

Chapter

3 Traffic Management Plan in Udonthani Urban Area

3.1 Concept and Traffic Management Plan

The concept of traffic management plan in Udonthani urban area is in accordance to urban development for Udonthani province and relevant agencies. For an efficient traffic management, the Consultants reviewed several studies from public and private agencies, including our own site survey, public participation, and congestion problems. Solution was made to relief traffic congestion in Udonthani as stated in the Chapter below.

3.1.1 Purposes of Traffic Condition on Udonthani Network

Most urban cities suffer from traffic congestion and it will get worse over the time. There are some helps from state, but so far the sustainable solutions have not yet been found. There are pro and con (advantages vs disadvantages) of each solution, demanding very much on related factors and its urgency, necessity, and timing.

The Consultants conducted traffic survey in Udonthani and performed traffic forecast for the future for both private and public transport modes. Our main goal is the traffic solutions as follows:

- 1) To lessen traffic Congestion in Udonthani
- 2) To improve travel corridor with better speed and mobility
- 3) To reduce number of accidents and losses in Udonthani urban area
- 4) To prepare and change motorist behaviors to suit the new mass transit system

3.1.2 Traffic Management Plan in Udonthani

This is a purposed traffic management plan from our study. We conducted traffic survey, traffic and ridership forecast of new Udonthani mass transit system. The traffic solutions depend on target groups, severity of the problem, difficulties for implementation as shown in **Figure 3.1.2-1**

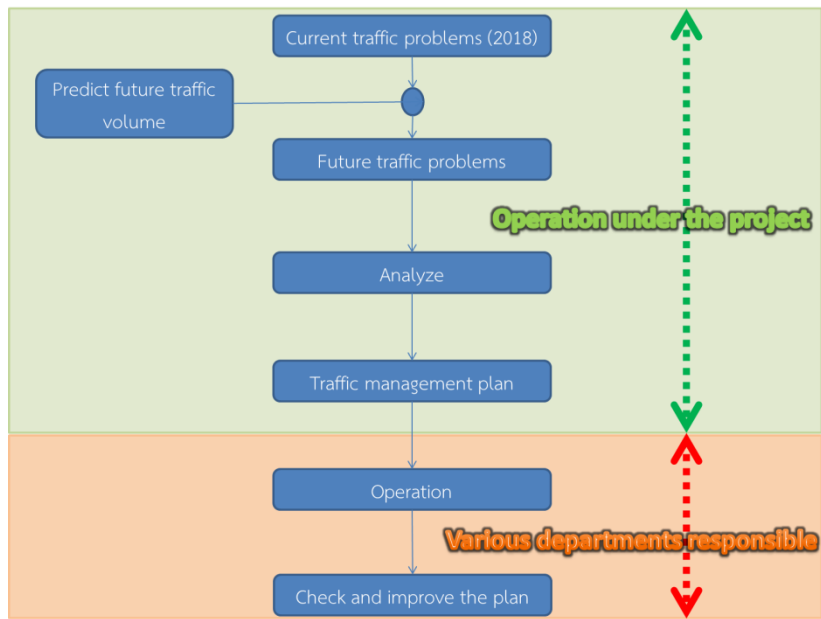


Figure 3.1.2-1: Concept of Traffic Solutions for Udonthani Urban Area

3.1.3 Targets of Traffic Management Plan for Udonthani Urban Area

A different area requires a different solution. For example, a school will attract a great volume of traffic during AM peak and PM rush hours. Parents will drop off children in the morning and pick them up in the afternoon. This results in traffic congestion.

