

**Ministry of Transport
The Republic of the Union of Myanmar**

**The Survey Program for
the National Transport Development Plan
in the Republic of the Union of Myanmar**

**Final Report
Executive Summary**

September 2014

JAPAN INTERNATIONAL COOPERATION AGENCY

**Oriental Consultants Co., Ltd.
International Development Center of Japan
ALMEC Corporation**

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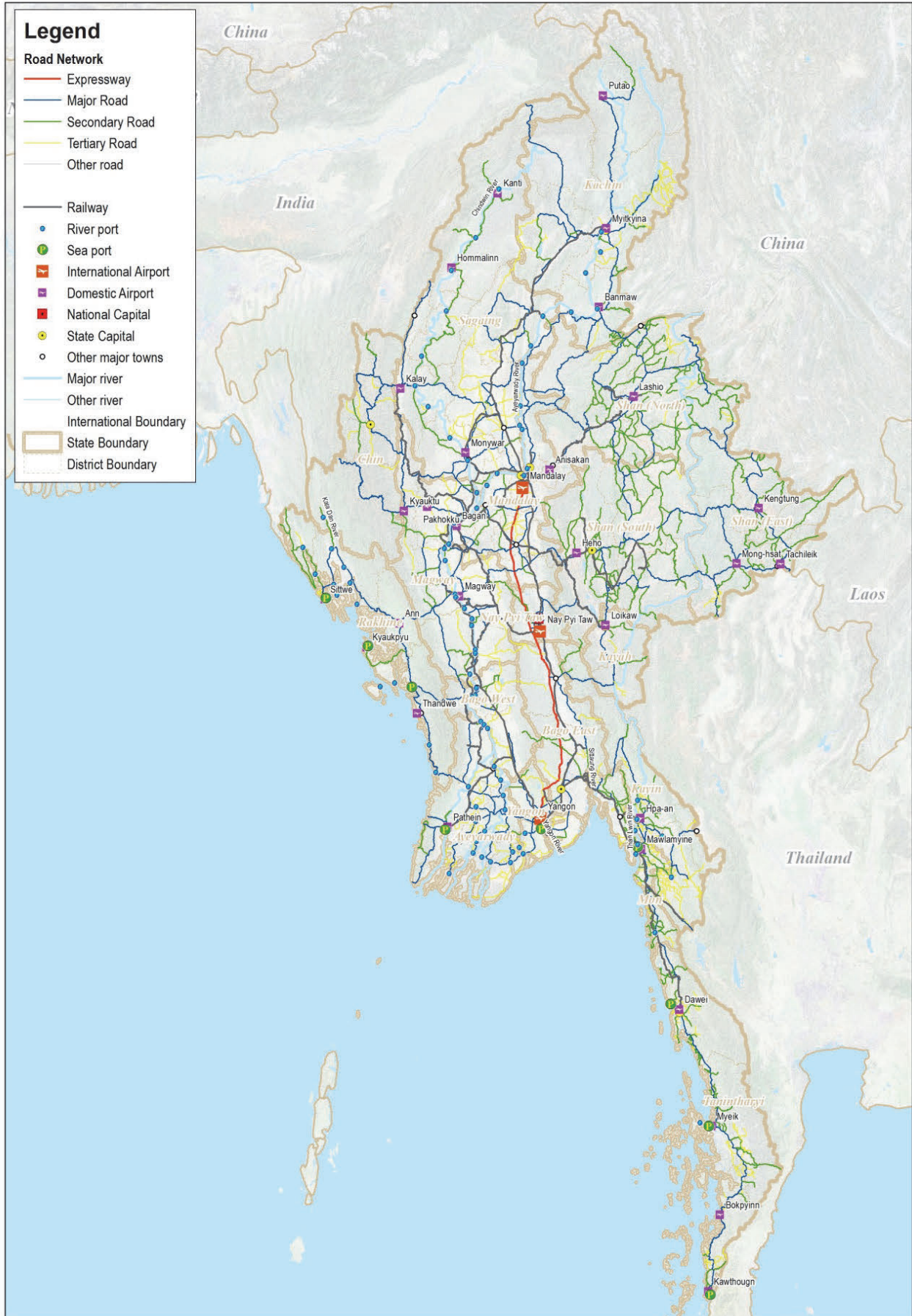
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Exchange rate used in this Report

USD	1.00 = JPY	99.2
USD	1.00 = MMK	970.9
MMK	1.00 = JPY	0.102

(As of October, 2013)



Legend

- Road Network**
- Expressway
 - Major Road
 - Secondary Road
 - Tertiary Road
 - Other road
- Railway
 - River port
 - Sea port
 - International Airport
 - Domestic Airport
 - National Capital
 - State Capital
 - Other major towns
 - Major river
 - Other river
 - International Boundary
 - State Boundary
 - District Boundary

Project Location Map

Source: Road, Railway (MIMU, Revised by MYT-PLAN), Sea port, River port (MYT-PLAN), River, Cities, Administrative Boundary (MIMU)

MYT-PLAN



**The Survey Program for
the National Transport Development Plan
in the Republic of the Union of Myanmar**

*A grand design for the transport sector at the dawn of new
and modern era of transport development in Myanmar*

Final Report (Executive Summary)

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Chapter 1 Introduction

Myanmar is strengthening its economic policies to take advantage of the social and economic growth potential of an open market economy. While the transport sector has a key role in fostering this economic growth, advancing social development, especially in terms of the infrastructure, of which development will be strongly needed to capitalize on regional trade opportunities. These policy reforms are important to realizing this growth potential, but success will also require the coordinated and sustained upgrading of the country's transport infrastructure, facilities, and skilled human resources.

To support domestic reforms in the transport sector, Myanmar is looking forward to 2015, when the ASEAN Community is economically integrated. Myanmar is eager to seize upon the growth opportunities provided by integration. The scale of growth in the region and the increase of foreign investment possibilities and infrastructure financing are helping in this regard. Myanmar's strategic location in the ASEAN region, its proximity to Bangladesh, China, India, Laos and Thailand, leave no doubt that Myanmar will play an important role in generating significant levels of regional GDP in the future. However, the possibilities for such growth mean that development of the country's transport sector should be an infrastructure priority, that will require investment in international airports, deep seaports, inland waterways, strategic rail and highway networks and improvements in cross-border infrastructure and regional connectivity.

