



Chapter

4 Transit Oriented Development (TOD) Plan around Mass Transit Stations and Park and Ride Facilities

4.1 Potentials

1) Potential as a Transport and Logistics Center

Udonthani has a potential in security in The Mekong River basin/Indochina. It is also situated on China's strategic route and Thailand's dual track North-East corridor. Udonthani have regional rail transport and airport infrastructures with a continuous traffic growth. Udonthani is also in 1st and 2nd ranking in term of rail and air passenger demand at a total 4,052 passengers/day or 2,573,977 passengers/annum.

2) Potential as a Commercial/Trade Center

Most land around Udonthani station has a mixed land use pattern. There are commercial buildings, housings, and markets such as Night Market, Night Barza, UD Town, Central Plaza Udonthani, Center Point 2003, etc. There are some nearby markets such as Nong Bua Market, Thai Esan Market, Muang Thong Sri Market, with whole sale and retailed shops for bus and rail transport passengers.

3) Potential as a Tourism Center

Udonthani has countless tourist attractions with beauty and diversity on the upper part of North Eastern region. Its history background and local knowledge has transformed Udonthani into a learning center in North Eastern region of Thailand. Udonthani was also the first settlement of pre historic Ban Chaeng civilization which counts as one among the earliest civilizations in the history of mankind.

4) Potential on an Efficient Land Use Planning and Management

Land use around the rail station is considered mixed land use with high density residential buildings with employment and commercial opportunities. This suits a concept of Transit Oriented Development and urban planning. This will emphasize on a development of new commercial areas within the urban area for a good and unique quality of life, pedestrian movement and facilities and a new mass transit system for better urban environment. The development will conform to historical background of Udonthani.



5) Potential on Project Developments in the Area

- SRT dual track with standard gauge system for the future high speed train (HST)
- DOH Motorway: Chonburi-Nong Kai on North-South Economic Corridor
- Feasibility Study and Construction Design of Bangkok-Nong Kai High Speed Train (Phase 2)

In the analysis of the existing physical conditions along the new mass transit stations, the Consultants conducted an onsite survey along the existing public transit service by considering all factors related to TOD concepts and development.

The locations of all mass transit stations are shown in **Figure 4.1-1**.