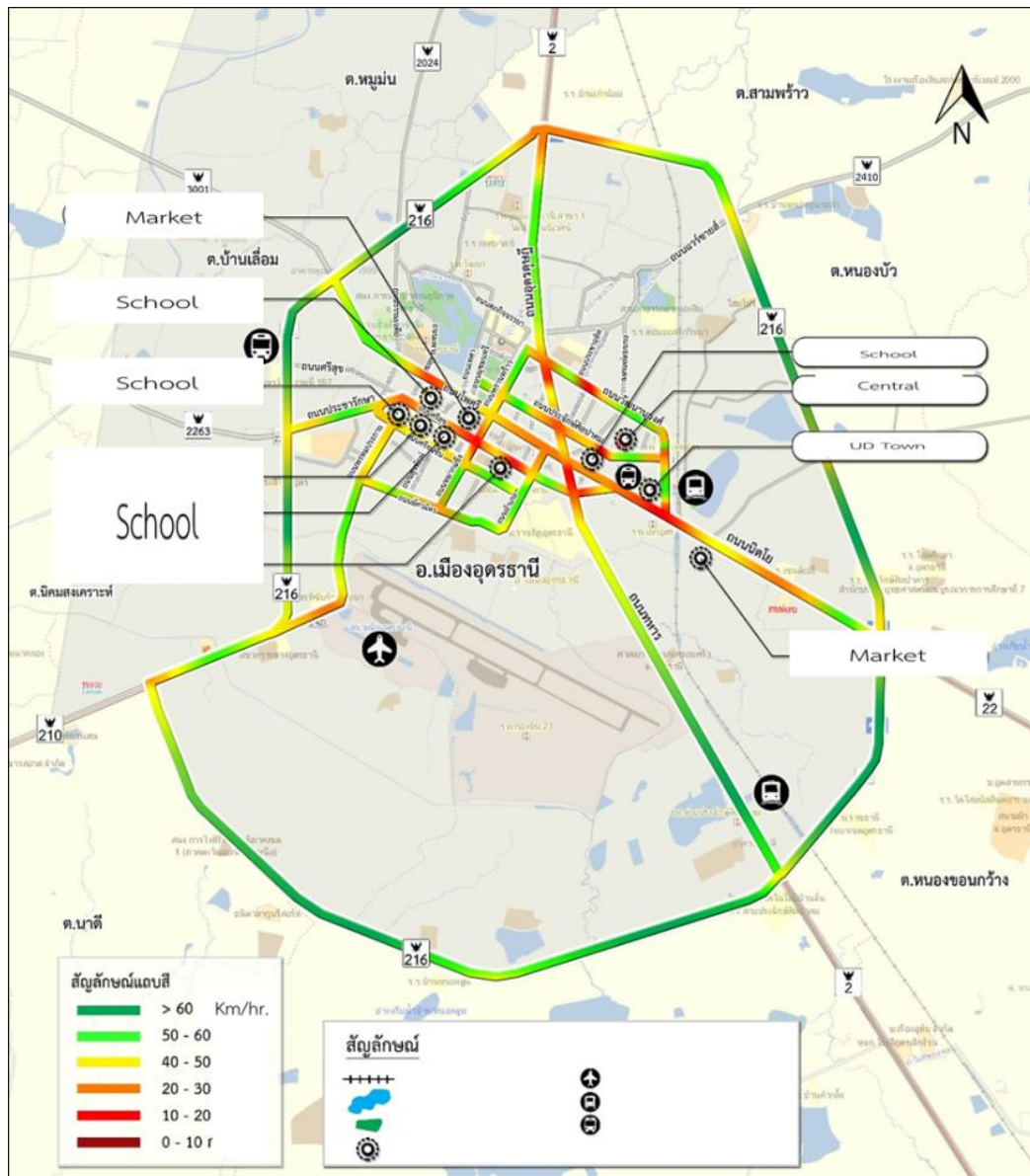
Possible solutions are:

- 1) Reduce the use of cars and motorcycles by 30% in 2042.
- 2) Encourage the use of public transport to 50% of mode share in 2042.

Nonetheless, different types and conditions of traffic congestion may require different approaches. The Consultants did further traffic analysis in the urban area of Udonthani so that a good traffic management plan and a sustainable solution can be achieved.

