we were unable to distribute campaign items to pedestrians on footpaths due to KVC regulations, awareness of the road safety campaign exceeded expectations even in the limited locations (shops, schools, and workplaces), so we hope to develop tools that can be used to promote road safety awareness among pedestrians in the future actively.

8. Project Achievements and Status of Accomplishment

8.1 Outputs and Indicators

8.1.1 Output-1

Output-1	Urban transport management plan is developed and there will be opportunities to coordinate with relevant authorities.

For output-1, five activities were implemented in the PDM with the effectiveness indicators shown in Table 8-1. The status of achievement for each is shown below.

Table 8-1：Status of Achievement of Effectiveness Indicators Related to Output-1

Indicators	Status of Achievement
1-1. Urban transport management plan is formulated.	A draft Urban Transport Management Plan was prepared and distributed to the relevant agencies at the 6th JCC held in March 2025 to obtain their comments, and based on the feedback received, the Urban Transport Management Plan was finalized.
1-2. Urban transport management plan is officially approved by the Nepali side.	The Urban Transport Management Plan was approved at the 7th JCC held in July 2025.
1-3. At least one meeting will be held among the related.	・On September 15, 2023, a lecture was delivered on the results of prioritizing intersections requiring improvements for consideration in the Urban Transport Management Plan, followed by an OJT session on data analysis and visualization related to prioritization. ・On March 26, 2024, an OJT session was conducted, where the main functions and applications of GIS were explained, followed by hands-on training on its operation. ・On March 27, 2024, an OJT session was conducted, where the basic knowledge and applications of GNSS were explained, followed by practical training on visualization techniques using GNSS data. ・On August 13, 2024, a seminar was held to present the proposed Urban Transport Management Plan and to discuss its finalization with the relevant agencies. ・On May 20, 2025, an OJT session was conducted that included a field visit and explanation of traffic surveys (travel speed, queue length, and directional traffic volume). ・On June 13, 2025, an OJT session was conducted on GNSS tracking and speed visualization. As described above, at least one meeting with the relevant agencies was conducted.

Source: JICA Expert Team

8.1.2 Output-2

Output-2	Intersection improvement capacity is enhanced.

For output-2, five activities were implemented in the PDM with the effectiveness indicators shown in Table 8-2. The status of achievement for each is shown below.

Table 8-2：Status of Achievement of Effectiveness Indicators Related to Output-2

Indicators	Status of Achievement
2-1. Intersections required to be improved in the Kathmandu Valley will be identified and intersection improvement plans will be formulated.	Out of the 107 major intersections in the Kathmandu Valley selected for the baseline survey, 17 representative intersections were identified from the perspective of intersection improvement typology, from which the pilot project intersections were further selected. In the first stage of the selection process, the intersections were screened based on construction period, construction cost, tolerance for land acquisition, and the presence or absence of grade separation plans. Among the five shortlisted intersections, further scoring was carried out in terms of their suitability as guideline application cases and their demonstration value. As a result, the Naya Baneshwor intersection and the Lainchaur intersection were selected, and improvement measures were planned and designed for these intersections.
2-2. At least one intersection will be improved.	The Naya Baneshwor intersection was selected as the pilot project for the Japanese side, and the Lainchaur intersection was selected as the pilot project for the Nepalese side.

Source: JICA Expert Team

8.1.3 Output-3

Output-3	The manual for improvement of operation and management of traffic lights is developed and the plan for installation and improvement of traffic lights are formulated.

For output-3, four activities were implemented in the PDM with the effectiveness indicators shown in Table 8-3. The status of achievement for each is shown below.

Table 8-3：Status of Achievement of Effectiveness Indicators Related to Output-3

Indicators	Status of Achievement
3-1. The manual for improvement of operation and management of traffic lights is formulated.	A draft Manual for the Improvement of Traffic Signal Operation and Management was prepared and distributed to the relevant agencies at the 6th JCC held in March 2025 to obtain their comments, and based on the feedback received, the Manual for the Improvement of Traffic Signal Operation and Management was finalized.
3-2. Training and/or seminars on the manual for improvement of operation and management of traffic lights are conducted at least 3 times.	・On September 19, 2023, a seminar was held to explain the operation and maintenance of traffic signals to ensure traffic safety and smooth flow. This was followed by a Q&A session on various aspects of traffic signal operation in Japan. ・On September 26 and November 29, 2023, training sessions on signal operation were conducted in preparation for the pilot project at the Naya Baneshwor intersection. ・On March 21, 2025, a training session on signal operation was conducted in preparation for the pilot project at the Lainchaur intersection, and on May 9, 2025, a seminar was held on the synchronization of signals at the pilot intersections. As described above, more than three training sessions and seminars were conducted.
3-3. A plan for installation and improvement of traffic lights in	A draft plan for the installation and improvement of traffic signals in the Kathmandu Valley was prepared and distributed to the relevant agencies at the 6th JCC held in March 2025 to obtain their comments. Based on the feedback received, the Urban Transport Management Plan, including the

Kathmandu Valley is formulated.	draft plan for the installation and improvement of traffic signals in the Kathmandu Valley, was finalized.