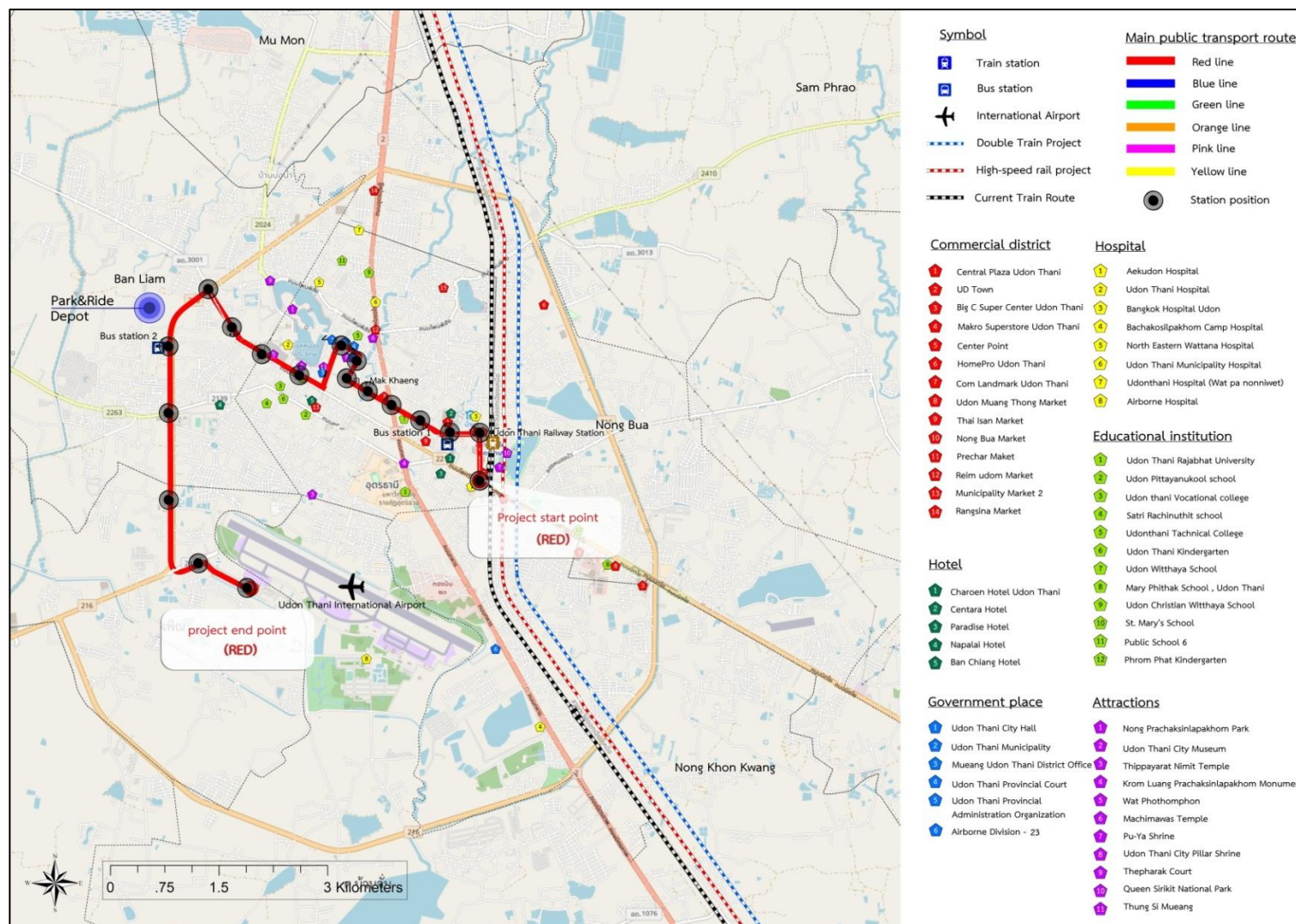


Figure 4.1-1: Mass Transit Route and Stations



4.2 Selection for Transit Oriented Development Area around Stations with Park and Ride Facilities

A suitable area for TOD is based on whether the area is qualified and fit TOD concept and design criteria or not. This follows the concept and design criteria from Phitsanulok Mass Transit Master Plan Study by Naresuan University which is also under the supervision of OTP.

The Consultants applied these criteria together with additional criteria on TOD developed by the Transportation and Development Policy (ITDP), USA which has 4 main steps as follows:

Step 1: A Selection of TOD (High Capacity)

Step 2: High Level Screening

Step 3: Detailed Screening

Step 4: A Selection of Potential TOD by ITDP

1) A Selection of TOD (High Capacity)

A selection of TOD around mass transit stations is of concerning analysis and evaluation of population density, accessibility to public transport service, availability of good public transport service, facilities for pedestrian and cyclists, and mixed land use.

There are 3 levels of evaluation of TOD.

➤ **Transit Adjacent (TA)** This area lacks basic criteria as it has low to medium population density despite that it is located adjacent to a public transport service with minimum road network with low accessibility. It also lacks transport facilities for pedestrians and cyclists with basic transport infrastructures for a livable city.

➤ **Transit Related (TR)** This area somehow follows basic criteria as it has medium population density adjacent to a public transport service with adequate road network and accessibility. It has basic transport facilities for pedestrians and cyclists with basic transport infrastructures, considering greater than TA.

➤ **Transit Oriented (TO)** This area has high population density adjacent to a public transport service with good road network and accessibility. It has good transport facilities for pedestrians and cyclists with basic transport infrastructures, considering the best.



2) High Level Screening

High Level Screening follows the basic criteria of TOD (Transportation Cooperative Research Program, 2004) as follows:

- Medium to High Population Density with housing and employment within 400-500 m radius from a mass transit station with development such as retail and service, housing, and employment.
- The safety and walkability are 2 main elements for a good and vibrant environment for pedestrians. Pedestrian network with good accessibility, safety crossing, visibility, adequate dimension for walking without any obstacles are required.
- The average vehicular speed should not exceed 40 kph for the safety of pedestrians and cyclists. Any area with high (or higher) speed traffic is definitely not suitable for TOD.

3) Detailed Screening

It is a procedure to determine a suitable area for TOD. The detail study will provide valuable data for decision making and design criteria.