3.2 Traffic Congestion in Udonthani

Traffic congestion in Udonthani is a result of transport demand that exceeds network capacity. The congestion becomes chronic and causes losses in travel time and economy. Most roads in Udonthani suffer low travel speed, particularly at peak hours as shown in Figure 3.2-1.



Source: The Consultants

Figure 3.2-1: Average Speed during Peak Hours

Based on recent statistics, Udonthani experiences a high rate of traffic accidents and a high fatality index. The main reason is negligence among motorists and also conditions of road network such as insufficiency of street lighting at night time, unavailability traffic control devices (signs and traffic lights), damages to road signs, etc.

From our traffic survey, we can classify locations of traffic congestion.

1. Traffic congestion in the city center
2. Traffic congestion near schools
3. Traffic congestion caused by on-street Parking
4. Traffic congestion caused by rail grade crossing
5. Traffic safety in Udonthani urban area
6. Miscellaneous

3.3 SWOT Analysis

SWOT analysis for internal and external factors. It is designed for any organization or project to determine strengths and weaknesses from internal factors and opportunities and threats from external factors

SWOT analysis for traffic in Udonthani urban area has the outcome in the form of TOW Matrix as shown in **Table 3.3-1**.

Table 3.3-1: SWOT Analysis for Udonthani Traffic Management Plan

No.	Description
Strengths	<u>Strengths</u> - Udonthani municipal has a state of art technology in traffic management. - Udonthani has a international airport with coverage area in upper Esan. - Udonthani urban area has a good road network for travel. - Udonthani connects east-west corridor from Laos-Loei-Nong Bua Lampu-Udonthani-Sakon Nakhon-Nakhon Panom-Laos. - Udonthani has a good human resource in traffic management. - Udonthani has higher economic and population growth than nearby provinces. - Udonthani has a good public transport service with 2 new red and blue buses. - Commuters have different choices of travel by different modes of transport.
Weaknesses	<u>Weaknesses</u> - Limited ROW with narrow lanes. Footpath in bad conditions. Not sufficient street lighting. - High proportion of motorcycles causes it difficult for mode switch to public transport. - Insufficient coverage service area of public transport. Lack of good LOS. Main mode of transport is still passenger car. - Traffic violation such as speeding, riding on footpath, driving in opposite direction. - Some sections of main arterials are actually collector roads. Stripped development along arterials in urban area generates high traffic demand. - More stripped development along travel corridors. Road widening is difficult to achieve. - Most arterials suffer from traffic congestion. Collectors also accommodate too much traffic demand.
Opportunities	<u>Opportunities</u> - Government has a plan to support public transport for Udonthani. - Awareness among motorists concerning traffic congestion. Mutual interest in reduction of car use and ready to switch to public transport. - Udonthani is located in “Central Economic Corridor” in N-S direction. - Udonthani has a potential as “New Economic Corridor” in E-W direction. - Opportunities for rail-road-air intermodal transport for goods and services to nearby provinces. - Potential in urban and land development in the vicinity around the existing Udonthani Rail Station from the incoming dual track and HST.
Threats	<u>Threats</u> - People prefer motorcycles for its convenience. - Development of public transport with convenience, comfort, and punctuality will require great amount of budget and high expertise in management. - Overall improvements of road network will require great amount of budget. - Limited accessibility to airport, rail, and other trip generators via both road and public transport. Lack of coordination among agencies.

3.4 Traffic Management Plan in Udonthani Urban Area

Purposes on the traffic management plan for Udonthani urban area is aimed at increasing more accessibility to road network for the future urban development and a sustainable public transport service. It will encourage the use of non motorized vehicle mode such as walking and cycling.

From visions, strategies, and targets of the development of Udonthani Mass Transit Master Plan and its surrounding in order that Udonthani will transform into “a Hub for Service Sector on the Upper Esan for AEC Economic Corporation”.

There are 3 stages of development.