Source: JICA Expert Team

8.1.4 Output-4

Output-4	Capacity to plan and implement traffic safety awareness will be strengthened.

For output-4, three activities were implemented in the PDM with the effectiveness indicators shown in Table 8-4. The status of achievement for each is shown below.

Table 8-4：Status of Achievement of Effectiveness Indicators Related to Output-4

Indicators	Status of Achievement
4-1. 70% of trainees / evaluators identify knowledge and skills in planning traffic safety awareness activities has improved.	More than 70% of the participants indicated that their knowledge of traffic safety was improved during the seminars and workshops conducted.
4-2. Traffic safety awareness activity plans and reports on the implementation of the activities.	Due to the limitations of KVTPO's proactive activities, the planning and reporting of traffic safety awareness activities were not conducted, but the planning and review of activities and compilation of lessons learned and recommendations were done collaboratively through on-the-job training and workshops.
4-3. More than 70% of respondents answer traffic safety awareness activities have improved.	More than 70% of the survey respondents were aware of the pilot project's traffic safety campaign, and more than 80% of them indicated that there was a change in their awareness of traffic safety.

Source: JICA Expert Team

8.1.5 Project Purpose and Indicators

Project Purpose	Appropriate transport management measures will be implemented to improve traffic condition and road safety in Kathmandu Valley.

The project goals set the effectiveness indicators shown in Table 8-5 for the PDM. The expected achievement for each indicator is shown below.

Table 8-5：Effectiveness Indicators for Project Purpose

Indicators	Expected to Achieve the Project Purpose
1. Urban transport management plan is reviewed and updated at least once.	In the final seminar held in August 2025, the contents of the formulated Urban Transport Management Plan were presented, and the importance of its periodic review and updating was shared with the relevant agencies. Going forward, it is expected that the relevant agencies will take the initiative in carrying out the updating process.
2. The guideline for improvement of intersection and the manual for operation and management of traffic lights developed under the Project are utilized and used for trainings or seminars in relevant organizations.	At the final seminar held in August 2025, the contents of the formulated Urban Transport Management Plan were presented, and the importance of its periodic review and updating was conveyed to the relevant agencies. It is expected that, going forward, the agencies concerned will

	take the initiative in implementing the updating process.
3. Improvement of intersection and improvement of operation and management of traffic lights will be planned and implemented using the guideline for improvement of intersection and the manual for operation and management of traffic lights developed under the Project.	At the Naya Baneshwor intersection, where improvements were implemented based on the Intersection Improvement Guidelines, clear effects were observed, including congestion mitigation, increased travel speed, and a reduction in unsafe behaviors. Furthermore, in the pilot project conducted in accordance with the Traffic Signal Operation and Management Manual, the signal cycle length was shortened, and the local police recognized its effectiveness, continuing the same operation even after the completion of the project. These achievements demonstrate the value of the guidelines and manual, which are expected to be continuously utilized in the planning and operation of other intersections in the future.
4. Campaign activities for compliance with traffic laws and road safety will be continued.	The traffic safety campaign involving schools has been recognized as effective in raising safety awareness among students, and school stakeholders have continuously requested its continuation. The Traffic Police also acknowledge its necessity, and it is expected that the campaign will be sustained through the continued collaboration of the relevant agencies.

Source: JICA Expert Team

8.2 Overall Goal

Overall Goal	Appropriate transport management measures will be implemented to improve traffic condition and road safety in Kathmandu Valley.

The project goals set the effectiveness indicators shown in Table 8-6 for the PDM. The expected achievement for each indicator is shown below.

Table 8-6：Project Goals and Outputs

Indicators	Expected to Achieve the Goal
1. New projects aimed at improving traffic congestion will be planned and implemented using the urban transport management plan.	The target is expected to be achieved as the project is moving toward implementation of the Kathmandu Valley Signal (ITS) grant project based on the Urban Traffic Management Plan. It should be noted that the Nepali side implemented synchronization of three intersections, including the Lainchaur intersection. However, since no physical improvements were carried out at the Khani Bibhag and Kesha Mahal intersections, the authorities have expressed their intention to promptly implement the intersection improvement plans shown in Figure 5-28 and Figure 5-29, which include the provision of right-turn lanes.
2. The storage length at major intersections will be reduced by 23%.	From the results of the two pilot projects, it was confirmed that combining intersection improvements with appropriate signal operations is effective in reducing queue lengths. It also became evident that, in order to alleviate congestion effectively, measures need to be taken not only at individual intersections but along entire corridors including adjacent intersections. Based on these findings, it is expected that, by