4) A Selection of Potential TOD by ITDP

To evaluate the readiness and potential of TOD with highest efficiency, the Consultants applied TOD criteria based on the Institute for Transportation and Development Policy (ITDP), USA.

Our evaluation has 2 groups of highly potential areas as follows:

Group 1: UD Town, Udonthani Rail Station, Udonthani Central Plaza

These 3 locations have approximately the same level of potential as they fit the concept of TOD with good accessibility to the future road and rail transport network and facilities. Further TOD improvements for safety of pedestrians and cyclists will encourage the use of public transport service. This will result in efficiency and sustainability development as high density commercial areas with generate high traffic volume.

Group 2: Won Wei Junction, Udon Clock Tower, Excise Office 4, and Tung Sri Muang

They have less potential than group 1 as most areas are old high density commercial areas. Most of which are scattering around Udonthani Municipality Office surrounded by a large public park, government offices, and academic institutions in the south. Nonetheless, group 2 has a potential for TOD and sustainable urban development.

4.3 Patterns of Transit Oriented Development Area around Stations

Evaluation of potentials within the vicinity of mass transit stations was made in accordance to the main vision from the new Udonthani Master Plan and its Future Vision (2018-2021) as a livable city, a center of commerce and investment of the Greater Mekong Sub Region. It is an extension from the previous study of Udonthani Land Use Master Plan and its Future Vision in 2010 as stated that Udonthani will be the center of administration offices, educational, commercial, transport activities of the upper North East of Thailand.

At the beginning, Udonthani will become a center of trade, commerce, and investment with highly mixed land use such as residential, government offices, academic institutions, and light industrial. Buildings are also planned to be mixed-use such as residential, commercial, and office buildings in order than a development of a compact city can be achieved. To encourage the diversity of all these activities, the Consultants determined proportions of area allocation for pedestrians and cyclists and also for accessibility to public transport. Such area will consist of residential, office, retail and service spaces with an emphasis to vertical land use for both single or cluster development.

The Consultants also initiate a mixed use development for a pilot project in Udonthani and activity centers in the vicinity as they should encourage vertical development for a mixed use of residential, commercial, retail, and open public spaces for communities within the vicinity of mass transit stations.

1) Area 1: TOD around UD Town, Udonthani Rail Station, and Central Plaza Udonthani (Activity Center)

Area 1 will be mixed use and allocated for residential and commercial development with accessibility to the existing and future transport facilities for a good quality of life to all urban dwellers. Proportions of land allocation are 50% for commercial space, 20% for office space, 20% for public space and 10% for recreation on 13 Rai as shown in **Figure 4.3-1**.

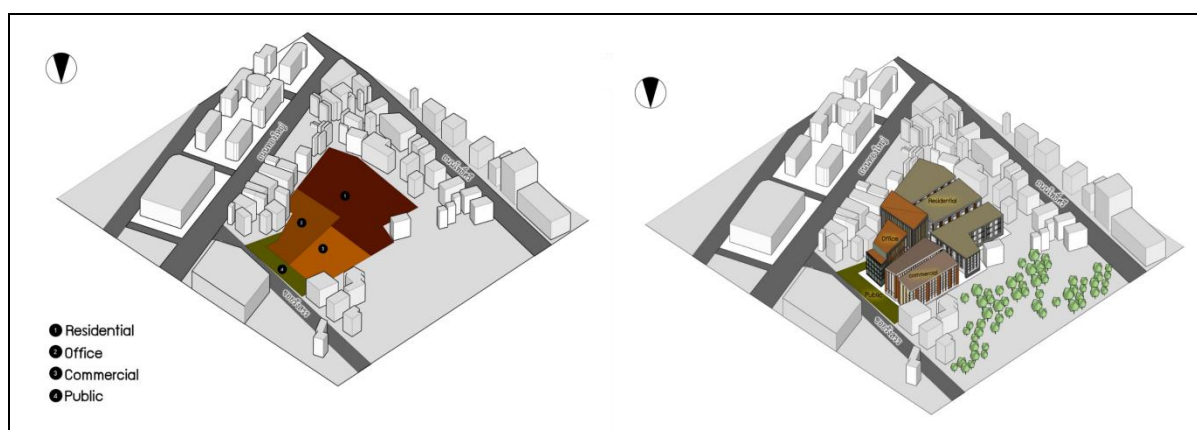


Figure 4.3-1: Land Use Plan and Allocation (Area 1)

2) Area 2: Development of Special Activity Center (Udonthani Rail Station)

Area 2 will also be mixed use and allocated for residential and commercial development with accessibility to the existing and future transport facilities for a good quality of life to all urban dwellers with a park and ride building for public transport commuters. Area 2 is divided into 2 smaller areas, 8 Rai (80%) area and 2 Rai (20%) area, respectively.