- First 3 Years Plan from 2022-2025 They are projects after design process
- Next 4-7 Years Plan from 2023-2027. They are projects necessary for the future urban and mass transit development. This should be preceded immediately within the next 10 years.
- Next 13 Year Plan from 2027-2039. They are projects after the urgent plan and intermediate plan. They can be later reevaluated based on the feasibility after the end of 2nd plan.

The detail is shown in **Table 3.4-1**.

Table 3.4-1: Strategic Plans

	Urgent Plan (2019-2022)	Intermediate Plan (2023-2027)	Long Term Plan (After 2027)
Strategy/Target	Encourage a Smart Growth Management for a sustainable urban development	Increase road network efficiency/encourage a suitable urban development	Connectivity to national network infrastructures
Development of Road Network	Solutions to critical locations/traffic hot spots/traffic management while maintaining flow on the Outer Ring Highway	Investments of new roads on the east of the city based on (draft) Udonthani Land Use Master Plan	Limit number of vehicles in road network

Internal and external factors to traffic demand in Udonthani urban area can be used to determine traffic management plan as shown in **Table 3.4-2**.

Table 3.4-2: Traffic Management Plan and Description

No.	Area	Description	Methods
1	Traffic solution in inner core	Along commercial area along Por Sri, Prachak Silpakom, Mak Kang, Pran Prao	- Encourage the use of public transport and walking streets with transfer facilities and convenience - Reduce travel delay between OD and activity center, road improvement suitable with land use
2	Traffic solution for schools	Around Sri Suk, Sri Chom Chaen, Por Sri, and several schools as delay occur during AM and PM peak hours	- Encourage development of intermodal transfer locations and reduce no of student drop off in front of school with more access from different directions
3	Traffic solution to on street parking	Around Udonthani inner core, particularly commercial areas such as Udonthani Hospital, municipal offices, Tung Sri Muang, and other commercial zones	- Control land use density, adding traffic control measures to curb violations with a proper management of on street parking
4	Traffic solution to rail grade crossing	Around rail station, commercial areas along Thong Yai, Wattananuwong, Prachak Silpakom, Utit, Nityo	- Increase accessibility to the east of SRT railway
5	Traffic safety in Udonthani	Area with risks to accidents, without traffic lighting Riding motorcycle on footpath Speed violation	- Improvement of road and footpath surface, add facilities eg. pedestrian crossing or pedestrian bridge, traffic lighting at night, traffic signs and controls, etc
6	Miscellaneous	Along roads in Udonthani urban area	- Landscape improvements - Bike lane with good safety and standard

The Consultants revised our traffic study based on the existing transport network development plan from Udonthani Land Use Master Plan (2010) to determine a diagram of a work flow in traffic management plan in **Figure 3.4-1**.