	gradually implementing intersection improvements and signal upgrades on a corridor basis in line with the formulated Urban Transport Management Plan, the target of reducing queue lengths by 23% at major intersections can be achieved.
3. The guideline for intersection improvement and the manual for operation and management of traffic lights developed in the Project will be used at other intersections.	The target is expected to be achieved as the project is moving toward implementation of the Kathmandu Valley Signal (ITS) grant project based on the Urban Traffic Management Plan. It should be noted that the Nepali side implemented synchronization of three intersections, including the Lainchaur intersection. However, since no physical improvements were carried out at the Khani Bibhag and Kesha Mahal intersections, the authorities have expressed their intention to promptly implement the intersection improvement plans shown in Figure 5-28 and Figure 5-29, which include the provision of right-turn lanes.
4. The number of accidents and traffic fatalities per number of vehicles at major intersections will be reduced by 30%.	At the Naya Baneshwor intersection, intersection improvements and the revision of signal operations resulted in a 30% reduction in the number of accidents. Building on this achievement, it is expected that implementing similar effective measures at other major intersections within the Kathmandu Valley will contribute to attaining the project's targets.

Source: JICA Expert Team

8.3 Lessons Learned from This Project

8.3.1 Lessons Learned from the Urban Transport Management Plan

(1) Development of Traffic Data in the Kathmandu Valley

In formulating the Urban Transport Management Plan under this project, it was essential to understand the overall traffic conditions across the Kathmandu Valley. To this end, wide-area data collection on traffic congestion and traffic accident occurrences was required.

To assess travel speeds, a GPS tracker survey was conducted by equipping 105 vehicles with GPS devices for a period of three weeks. The location data obtained through this survey was aggregated to calculate the average travel speed by time period for each road link within the Kathmandu Valley, thereby creating a comprehensive travel speed distribution dataset.

Regarding traffic accident data, records from July 2021 to June 2022 were obtained from KVTPO. However, the accident locations were recorded in descriptive form, and spatial information such as latitude and longitude was not included. As a result, considerable effort was required to manually interpret the accident locations and plot them on a GIS system in order to develop geospatially referenced data.

For future urban transport planning and project implementation to proceed efficiently, it is essential to promote the structuring (i.e., standardisation of spatial information) and digitisation of data collected by administrative authorities and the police. The development of a robust data acquisition and utilisation system will be vital.

(2) Effective Use of the 107 Intersections Database

For this project, a baseline survey was conducted for 107 intersections in the Kathmandu Valley, as described in Section 3.2, Implementation of the Baseline Survey Implementation. The survey results were compiled into a database based on the contents shown in Figure 3.1, which includes signal patterns and traffic volume survey results in addition to each intersection attribute.

These data can be used as basic data for implementing and evaluating future urban traffic management plans.

(3) Technology Transfer through Practical OJT

Under this project, a total of five on-the-job training (OJT) sessions were conducted for staff members of key agencies involved in the formulation and implementation of the Urban Transport Management Plan, including KVDA, RSTU, KMC, KVTPO, MOPIT, and LMC.

The training began with fundamental GIS skills and gradually advanced to techniques for visualising and analysing traffic data (such as travel speed and accident information). Participants conducted hands-on exercises using actual data, enabling them to visualise urban transport issues on maps. As a result, it was confirmed that the participants acquired the necessary skills to perform such analysis and that, with further development of traffic data systems, each agency is increasingly capable of conducting its own evaluations.

Meanwhile, feedback collected through post-training evaluation forms revealed comments such as, "I would like to receive more advanced training," and "I prefer intensive seminars over short, fragmented sessions." These comments highlighted a strong demand within the agencies for structured and intensive capacity-building opportunities.

Therefore, future projects should not rely solely on one-off training sessions but should incorporate continuous and phased OJT, combined with intensive seminars. Such a comprehensive approach to human resource development will be essential for building sustainable urban transport management capacity.

(4) Development of Traffic Data for the Kathmandu Valley

In order to formulate an urban traffic management plan for this project, it was necessary to collect data on congestion and the occurrence of traffic accidents over a wide area in order to understand the actual traffic conditions throughout the Kathmandu Valley.

With regard to the understanding of travel speed, a GPS tracker survey was conducted in which 105 vehicles were installed with GPS trackers for three weeks in order to obtain wide-area speed distribution data. Travel speed distribution data was created by tabulating and inputting the average values for each link in the Kathmandu Valley for each time period from the location information obtained from this survey.