Proportions of land allocation of the first area are 50% for commercial space, 30% for office space, 10% for public space and 10% for **recreation**. Land allocation of second area will be 100% solely for a park and ride building as shown in **Figure 4.3-2**.

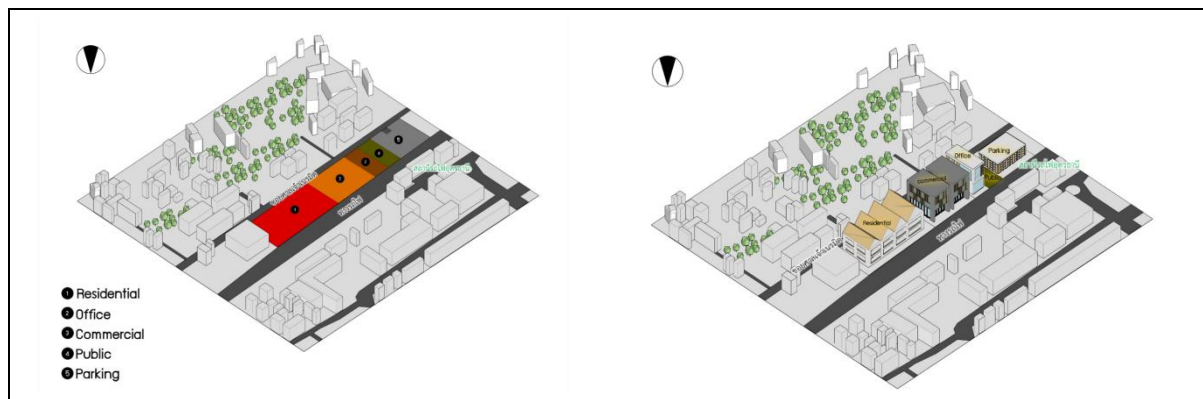


Figure 4.3-2: Land Use Plan and Allocation (Area 2)

3) Area 3: Development of City Center (Udonthani Penitentiary)

Area 3 will also be mixed use and allocated for commercial, residential, and office development. Proportions of land allocation of area 3 are 40% for commercial space, 30% for office space, 20% for public space and 10% for **recreation** on 24 Rai as shown in **Figure 4.3-3**.

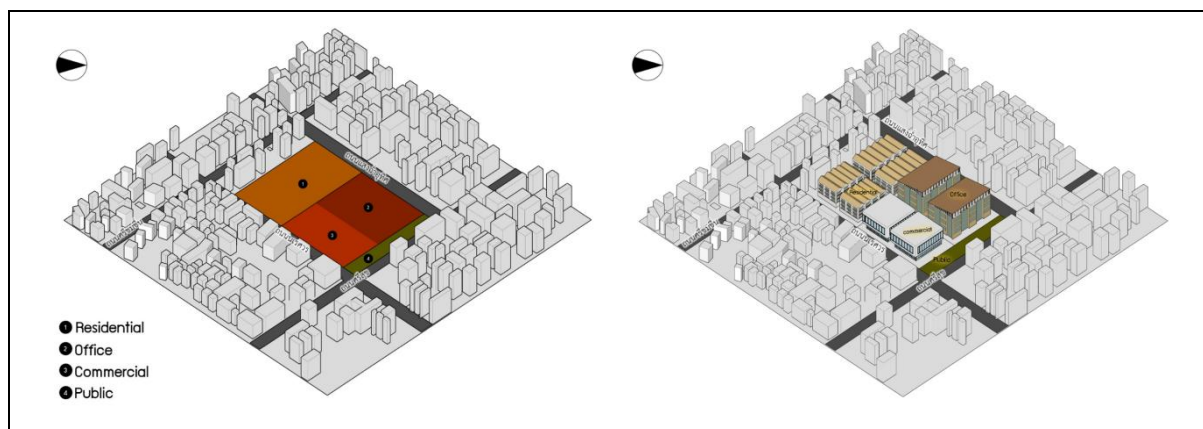


Figure 4.3-3: Land Use Plan and Allocation (Area 3)