Against this backdrop, the MYT-Plan shows a key step toward improved transport systems, providing policy guidance for Myanmar to capitalize on new opportunities and emerging trends in the transport sector; it is designed to ensure that Myanmar is well prepared to address moving people efficiently and sustainably.

Myanmar is also poised to leverage the private sector's expertise and finances through new partnership arrangements like Public-Private Partnerships that can diversify Myanmar's sources of investment in transportation. These initiatives show clearly how eager Myanmar is to demonstrate its strategic planning for the transport sector at the dawn of new and modern era of transport development.

The MYT-Plan has been prepared with Myanmar's National Comprehensive Development Plan (NCDP), which describes the country's development vision and strategic goals, and, it will be updated in conjunction with the achievement of national development objectives, guided by the NCDP.

Chapter 2 New Direction and Challenges

2.1 New Direction

Myanmar's "New Direction" is about planning for a future that is more sustainable, economical, efficient, and profitable. It is about ensuring that Myanmar's future populations and employment growth are complemented with new and more reliable ways to move. It is about seeking more innovative ways for citizens and business to move and transport goods efficiently, safely and affordably. In essence, the Plan is a "grand design for the transport sector at the dawn of new and modern era of transport development in Myanmar".

This New Direction is also about enhancing the Myanmar's economic vitality by ensuring goods and services flow easily, while attracting new commerce and industry. The infrastructure is an essential element of Myanmar's economy and the Government is committed to pursuing new policies and initiatives that promote more efficient travel, for business and for people.

The Myanmar National Transport Master Plan (MYT-Plan) is a long-term vision for a strong, healthy, sustainable future shared by local governments, citizens, business groups and organizations. It is a comprehensive and forward looking analysis of how Myanmar's transport sector must adapt to an increasingly interconnected world, while providing efficient, safe and environmentally friendly service to citizens.

While the MYT-Plan can help Myanmar to achieve its socio-economic development goals, the completion of this Plan is not the end of the process for Myanmar's transport sector. Strategic transport infrastructure, such as land transport (buses, trucks), railways, inland water and maritime transport, and civil aviation together with development of capacities will need additional work to refine them to suit the modes and corridors where additional growth will be directed. Over the next several years, with the adoption of this MYT-Plan, Myanmar will invest in corridors by providing new waterway services, expanding inter-city bus services, improving rail services, modernizing freight transport services and enhancing airport facilities.

2.2 Key Challenges

Myanmar's multimodal system includes nearly 150,000 kms of road, which handle more than 90% of passenger travel and about 80% of commodity movement. There are more than 500 bridges along 6,650kms of navigable waterways and nine ports in operation with current cargo flow transported at approximately 20,600 tons per day. Myanmar's railway network of nearly 6,000 kms operating 427 trains per day. There are 33 airports carrying 3,492,400 domestic passengers and 2,007,399 international passengers per year. With this network of transport modes, Myanmar is working hard to create a truly multimodal transport system that can adjust to changes in domestic and regional transport influences, including more GDP with expected economic growth. Myanmar is also encouraging development of new transport industries, a

critical effort as passenger travel patterns change, with people seeking more autonomous travel (versus public transport) and having more disposable income for air travel, as opposed to bus and rail transport.

There are key sector issues for Myanmar's authorities in each mode, within a multi-modal system. These include adequate planning and coordination, measures to safeguard safety, security and the environment, investments in human resources, institutions, regulations and seeking new financial support.

2.3 Key areas of consideration and corresponding issues

In addition to the key challenges in the field of physical improvement, a series of strategic or cross-sectoral issues are identified in five key areas, as stated below.

(1) Planning and Coordination:

- Fragmented planning and poor coordination among transport infrastructure institutions, agencies and operators at national, regional and city/local levels lead to overlaps and/or shortfalls
- Integration of strategic transport and spatial development initiatives requires strengthening
- Efficient planning of transport infrastructure in rural regions is impacted by national security considerations

(2) Infrastructure Development:

- Coordination is lacking within and among the transport networks, this hinders efficient travel and modal transfer
- The lack of capacity and efficiency in most sectors is due to the low standard/quality of existing infrastructure and inadequate facilities and equipment

(3) Institutional and Regulatory:

- The roles of government and private sector in supply, management and maintenance of transport infrastructure and services needs clarifying
- Inadequate human resources and data at national, regional and city levels for transport planning and related land use development/spatial planning restricts implementation and enforcement
- Legislative and regulatory frameworks for transport infrastructure provision and operation need updating

(4) Pricing and Resource Allocation:

- Investment returns/cost recovery in the transport sector is exacerbated by a high proportion of poverty-level households, especially in rural and agricultural regions

- Impacts of transport investments on spatial development are not well understood, including use of transport infrastructure to stimulate sustainable development.

(5) Community, Society and the Environment:

- Absence of social and environmental considerations in planning and design of transport infrastructure
- Safety standards and enforcement mechanisms, especially highway safety standards, need overhauling
- Use of inefficient transport technologies in transport sector exacerbates energy consumption
- Environmental assessment techniques, data and skills are not well developed, monitored or enforced+ institutional issues

Chapter 3 Frameworks for National Transport Planning

Myanmar is becoming increasingly active with the flow of people and goods. The economic centres and corridors are seeing more movement of goods and services, in between states and across borders. Myanmar's government is active also, enacting political and economic reforms that are helping position Myanmar as a new Asian frontier for foreign investment.