For traffic accident data, records from July 2021 to June 2022 were obtained from the KVTPO, but the accident locations were descriptive and lacked spatial information in terms of latitude and longitude. Therefore, it was necessary to read the accident locations and plot them on the GIS, which required a great deal of effort to develop the location information.

In order to smoothly carry out future plans and projects related to urban transportation, it is essential to promote the structuring (standardization of location information) and digitization of data collected by administrative agencies and the police, and it is important to develop a data acquisition and utilization system.

8.3.2 Lessons learned from intersection improvements

(1) Integrated Improvement of Intersection Design and Traffic Lights Operation

In the pilot project at the Naya Baneshwor intersection, physical improvements were implemented prior to adjustments in traffic light operations. However, this approach resulted in a worsening of traffic

congestion. Later, by incorporating appropriate traffic light operations, such as monitoring traffic conditions via CCTV and adjusting signal phases based on congestion levels, smoother traffic flow was achieved.

In another pilot project implemented by the Nepali side, an attempt was made to synchronise traffic lights at three intersections. However, physical improvements were carried out only at the central intersection, while the other two remained unchanged. As a result, overall congestion worsened. This experience highlighted a key lesson: localised physical improvements or operational adjustments alone are not sufficient. Structural upgrades to intersections and optimisation of traffic light operations must be implemented in combination to effectively improve traffic conditions.

For future intersection improvement projects, a comprehensive approach that integrates both physical infrastructure and traffic light operations will be essential.

(2) Promoting Understanding of Design Standards and Responding to Actual Pedestrian Behavior

In the pilot project at the Lainchaur intersection, the intersection was made more compact to enhance pedestrian safety by introducing traffic islands and relocating the pedestrian crossings. For the design of the crossings, a dashed-line format (Figure 8-1), which is the standard style for signalized crossings according to the Traffic Signs Manual, was adopted.

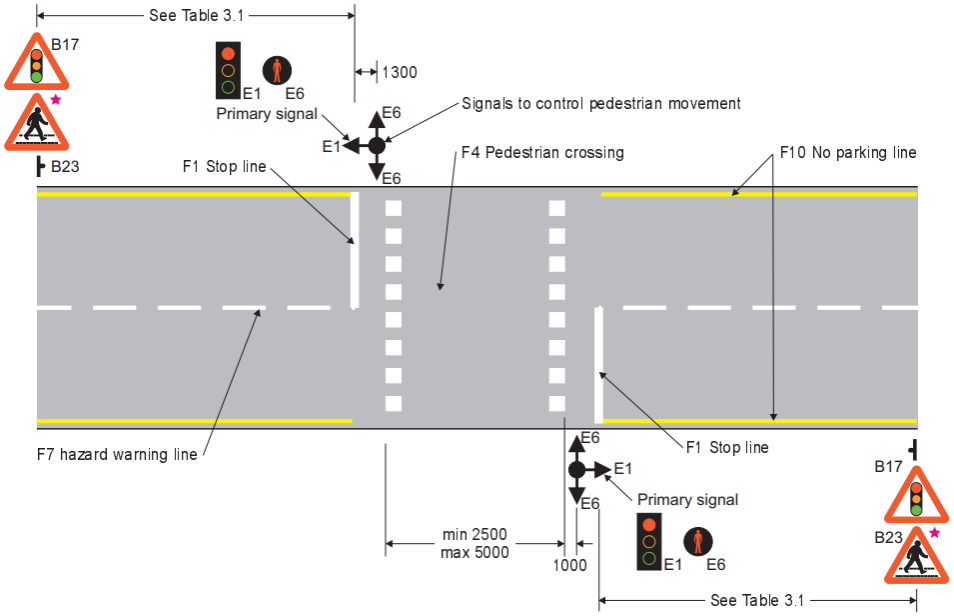
However, this type of crossing has rarely been implemented within the Kathmandu Valley and was not widely recognized by pedestrians. As a result, many pedestrians continued to use the location of the former zebra-style crossing (Figure 8-2), which had been removed and painted over.

One possible reason for the widespread use of zebra-style crossings in the Kathmandu Valley may be the insufficient understanding of the Traffic Signs Manual among designers and contractors.

Given this situation, two possible approaches can be considered for future infrastructure development:

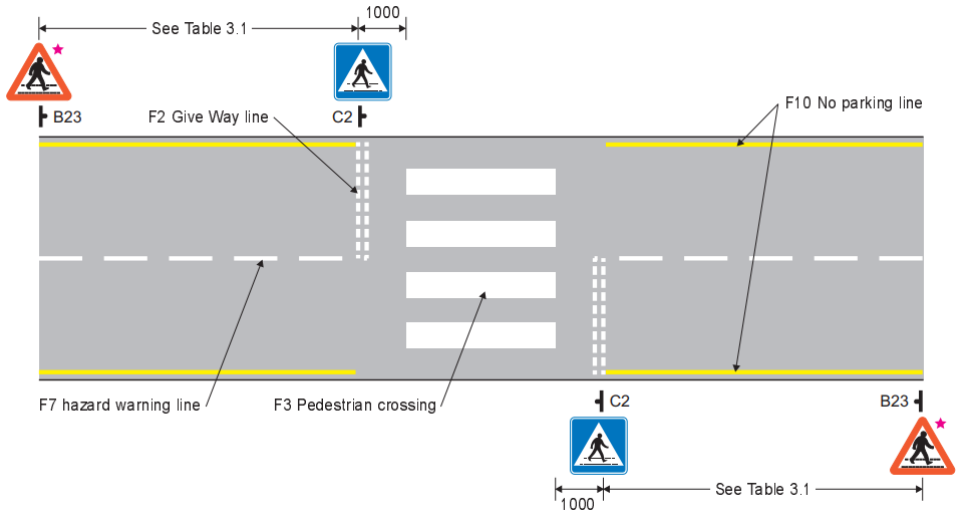
- Strengthen technical training and promote wider dissemination of the guidelines among designers and contractors, encouraging the standardisation of dashed-line crossings at signalised intersections.
- Revise the current design standards to reflect local practices by standardising the widely recognised and commonly used zebra-style crossings.

In either case, it is essential to establish practical and effective regulations that are grounded in actual field conditions.



Source: Traffic Signs Manual (Volume-1), DOR

Figure 8-1 : Standard Pedestrian Crossing Design for Signalized Intersections (Dashed Lines)



Source: Traffic Signs Manual (Volume-1), DOR

Figure 8-2 : Standard Format for Pedestrian Crossings at Unsignalised Intersections (Zebra-Type)

(3) Balancing Traffic Flow and Safety through the Introduction of Exclusive Right-Turn Lanes

Many intersections within the Kathmandu Valley lack exclusive right-turn lanes. Even in the pilot project implemented by the Nepali side, the Khani Bibhag and Keshar Mahal intersections, which are adjacent to the Lainchaur intersection, did not have exclusive right-turn lanes on the main road approaches. As a result, when traffic light control was introduced under these conditions, right-turning vehicles obstructed through traffic, leading to reduced traffic flow efficiency.

This experience highlighted an important lesson: when implementing traffic light control, it is essential to make full use of the available road width to provide exclusive right-turn lanes. This is critical for maintaining smooth traffic flow and ensuring that intersections function effectively.

Future intersection improvement efforts must go beyond signal planning alone. A fully integrated design approach is required, including both the reconfiguration of physical intersection geometry and the optimisation of operational elements.

(4) Installation of Left-Turn Free Lanes Based on Traffic Volume

At many intersections within the Kathmandu Valley, left-turn free lanes are widely implemented to improve traffic flow. These lanes allow left-turning vehicles to proceed without obeying traffic lights and are typically operated with dedicated lanes that are excluded from signal control.

However, when such lanes are uniformly introduced at intersections with low left-turn volumes, it can lead to inefficient use of road space. This may result in difficulties securing sufficient space for through and right-turn lanes, potentially decreasing the overall traffic-handling capacity of the intersection.

In addition, when there are many pedestrians crossing, pedestrian-vehicle conflicts frequently occur when left-turning vehicles cross the zebra crossing, threatening pedestrian safety.

Therefore, decisions regarding the introduction of left-turn free lanes should be made carefully, based on traffic volume surveys including crossing pedestrians. Where the volume of left-turning vehicles is low, it is preferable to prioritize other traffic flows in the intersection design.

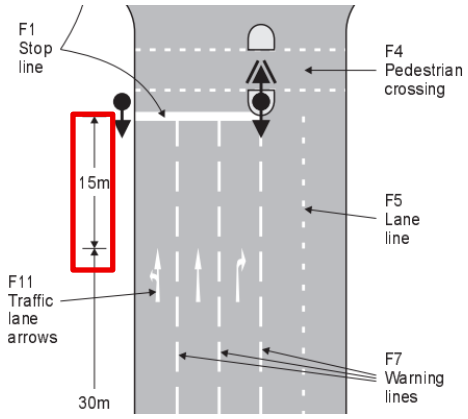
For future intersection improvements, it is important not to install left-turn free lanes by default. Instead, planning and design should focus on optimizing the overall functionality of the intersection.

(5) Positioning of Directional Arrows on Lanes

According to the Traffic Signs Manual, as shown in Figure 8-3, directional arrows (lane markings indicating the direction of movement) should be placed 15 meters before the stop line. At the pilot intersections implemented under this project, directional arrows were installed in accordance with this guideline.