4.4 Transit Oriented Development with Park and Ride Facilities

4.4.1 Area and Land Allocation of TOD and Park and Ride Facilities

There are 3 locations for TOD as follows:

1. UD Town, Udonthani Rail Station, and Central Plaza Udonthani
2. The vicinity around Udonthani Rail Station
3. Udonthani Penitentiary

Each location has its own importance to the future land use and transport facilities in order to achieve integrated public transport service and land development around mass transit stations.

The Consultants has summarized land use and proportions of allocation for all 3 locations as shown in **Table 4.4.1-1**.

Table 4.4.1-1: Proportion of Mixed Use Allocation

Type	Mixed Use	Proportions (%)
➤ Activity Center	- Group of retail, commercial, office for large area - Social service and facilities - Large housing, community activity, and open public space - Vertical development next to footpath	- Residential 50% - Commercial 20% - Office Building 20% - Public Space/ Recreational Space 10%
➤ City Center	- High density office buildings - Stores and commercial as main destination - High density housing, community activity, and open public space - Entertainment & recreation - Vertical development next to footpath	- Residential 40% - Commercial 30% - Office Building 20% - Public Space/ Recreational Space 10%
➤ Special Activity Center	- Specific land use for transport; intermodal transfer, park & ride - Residential area with significance to local population, local communities, and local activities. - Shops and services	- Residential 50% - Commercial 30% - Office Building 10% - Public Space/ Recreational Space 10%



4.4.2 Transit Oriented Development Plan

Table 4.4-2-1: TOD and Park and Ride Plans

no	Project	Quantity	Investment Costs in 2019 (M Baht)	Phase 1 (7 year plan)		Phase 2 (13 year plan)	
				Urgent Plan (3 Years)	Year 4-7	Year 8-12	ระยะปีที่ 13-20
				(2020-2022)	(2023-2026)	(2027-2031)	(2032-2039)
Target 2: A new standardized public transport system with great efficiency and adequate service quality to all commuters							
Strategy 2: Development of a standardized public transport system with great reliability and service quality							
1	Development of Park and Ride	6 locations	175.24				
Target 3: A state of art technology, reducing travel costs, energy consumption, and environmental friendliness							
Strategy 3: Development of a mass transit system with a state of art technology with greater accessibility, reducing travel costs, energy consumption, and environmental							
1	A feasibility study of the optimum fare system and e ticketing	1 project	50.00				
2	Transport Oriented Development (TOD)	3 locations	6,753.00				
	2.1 UD Town, Udontani SRT Station, Central Plaza Udonthani		2,356.00				
	2.2 Udontani SRT Station		1,053.00				
	2.3 Udonthani Penitentiary ²⁾		3,344.00				



Park and ride is designed primarily for public transport commuters traveling along the corridor.

There are 6 planned park and ride locations.

1. Park and Ride at Udonthani Rail Station

Access to this park and ride can be achieved from Nittayo – Por Sri Road then thru Soi San Chao Neramitr. It is a 4 story building with the maximum capacity of 355 cars, 60 motorcycles.

2. Park and Ride at 2nd Bus Terminal

Access to this park and ride can be achieved from Highway no 216 adjacent to 2nd Bus Terminal. It is an at grade parking with the maximum capacity of 164 cars, 62 motorcycles.

3. Park and Ride at Labor Court

Access to this park and ride can be achieved from Nittayo Road. It is an at grade parking with the maximum capacity of 268 cars, 147 motorcycles.

4. Park and Ride at Udon Thani Rajabhat University Station (Sam Phrao Center)

Access to this park and ride can be achieved from Highway no 2410. The area opposite the Udon Thani Rajabhat University. It is an at grade parking with the maximum capacity of 150 cars, 82 motorcycles.

5. Park and Ride at Nakha Market Station

Access to this park and ride can be achieved from Mitraphap Road. It is an at grade parking with the maximum capacity of 100 cars, 60 motorcycles.