In this backdrop, the MYT-Plan includes a number of features:

- Demographic analysis and a demographic framework, including population projections
- Economic growth scenarios to forecast economic performance and prerequisites
- A financial framework, indicating the levels of investment required as well as sector constraints, and indicative PPP targets
- An environmental framework to maintain and preserve Myanmar's natural and environmental assets for future generations
- A National Spatial Development Framework
- Connections to related international frameworks / agreements

3.1 Population Projection

Under the moderate growth scenario, by 2030, Myanmar's population will increase by 14% to about 60 million residents. This growth will be especially evident in key areas like Yangon, Mandalay metropolitan area as well as the Special Economic Zones (SEZ) like Kyaukphyu, Dawei and Thilawa, where economic investment will spur indigenous population growth and attract new people to the areas (refer to Figure 1 and Figure 2).

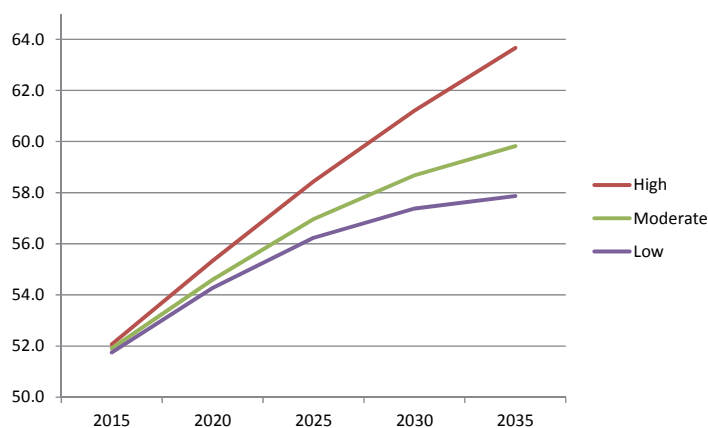


Figure 1 Population Projection

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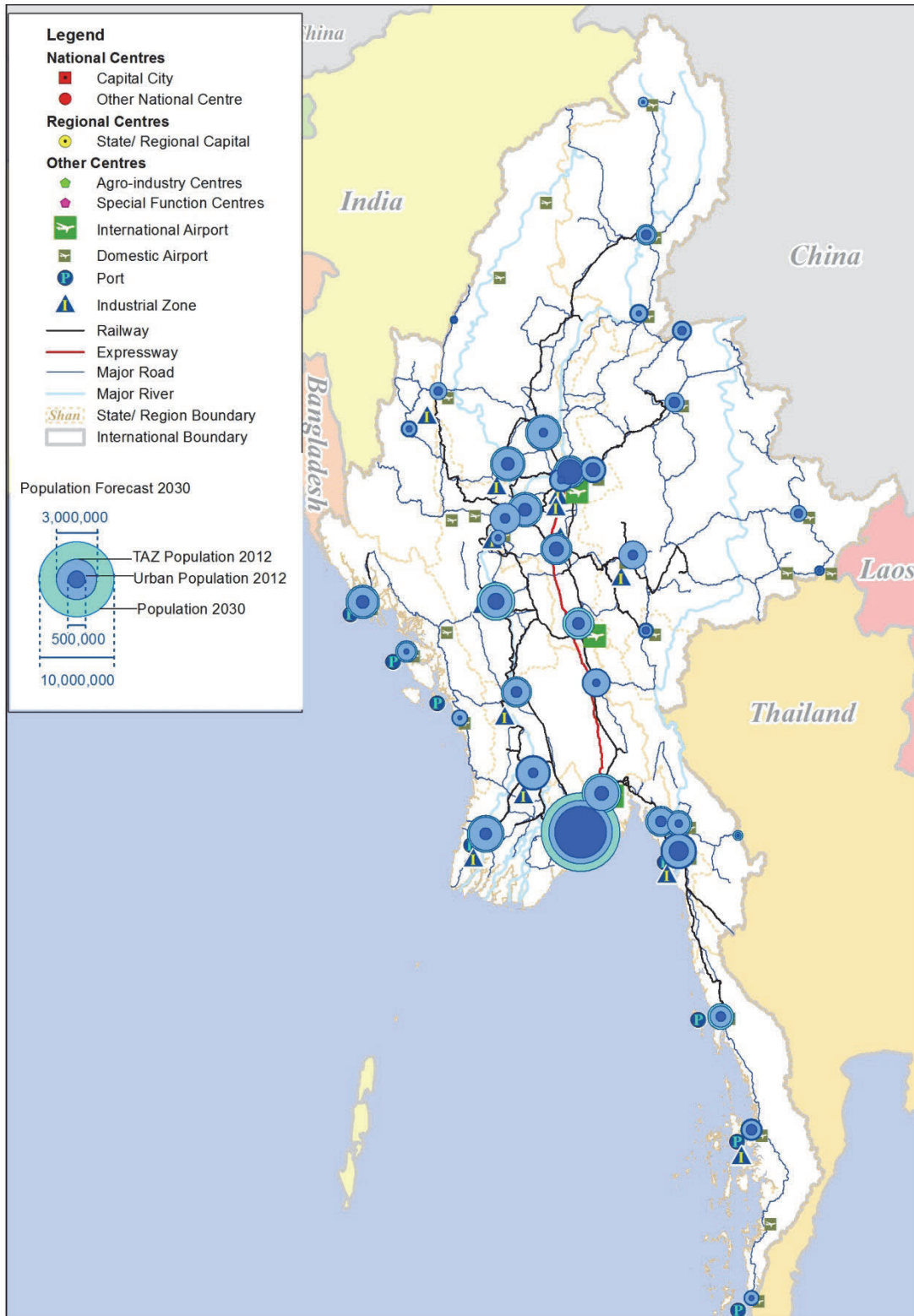


Figure 2 Population Distribution 2030

Source: Road, Railway, State Boundary, River, City (JST based on MIMU GIS data),
Airport (JST based on Dept. Civil Aviation), Port (JST), International Boundary (ESRI)



3.2 Economic Growth Scenario

Myanmar's President H.E. U Thein Sein has set a target of annual GDP growth rate at 7.7% per year in 2011, for the current five-year development plan. It is highly probable that Myanmar has the potential to achieve such rapid economic development over the next three decades. However, by considering the actual achievement in the recent years, the MYT-Plan has set a moderate growth scenario of 7.1 % (refer to Figure 3) though the year 2030 from 2013.