This placement is generally effective in rural roads with low traffic volumes, both in terms of visibility and functionality. However, in urban intersections where traffic volumes are high and congestion frequently occurs, the arrows positioned 15 meters ahead of the stop line may become obscured by queued vehicles. As a result, the arrows may not function effectively in guiding drivers.

This experience suggests that while standard design guidelines should serve as the basis for future installations, the actual placement of multiple directional arrows should be adjusted flexibly according to local traffic volumes and conditions. Such an approach can help improve driver guidance and enhance safety at intersections.



Source: Traffic Signs Manual (Volume-1), DOR

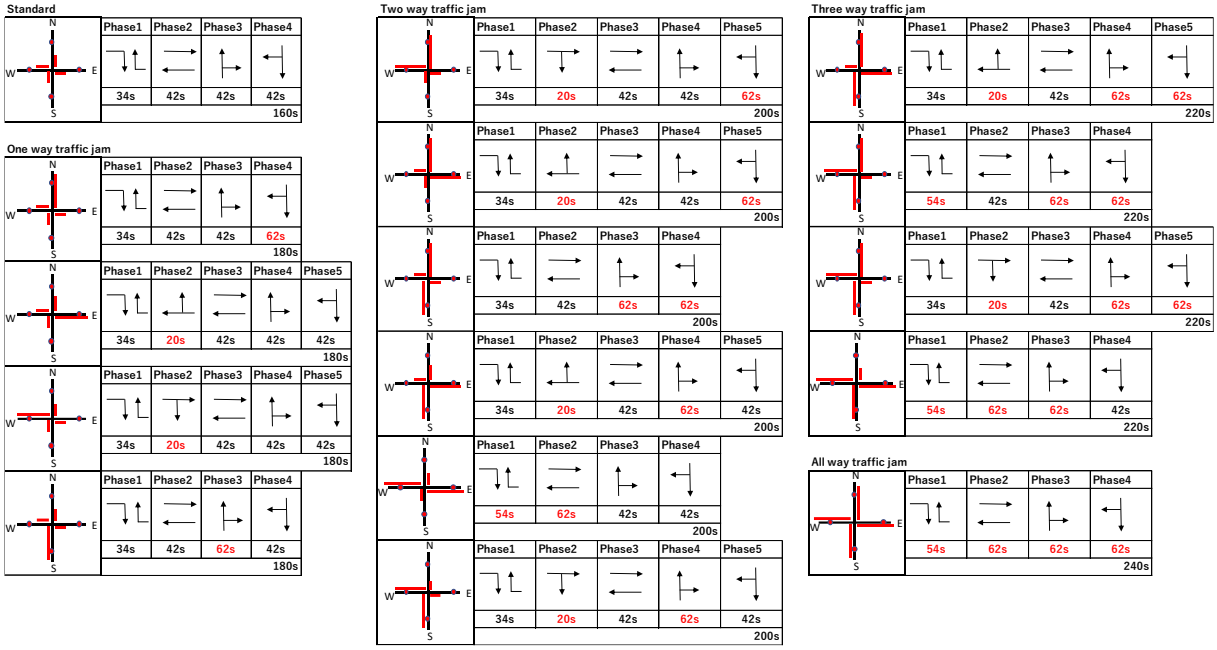
Figure 8-3：Positioning of Lane Direction Arrows (15 m in Advance of Stop Line)

8.3.3 Lessons Learned from Traffic Lights Operation and Management

(1) Simple Traffic Lights Indications Allowing Flexible Operation Based on On-Site Judgment

In the pilot project at the Naya Baneshwor intersection, a reference table of traffic lights indications (Figure 8-4) was developed to enable the selection of appropriate signal patterns based on traffic conditions. Through OJT, traffic control room personnel were instructed on how to utilize the table effectively. The adopted method involved visually checking congestion levels in each approach using CCTV image. When congestion exceeded pre-defined thresholds, a corresponding signal pattern was selected based on field judgment. This simple approach did not require technically complex control devices or algorithms. Instead, it allowed operators to intuitively understand and manage the system, making it easier to adopt in practice. It was confirmed that this method has been continuously used in actual operations.

This experience underscored the importance of establishing practical and easy-to-use signal operation methods that can be sustainably applied in the field. In addition, human resource development will remain essential for future traffic light operations.



Source: JICA Expert Team

Figure 8-4：Traffic Light Indications Applied in the Pilot Project According to Traffic Conditions

(2) Coordinated Traffic Light Control at Multiple Intersections and the Perspective of TDM

In the pilot project implemented by the Nepali side, signal synchronisation was carried out at three intersections, including Lainchaur, with the aim of improving traffic flow along the north-south main road. However, after the start of operations, individual requests were made by traffic police stationed at each intersection to extend green times and make other adjustments. Responding to these requests led to a significant increase in the signal cycle length compared to the original design. In some cases, when such requests were not accommodated, officers forcibly switched off the traffic lights on site, resulting in operational disruptions.