6. Park and Ride at Yutthasilp Prasit Camp Station

Access to this park and ride can be achieved from Mitraphap Road adjacent to Yutthasilp Prasit Camp. It is an at grade parking with the maximum capacity of 103 cars, 50 motorcycles.

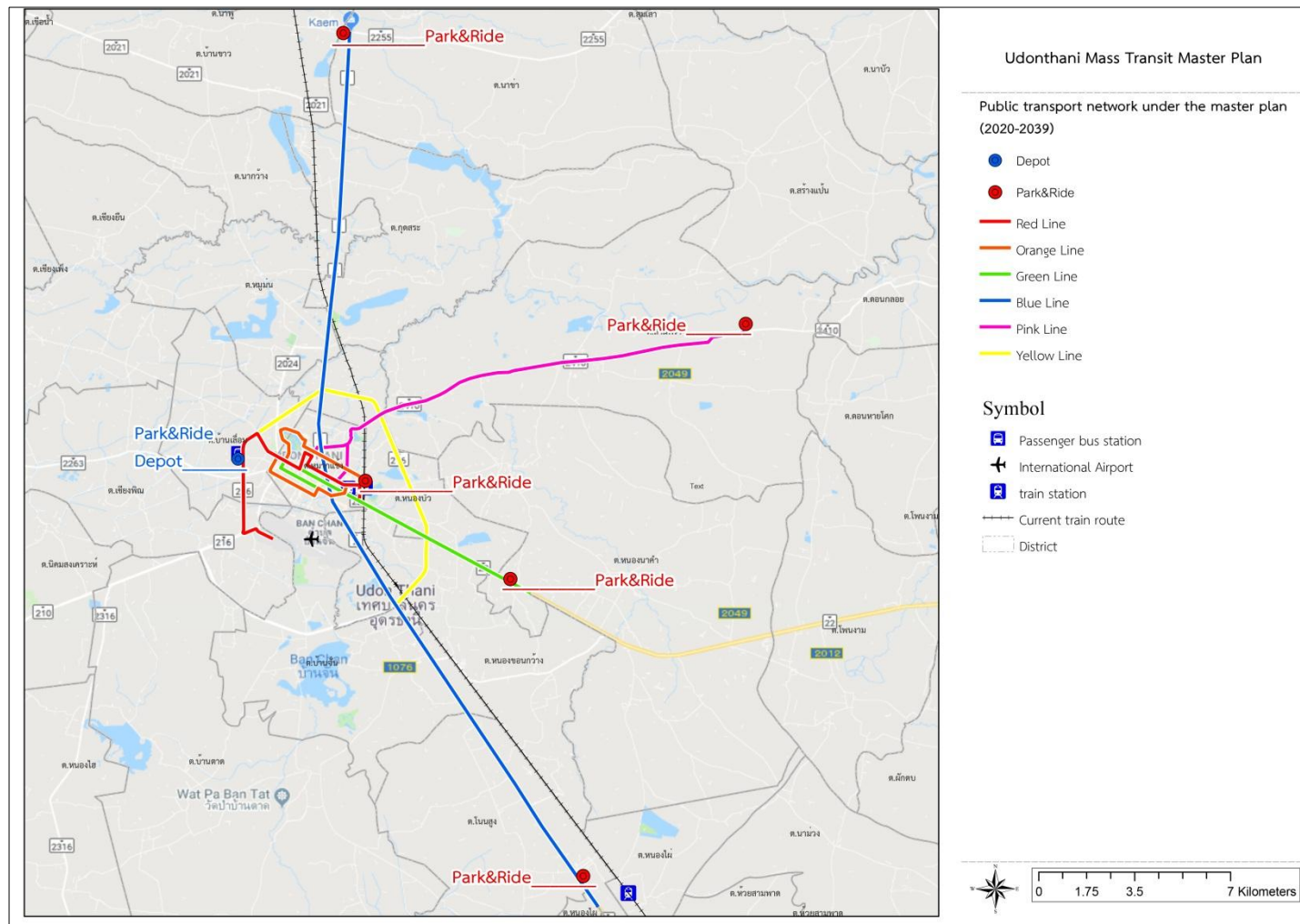


Figure 4.4.2-1 : Park and Ride