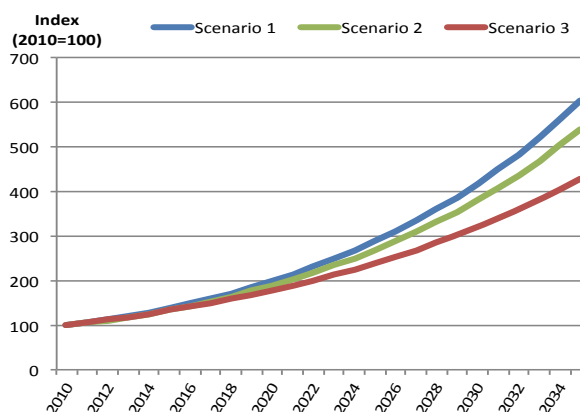


Figure 3 Economic Growth Scenarios

3.3 Fixed Capital Formation in the Transport Sector

In addition to the transport sector, the Government of Myanmar must also invest in other infrastructure sectors, including power generation, transmission and distribution, water supply and sanitation, telecommunications, etc. The MYT-Plan has determined that these critical sector investments will require that the ratio of transport sector Gross Fixed Capital Formation (GFCF) to total Government Capital Expenditure (GCE) be limited to around 30%. As a result, it is recommended that the Government increase the transport GFCF ratio from its current level of 4-5% to 10% as soon as possible and to make every effort to maintain this level through 2030. If the Government is successful, the cumulative investment required between 2014 and 2030 will be about 48 trillion Kyat at 2014 constant prices (refer to Table 4).

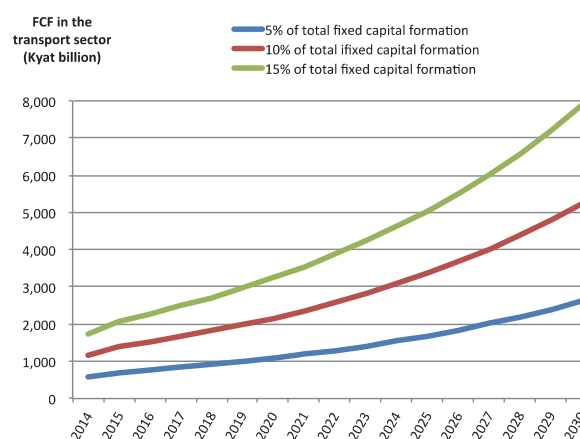


Figure 4 Alternative Transport Sector Investment (GFCF) Scenarios

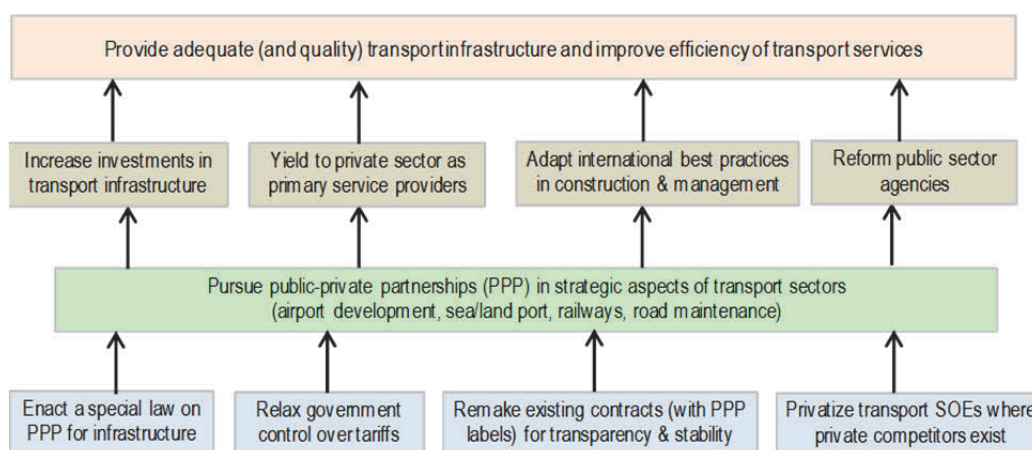
3.4 Indicative PPP Targets for Myanmar

The Government of Myanmar has embraced Public-Private Partnership (PPP) as a strategy to expand and modernize its transport sector. PPP is also expected to help achieve the target of 7.1% annual GDP growth in average through 2030 from 2013. To achieve this growth target and lift itself out of poverty and least developed status, Myanmar needs to make its own investment in the transport sector equivalent to about 30% of its GCE, however, the investment deficit is wide, in both the public and private sectors. If gaps continue to exist between the scale

of required investment in the transport sector and the capacity of the Government to mobilize funds from existing domestic sources, four options are available for the Government to bridge this gap:

- Raise taxes and/or improve tax collection efforts
- Secure more funds from ODA sources
- Develop innovative financing schemes
- Attract private sector investments via Public-Private Partnerships (PPP)

The possibility of the PPP to contribute to the achievement of transport development objectives is illustrated by way of a means-ends tree (refer to Figure 5).



Source: JICA Study Team

Figure 5 Means-Ends Tree for PPP in Myanmar Transport Sector

3.5 Environmental Considerations

Myanmar is home to a rich and diverse environment. Investments in transport infrastructure often come in direct contact with the environment as nearly 75% of the nation's population lives in rural areas among dense forests that include more than 300 mammal species, 7,000 plant and 1,027 bird species.

The MYT-Plan Strategic Environmental Assessment (SEA) provides recommendations that identify areas where proposed transport infrastructure projects should be situated, in order to mitigate negative social and environmental impacts. In addition, the environmental suitability analysis used in SEA can be used as a tool to conduct environmental management in the implementation of the Master Plan (refer to Figure 6).