Furthermore, while there was a request to develop a reference table of traffic light indications (as shown in Figure 8-4), similar to the successful case at Naya Baneshwor intersection, it became apparent that the complexity of congestion patterns across the three intersections made it impractical to manage the system with a simplified tool such as a predefined signal plan table.

Ultimately, it was concluded that the traffic volume on this corridor exceeded its capacity, and improvements to signal control alone could not resolve the underlying problem. Therefore, in addition to optimising traffic signal operations, it is essential to implement complementary measures such as Transportation Demand Management (TDM), aimed at reducing and distributing traffic volume itself.

This experience highlighted the importance of adopting a broader perspective in urban traffic management—one that does not rely solely on intersection improvements or signal optimisation, but strategically balances traffic supply (capacity) and demand (volume).

(3) Dedicated Traffic Light for Continuous Left Turns

In this project, a dedicated traffic light was introduced for the first time in Nepal to stop continuous left-turning vehicles in order to ensure safe pedestrian crossings. The purpose of this signal is to display a red light for left-turning vehicles during the pedestrian green phase, thereby allowing pedestrians to cross safely.

However, observations following the start of operations revealed that many vehicles ignored the red light and continued turning left, frequently compromising pedestrian safety. Because the dedicated left-turn signal was installed just after vehicles entered the intersection, an advance warning signal was added upstream of the intersection. Nevertheless, some drivers stopped at the warning signal itself, indicating confusion.

This experience highlights the importance of providing clear information and raising awareness among drivers when introducing new signal operations. Proper signage (Figure 8-5) indicating the purpose of each signal, such as “for left-turn vehicles” or “advance warning,” should be installed. In addition, stricter enforcement and guidance by traffic police are necessary to support compliance.

In future cases where changes in traffic control methods or new infrastructure are introduced, it is essential to combine physical improvements with “soft” measures that promote user understanding and adherence. These combined efforts are crucial for ensuring safety and the successful adoption of new systems.

Source: JICA Expert Team

Figure 8-5：Image of Traffic Signal Instruction Sign

(4) Traffic Safety Education and Strict Enforcement of Traffic Signals

After implementing signal synchronization at three intersections, including the Lainchaur intersection, it was observed that even after the signal changed from green to red, many vehicles continued to enter the intersection following the vehicle in front of them and remained in the intersection. This obstructed traffic in the direction where the green signal was displayed and caused traffic congestion.

Therefore, it is necessary to strengthen traffic safety education to ensure strict compliance with traffic signals and to strictly enforce violations such as entering the intersection when the signal is red.

8.3.4 Lessons Learned from Traffic Safety Awareness Activities

(1) Institutional Foundations

Road safety awareness initiatives are more effective when supported by a strong legal framework and clear coordination among relevant ministries and agencies. However, Nepal currently lacks comprehensive road safety laws and depends on existing regulations, which hampers the legal enforcement of awareness messages and blocks the development of a culture of compliance among its citizens. When planning awareness activities, it is important to analyze the current state of road safety laws and regulations in the target country and, if needed, support legal reforms and establish coordination mechanisms between relevant ministries and agencies from the beginning. In particular, strengthening the legal authority and independence of the "competent authority" responsible for road safety is crucial for improving the sustainability and effectiveness of awareness efforts.

(2) Strategic Investment in Agencies Responsible for Awareness Activities

The capacity of agencies and personnel, such as police officers who conduct road safety awareness activities, directly affects the success of those efforts. In Kathmandu, a notable shortage of traffic police officers has been reported, hindering their capacity to dedicate adequate time and effort to awareness campaigns.

The Road Safety and Traffic Unit has one manager and several staff members, but all of them have other duties and are reassigned every six months to a year. As a result, they have limited knowledge of road safety awareness activities and rarely conduct such activities.

Additionally, because of limited training in planning and creating effective awareness campaigns, activities often just focus on disseminating information.

It is essential to verify the personnel structure of the organization responsible for road safety awareness activities in advance and consider increasing staff or providing training as necessary. To improve quality and effectiveness, it is essential to develop and implement structured training programs that equip participants with specialized knowledge and skills, such as communication strategies and evaluation techniques, to foster awareness change.

(3) Enhancement of Budget Efficiency

Road safety awareness programs often face financial challenges because it is difficult to measure their impact. In Kathmandu, the lack of detailed data on the economic costs of road accidents hinders efforts to justify spending on awareness campaigns. Additionally, the limited tools available for assessment and evaluation further prevent a clear understanding of how effective different strategies are.