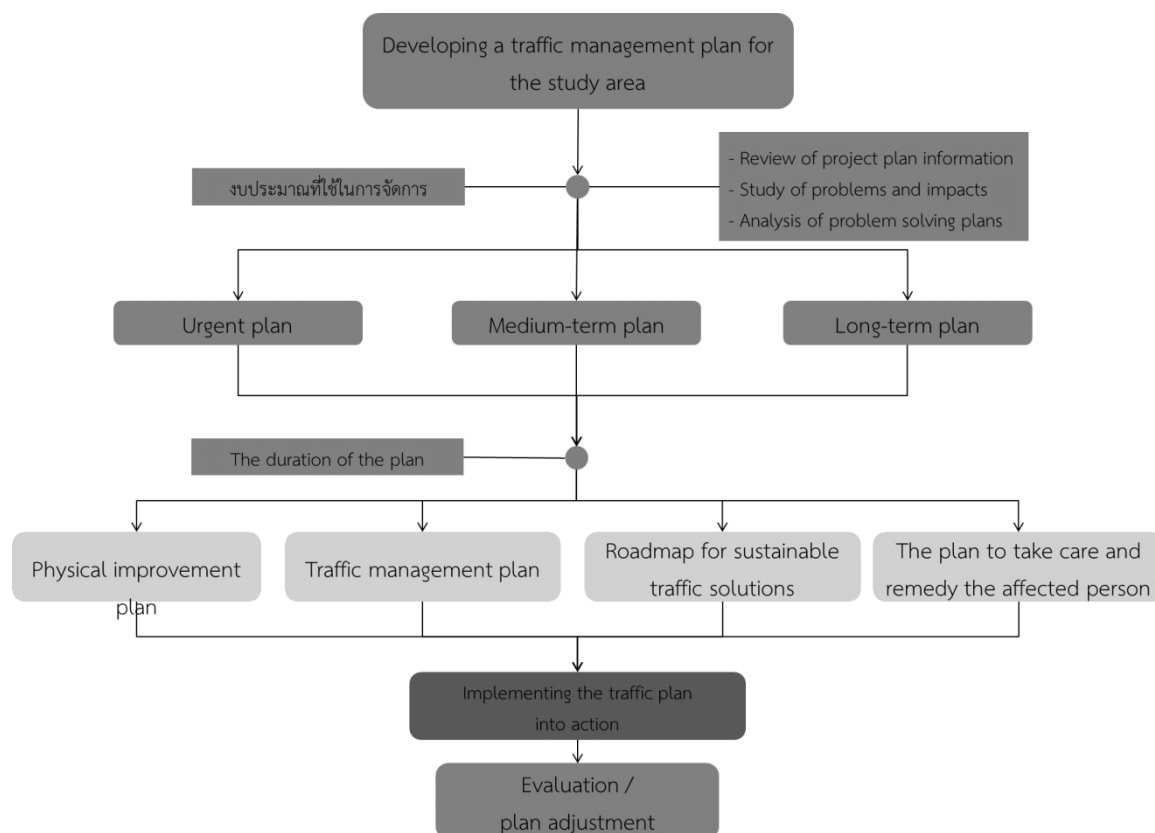


Figure 3.4-1: Traffic Management Diagram Work Flow

3.5 Project Prioritization of Traffic Management Plan

Criteria in project prioritization depend on 2 main factors 1) it is to be in accordance to the master plan and 2) opportunity in the allocation of budget.

Factor 1: It is to be in accordance to the main master plan as it follows land use and land development particularly a high density area that becomes an activity center and generates high traffic demand. Service to people is needed.

Factor 2: Opportunity in the allocation of budget plays a vital role. Low budget project is only suitable for only a few local administrations. High budget project has a good opportunity to allocate high amount of budget, if it is already a committed project. If the project requires several agencies to take action, an opportunity to secure high amount budget will be low.

From 2 factors above, we can determine project by its readiness from very high, high, medium, and low as shown in **Figure 3.5.1**.