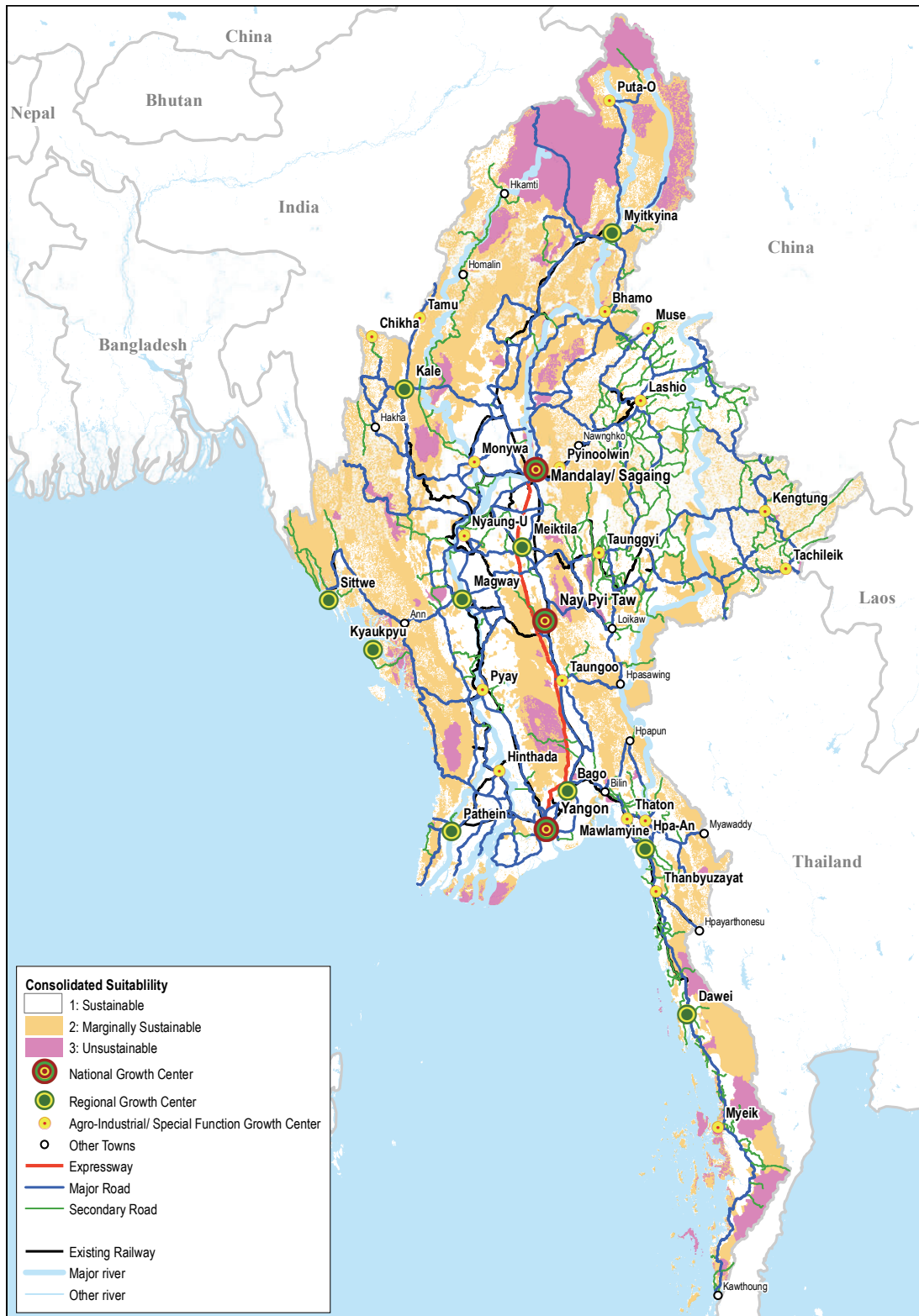
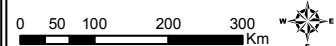


Figure 6 Consolidated Suitability Analysis

MYT-PLAN



3.6 National Spatial Development Framework

The National Spatial Development Framework (NSDF) incorporates strategic activity hubs, based on nationally-important cities, regional/state capital cities and other main urban centres/concentrations of population and economic activity such as industrial zones and Special Economic Zones (SEZs), agro-industrial based centres. Other key cities/towns that provide more specialized functions (e.g. port activities, rail transport hubs, airports and national/international tourism hubs, and/or important border trade towns) are also identified (refer to Figure 7).

The NSDF also includes strategic transportation networks, including ASEAN/trans-national highway and railway corridors, ASEAN Highways, Myanmar national expressways and other major roads, railways and major rivers with an inland waterway function, which are required to underpin and strengthen the transport (and thereby economic) linkages between the strategic activity hubs. In relation to the above key activity hubs and main transport networks/interchanges and facilities, future major land use development should be guided and encouraged (refer to Figure 8).

The major constraints for development include environmentally-sensitive areas, such as protected wildlife sanctuaries and national parks, and protected state and other forest zones. In relation to the strategic environmental constraint and vulnerability areas suggested by the suitability analysis, major new land use and transport development should not be encouraged and new projects should not normally be permitted, unless these are in the national interest.

The National Spatial Development Framework (the balanced mix of economic activity hubs, strategic transport networks and facilities and major environmental protected areas) can therefore provide a useful and robust tool that will assist decision-makers in determining priorities for future transport investment decisions.