Starting from the project planning stage, it is important to strengthen data collection and analysis capabilities, especially concerning traffic accident data (focusing on economic loss analysis), to create a basis for quantitatively demonstrating the economic benefits of awareness campaigns. Additionally, it is vital to introduce indicators (such as changes in compliance rates for specific traffic rules, trends in accident occurrence rates) and evaluation mechanisms to objectively measure and assess the "effectiveness" of awareness campaigns, supporting the implementation of a PDCA cycle. This is crucial for ensuring the efficient use of budgets and accountability.

(4) Comprehensive Approach and Long-Term Perspective for Cultural Cange

Road safety awareness activities alone have limited impact and must be combined with measures like law enforcement, infrastructure improvements, and technology adoption to create a stronger effect. In societies that do not recognize traffic violations as a social problem that causes serious accidents, short-term campaigns are unlikely to change people's minds and attitudes. A consistent and sustained approach is crucial. Therefore, road safety awareness efforts should involve a range of stakeholders, not only the police but also schools, local communities, and private companies. Since changing public awareness

and behavior takes time, it is important to develop long-term strategies that focus on continuous education programs and social norm development, rather than relying on one-time campaigns, and maintaining these efforts continuously is essential.

8.4 Conclusion

8.4.1 Formulation of Urban Transportation Management Plan

Activity 1 achieved three indicators as shown in 8.1.1: an urban transportation management plan is formulated (plan development), an urban transportation management plan is officially approved by the Nepalese side (approval), and at least one meeting among the agencies involved in transportation management is held (consensus building). In addition, the following points generated added value;

- Collect and analyze travel speed and traffic accident data, and prioritize intersections that require intersection improvements and signal installation based on a combination of the two types of data.
- By using data analysis and visualization techniques acquired through OJT, a system that can be operated independently even after the project is completed has been established.

This has enabled the creation of a system that will provide the urban This has established the policy foundation and implementation system for urban transportation management in the Kathmandu Basin. In the future, through phased implementation and continuous monitoring of priority measures based on this plan, it is expected that concrete results of traffic safety and smoothing will be steadily visualized.

8.4.2 Development and Application of Intersection Improvement Guidelines

Activity 2 achieved the effectiveness indicators in Outcome 2 through a three-step process as shown in 8.1.2: data-driven intersection selection process, development of intersection improvement guidelines, and application to pilot projects.

The design and construction lessons learned from the pilot project and the results of the guideline application will serve as practical guidelines for the steady implementation of the urban traffic management plan to be implemented in the future.

In addition, the Nepalese side took the lead in improving the Lainchaur intersection by referring to the Naya Baneshwor intersection pilot project conducted by the Japanese side. This demonstrated the improved implementation capacity and was an important milestone toward the implementation of sustainable urban traffic management.

A conceptual design for the improvement of a typical 17- intersection was created and included in the guidelines, which were handed over to the Nepalese side. Currently, the Nepalese side is proceeding with intersection improvements based on this design. By implementing this in conjunction with improvements to traffic signal operations, congestion is expected to be reduced.

8.4.3 Formulation of Manual for Improvement of Operation and Management of Traffic Lights and Plan for Installation and Improvement of Traffic Lights in Kathmandu Valley

In Activity 3, as shown in 8.1.3, the indicators of Outcome 3 were achieved through the formulation of the manual for improvement of operation and management of traffic lights (technical standardization), training and seminars using the manual (human resource development), and the formulation of a plan for installation and improvement of traffic lights in the Kathmandu Valley (investment planning).

Through the final version of the manual and OJT during the pilot period, KVTPO has established a system that enables it to autonomously study and apply signal control according to on-site conditions. Furthermore, the inclusion of the traffic light installation and improvement plan into the urban traffic management plan facilitates the practical application of the lessons learned in 8.3 about integrating intersection improvements and traffic light operations.

In the next phase, it is expected that traffic facilitation and safety improvements at priority intersections can be achieved even more effectively.

8.4.4 Implementation of Road Safety Awareness Training, Seminars, and Campaigns

In Activity 4, as indicated in Section 8.1.4, the implementation of training, seminars, and campaigns resulted in 70% of trainees/evaluators identifying knowledge and skills in planning road safety awareness activities, collaboration with KVTPO on road safety awareness through OJT and workshops, as well as the results of a pilot project survey in which more than 80% of respondents recognized improvements in the activities, led to the achievement of Output 4's effectiveness indicators through a three-step process.

On the other hand, road safety awareness in Nepal faces challenges such as the lack of a comprehensive legal framework and inter-ministerial coordination, weak staffing and training systems, and insufficient mechanisms for effectiveness measurement and economic justification. Addressing these issues requires strengthening legal authority, developing human resources, establishing a traffic accident data analysis framework, and introducing the PDCA cycle. Furthermore, as short-term awareness efforts are unlikely to bring about cultural and behavioral change, a long-term and comprehensive strategy involving collaboration among diverse stakeholders is essential.