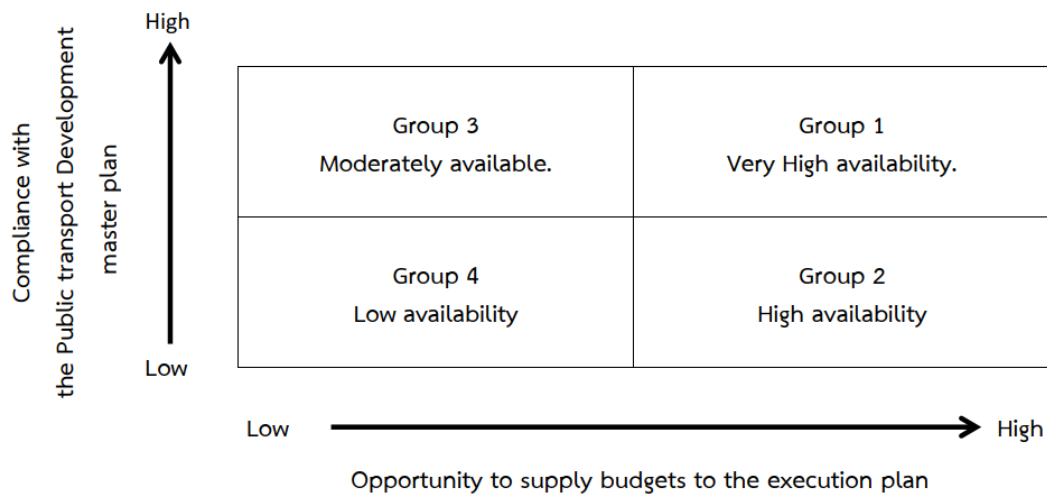


Figure 3.5-1: Readiness of Project Prioritization

Group 1: The project has the highest readiness. The project is in accordance to the land use master plan for mass transit development in a highly dense urban area which generates high amount of traffic. The project requires low budget, only one local administration can take responsibility. Or the project requires high budget, but it is already in the implementation plan.

Group 2: The project has a high readiness. The project is in accordance to the land use master plan for mass transit development in a less dense urban area compare to the project in Group 1. The project requires low budget, only one local administration can take responsibility. Or the project requires high budget, but it is already in the implementation plan.

Group 3: The project has a medium readiness. The project is in accordance to the land use master plan for mass transit development in a highly dense urban area. However, the project has some uncertainty in a macro level. Allocation of project budget is also uncertain. Several administrations need to take responsibility. Such project is considered a long term investment.

Group 4: The project has a low readiness. The project is also in accordance to the land use master plan for mass transit development in a less dense urban area compare to the project in Group 1 and 3. Allocation of project budget is also uncertain. Several administrations need to take responsibility.

3.5.1 Urgent Traffic Plan (Short Term Plan)

Road Network Improvements

- 1) Improvements of physical conditions along the new red and orange bus transit corridors and in the vicinity around the stations.
 - Improvements of footpaths on both sides with a new landscape for pedestrian and non-motorized travel.
 - Improvements of road median to reduce congestion and delay.

- 2) Improvements of road network efficiency
 - Improvements of the quality of Prom Praguay Road, including the shoulders. Prom Praguay Road acts as a short cut from Udonthani International airport to city core.
- 3) Physical Improvements and Installation of Safety Devices
 - New pedestrian crossings and pedestrian bridges at Sri Suk Junction. A new pedestrian crossing is required with pedestrian crossing signal to slow down the traffic.
 - New traffic signals along the new red and orange bus transit.
 - New barriers to prevent on street parking on footpath or riding motorcycle on footpath. This will reduce recurring traffic accidents.
 - New street lighting to reduce accidents.

Traffic Management Plan

- 1) Traffic Signal Setting
 - New traffic signal setting along red and orange bus transit corridors will be changed from 2 phase signals to 4 phase signals to reduce delay from right turn movement.
 - New bus way on one way street. New traffic signals will be installed with a new phase for bus prioritization to increase bus flow. This is a normal practice worldwide.
 - A new ITS will be installed concerning route choices, congestion, and accidents. A new ITS can use solar energy.
 - Management of on street parking to increase traffic flow. New pavement marking are required for car parking, motorcycle parking, and bicycle parking.
 - Dimension for car parking 2.50 x 5.50 m
 - Dimension for motorcycle and bicycle parking 2.00 x 1.00 m

Pattern of Parking: Parallel parking for car and 45 degrees parking for motorcycle and bicycle.

- New “No Double Parking” signs with strict law enforcement from police and local officers to reduce traffic congestion.
- Color “white-red” will be applied to curb for no street parking. The radius at any intersection will facilitate traffic movement. The “white-red” color will be painted at a length of 15-20 m from the intersection for a 4 arms intersection. For a 3 arms intersection, a length of “white-red” color can be approximately 60 m.

2) One way Street

- Convert 2 way roads into 1 way, increase the existing road capacity, and reduce turning conflicts on Sri Suk, Por Sri, Muk Montri, Naresuan, Por Niyom, and Amphor Rd.
- Install new traffic control devices, parking markings, and with new road improvements.