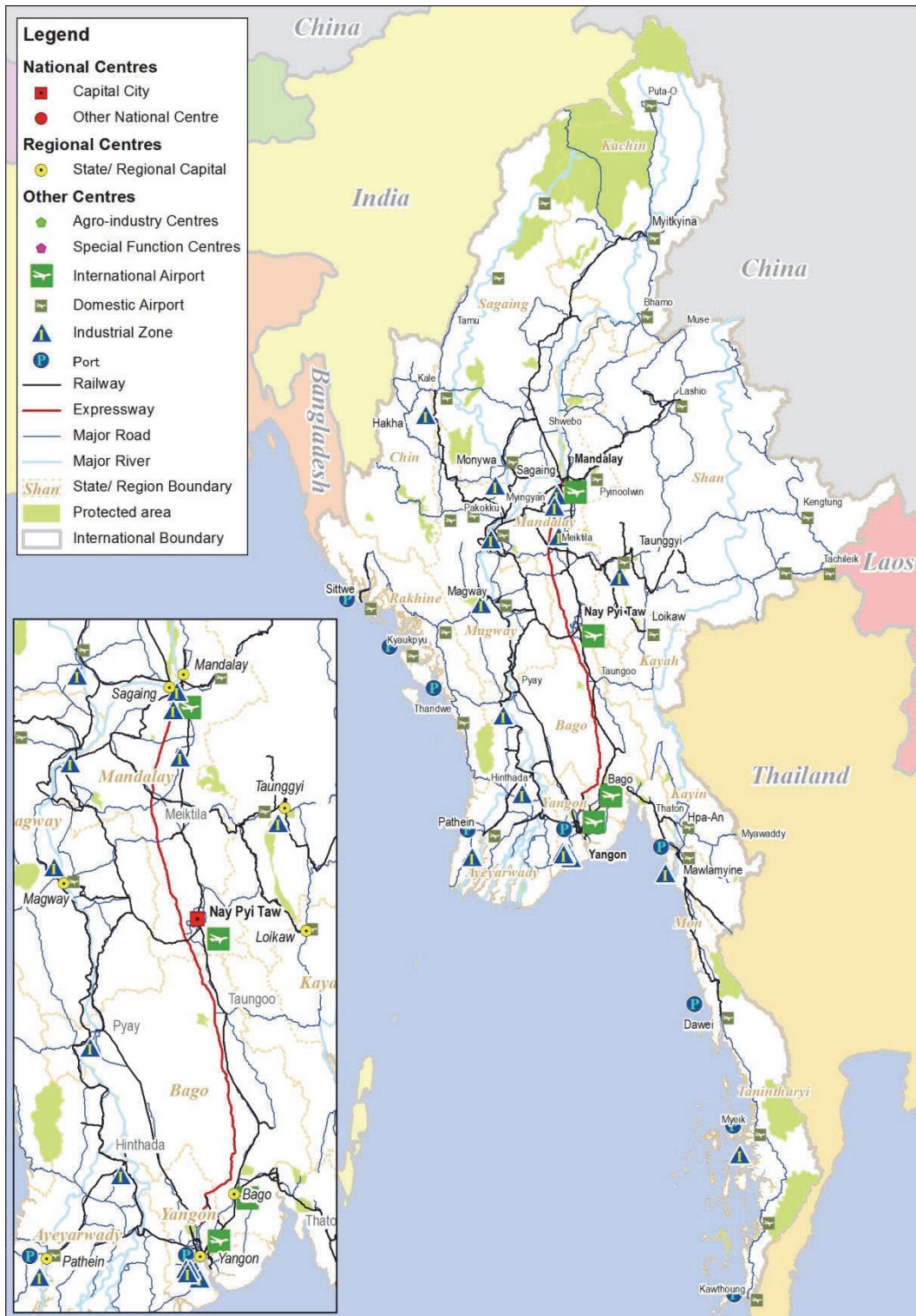


Figure 7 Existing Context

Source: Road, Railway, State Boundary, River, City (JST based on MIMU GIS data),
Airport (JST based on Dept. Civil Aviation), Port (JST), International Boundary (ESRI)





Figure 8 National Spatial Development Framework

3.7 Transport Demand

Demand for transport services will increase with passenger transport expected to increase to 1.4 million in 2030 from 0.3 million persons per day in 2013 in terms of inter zonal trips (refer to Figure 9). Domestic cargo flows are also expected to increase from 209,000 tons per day in 2013 to 974,000 tons per day in 2030. Both passenger and cargo increases will be most heavily felt along the major development corridors (refer to Figure 10 and Figure 11).

International air passengers are expected to rise as well, from 2 million passengers per year in 2012, to 14 million passengers per year in 2030. Yangon International Airport as well as Mandalay and Hanthawaddy International Airports will see significant demand increases.

International sea cargo throughput in Myanmar is expected to increase, from 26 million tons in 2011 to 90 million tons, while container cargo throughput is also expected to increase , from 0.34 million TEU in 2011 to 8.1 million TEU in 2030.

This increased demand is the basis for the recommended new investment, institutional strengthening, updates to transport policy and renovations to infrastructure and systems that the MYT-Plan recommends.