Plan to Support Sustainable Traffic Solution

- 1) New traffic checkpoint.
- 2) Public relation concerning traffic laws.
- 3) Public cooperation from students such helmet for those riding motorcycles.
- 4) Measures in motivation or award to those who use public transport.

Remedy to those under Impacts

- 1) For new channelization for a new bus lane, pavement markings will clear and comprehensible to motorists, particularly center line of the roadway to avoid confusion from motorists.
- 2) Encourage private developers to have their own parking space to curb on street parking. Exception will be made on red and orange bus transit corridors, since on street parking will be allowed.
- 3) On street parking will be allowed at a location with “white-yellow” color during AM and PM rush hours in the vicinity of schools.

3.5.2 Medium Term Plan

Road Network Improvements

- 1) There are 5 locations of park and ride as follows:
 - North Western Location: in the vicinity of 2nd Bus Terminal near the beginning of the yellow line
 - North Location: in the vicinity of Nang Kae Park near the end of the blue line
 - North Eastern Location: in the vicinity of Suan Sunandha Rajabhat University, Udonthani Campus near the end of the pink line
 - South Eastern Location: in the vicinity of Udon Sirisawat Mill near the beginning of red bus service
 - South Location: in the vicinity of Global House, Ban Tad near the beginning of blue bus service

- 2) Development and improvements of road network along new bus transit corridors.
 - Improvements of footpaths on both sides with a new landscape for pedestrian and non-motorized travel.
 - Improvements of road median to reduce congestion and delay.

Traffic Management Plan

- 1) New parking fee for a better traffic circulation. The first 15 minute will be free of charge. The next 15 minutes will be charged at a specific rate.
- 2) Cooperation from local officers and police to strictly enforce the traffic laws.
- 3) Installation of a new ITS to encourage the use of public transport service.

Plan to Support Sustainable Traffic Solution

- 1) New traffic checkpoint.
- 2) Public relation concerning traffic laws.
- 3) Public cooperation from students such helmet for those riding motorcycles.
- 4) Measures in motivation or award to those who use public transport

Remedy to those under Impacts

- 1) New sticker for local residents for free parking. It is to be limited to 1 sticker per household. Tenants are not included. At any congested area, no parking will be allowed, except nearby streets.
- 2) New landscape improvements for public transport commuters.
- 3) Encourage the public to use public transport service.
- 4) Reduce growing discontent from new public transport project from all those relocated local street vendors by providing new locations.
- 5) Encourage parents to drop off children at public transport facilities to reduce traffic congestion.

3.5.3 Long Term Traffic Plan

Road Network Improvements

- 1) Enhance potentials in traffic intersections
 - 3 existing roundabouts namely Wong Wien Nam Pu, Wong Wien Silapa Prachakom, and Wong Wien Clock Tower will be converted into signalized intersections.
 - New access for the existing Udonthani Rail Station to the new urban development for dual track railway and HST.

2) New Road Network

- Increase accessibility of the existing road network
- Improvements of access roads as new collectors.

Traffic Management Plan

- 1) New parking fee at Tung Sri Muang.
- 2) No right turn to reduce turning conflicts and accidents.
- 3) Congestion charge during peak hours.
- 4) New phase setting for the traffic signals at 3 roundabouts to facilitate pedestrian movement.

Plan to Support Sustainable Traffic Solution

- 1) New traffic checkpoint.
- 2) Public relation concerning traffic laws.
- 3) Public cooperation from students such helmet for those riding motorcycles.
- 4) Measures in motivation or award to those who use public transport

Remedy to those under Impacts

- 1) “No Parking” signs will be placed for 1) odd & even day 2) all day, and 3) except public holiday.
- 2) A new ITS will be installed at every single intersection in Udonthani with CCTV to curb crime rates and detect traffic violations.