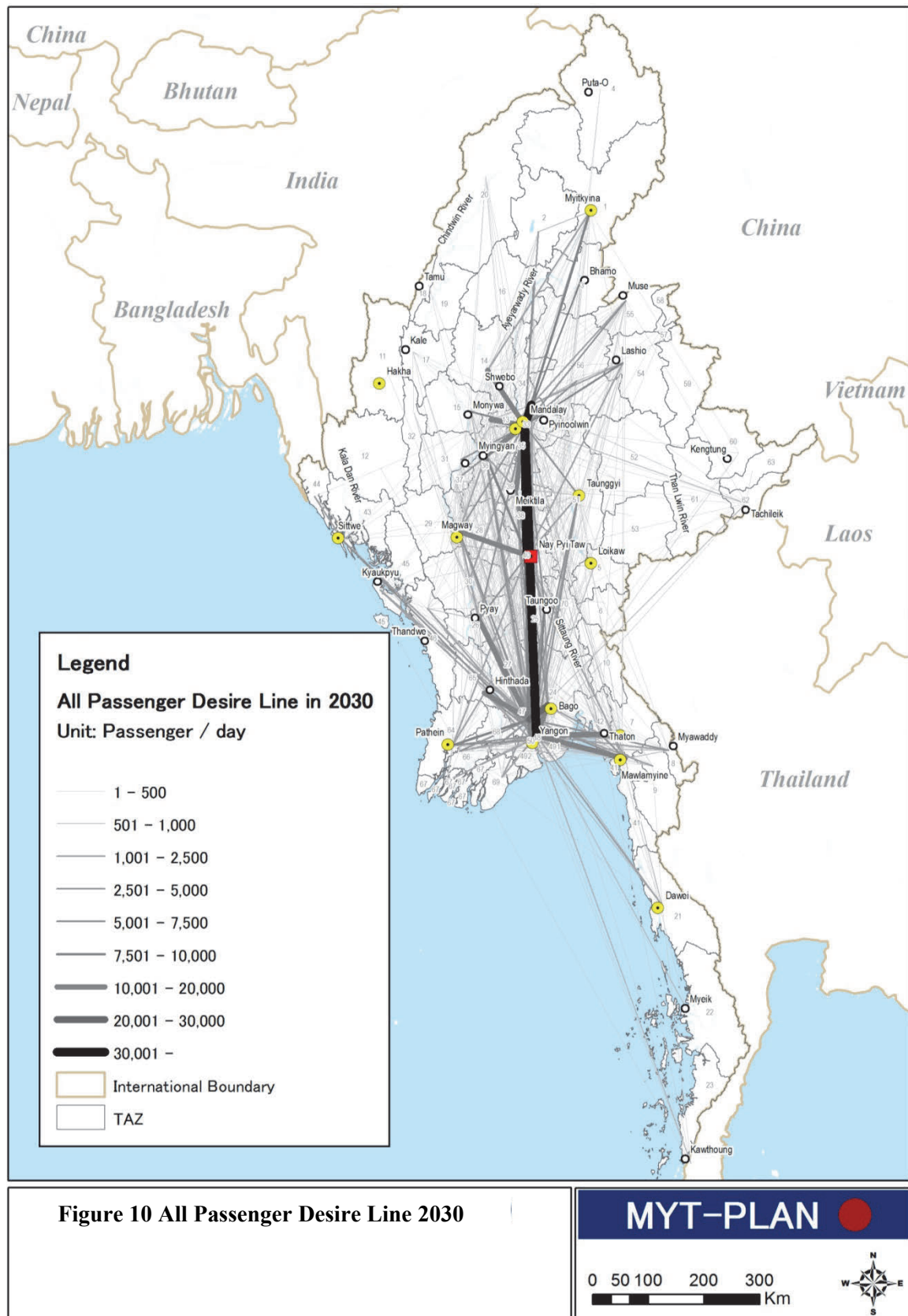


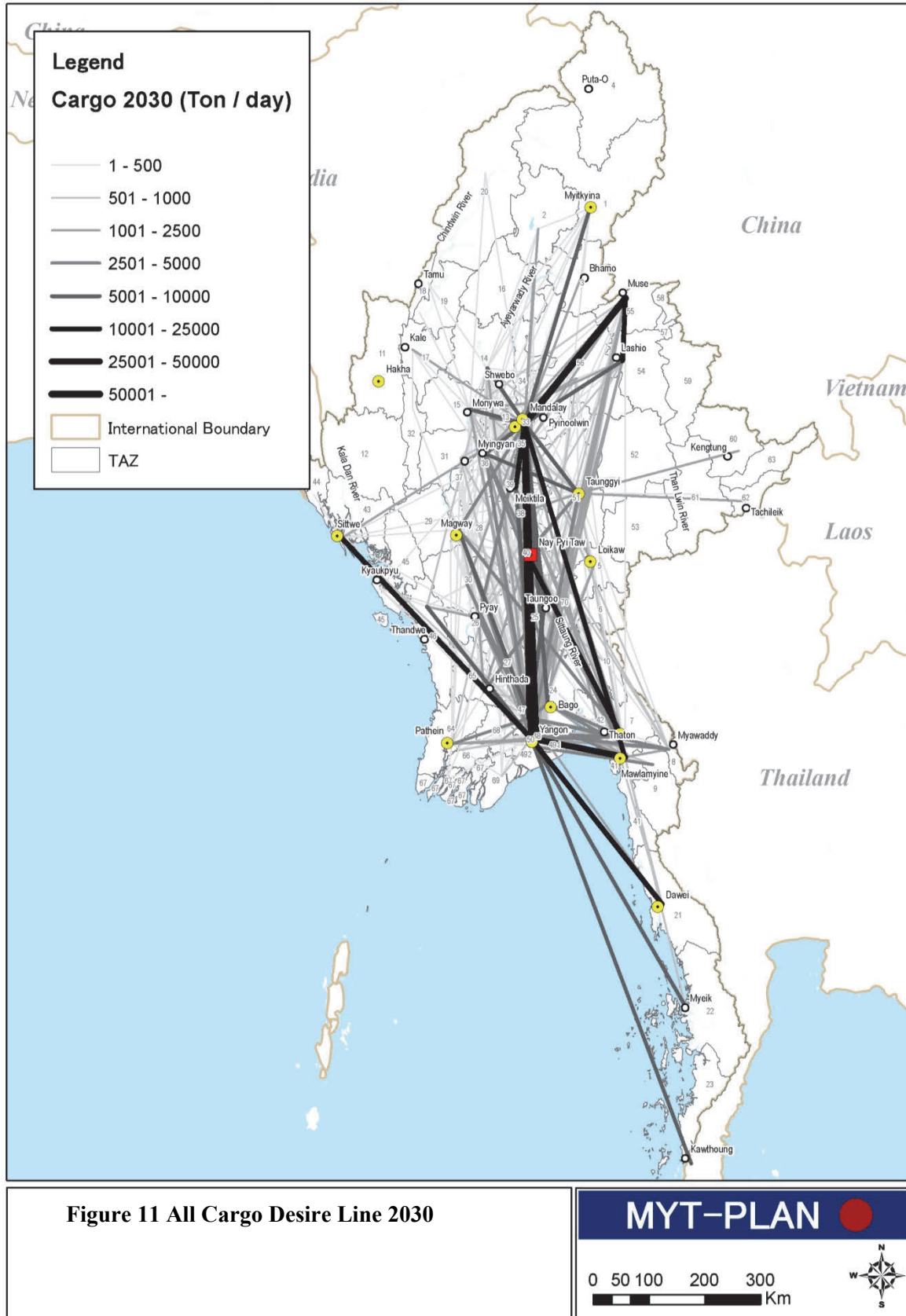
Figure 9 Traffic Analysis Zone

Source: MIMU and ESRI world data

MYT-PLAN

0 50 100 200 300 Km





3.8 ASEAN Integration

Regional connectivity is an increasingly important aspect of Myanmar's transportation sector.

An efficient, secure and integrated transport network in ASEAN is vital to realizing the full potential of regional economic integration, as well as enhancing the attractiveness of the region, its tourism and as an investment destination.

An integrated transport network is also vital for narrowing the current development gaps between the member countries in the region. A regional approach to port, rail and road network and system improvement plans for neighbouring countries, such as Thailand, India, China, and Bangladesh is needed to ensure updated policies and programs to develop and complete strategic transport networks.

The ASEAN Strategic Transport Plan 2011-2015, also referred to as Brunei Action Plan, provides the main reference that guides ASEAN transport cooperation and integration in between 2011 and 2015. Based on a comprehensive assessment of the transport context in ASEAN, the Brunei Action Plan identifies strategic actions to be implemented to support the goals of the ASEAN Economic Community by 2015, as well as the priority of enhancing regional connectivity identified in the Master Plan on ASEAN Connectivity.

Chapter 4 MYT-Plan Vision and Purpose

4.1 MYT-Plan Vision

The Myanmar National Transportation Master Plan (MYT-Plan) will serve as a blueprint for transportation strategies and the basis upon which capital improvements are made through 2030 from now. This Master Plan will also provide guidelines that are adaptable to other industrial sectors and to private investment, and assist with investment planning and decision making for a variety of transport sector projects.

In this way, the Master Plan will influence the transport sector's development, by presenting a set of policies that are relevant to all modes of transport, as well as development strategies for specific modes like road/road transport, rail, air, maritime and inland waterway, as well as the associated projects and activities that can help these modes achieve the Transport Vision, which is

“To develop an efficient, modern, safe, and environmentally-friendly transportation system in a coordinated and sustainable manner that embraces all transport modes for the benefit of the country and people of Myanmar”.

4.2 The MYT-Plan Objectives

The MYT-Plan objectives are specifically stated as below:

1. To establish a long-term development vision and corresponding strategies of the transport sector in line with the National Comprehensive Development Plan (NCDP).
 2. To draw up an integrated national transport network plan which enables multi-modal transport services all over the country.
 3. To provide an effective coordination mechanism in transport planning and investment.
 4. To minimize environmental impacts caused by the transport infrastructure development through better planning and enhanced coordination between the ministries concerned.
 5. To improve safety and security to an international standard level.
 6. To encourage private sector's involvement in the transport infrastructure development, operation, maintenance and management.
 7. To support other industrial sectors by providing safe, secured, reliable, reasonable and all season transport services.
-

Chapter 5 Sector Vision and Strategic Objectives

5.1 Road Transport Sector

Sector Vision

“Develop all-weather and safe road transport infrastructure in order to fulfill social and economic transport needs of the nation in a coordinated manner with other modes of transport; and build robust foundation for land transport industries in terms of road infrastructure and regulatory framework; and achieve environmentally-friendly land transport system development throughout the country.”

Sector Strategic Objectives

- RD-01 Update and establish safe, environmentally-friendly and modern motorways, highways and bridge designs to international standards.
- RD-02 Plan and build a hierarchical union highway and motorway network to support regional development along the designated transport corridors and major transport nodes, conforming to the ASEAN transport agreement.
- RD-03 Develop an all-weather and disaster-free trunk road network along designated transport corridors.
- RD-04 Develop cost-effective asset management measures and mechanisms.
- RD-05 Reduce the number of road accidents to the level of advanced countries as soon as possible.
- RD-06 Establish clear institutional and organizational frameworks in the road transport planning administration and management sector, establishing lines of demarcation between the central government and the region / state governments.
- RD-07 Maintain and further encourage the participation of the private sector in developing road transport infrastructure and providing transport services.
- RD-08: Improve and enhance the road and land transport industry to increase business performance.



5.2 Rail Transportation Sector

Sector Vision

“Develop safe rail network and services along the designated major economic development corridors in order to fulfill social and economic transport needs of the nation in a coordinated manner with other modes of transport to achieve higher inter-modality; contribute to the environmental improvement through introduction of low carbon technologies, and build preferred business environment through provision of safe, punctual, comfort and high capacity rail transport services with affordable yet reasonable prices.”

Sector Strategic Policies and Objectives

- RWY-01 Develop effective asset management measures and mechanisms to fully utilize the existing assets.
- RWY-02 Rehabilitate the existing rail infrastructure and associated systems along the designated development corridors and to/from major transport nodes to a higher standard.
- RWY-03 Develop all-weather and disaster-free trunk rail network and services along the designated development corridors.
- RWY-04 Reduce the number of rail accidents to the level of advanced countries, as soon as possible.
- RWY-05 Introduce environmentally-friendly technology in the rail infrastructure and rail transport industry.
- RWY-06 Increase participation of the private sector in developing rail and rail-related infrastructure and businesses such as ICD development and operation and rail-based freight forwarding business.
- RWY-07 Improve MR’s business performance, focusing on market-driven freight transport services.
- RWY-08 Be prepared for early introduction of High Speed Railway (HSR) Passenger Service.
- RWY-09 Encourage and promote business and industrial activities along rail corridors, that can yield stable demand of both passenger and freight.
- RWY-10 Reduce operational and management costs by streamlining the institutions, the number of staffs, etc.



5.3 Maritime and Inland Water Transportation Sector

Sector Vision

“Develop world-class international gateway port(s) as one of the hub seaports in Asia and all-weather and 24-hours inland waterway transport services along the designated development corridors in order to fulfill social and economic transport needs of the nation in a coordinated manner with other modes of transport to enable higher inter-modality; and build preferred business environment in the country through provision of safe, punctual, and high-capacity water transport services with competitive prices.”

Sector Strategic Objectives

Maritime Transport

- WT-01 Enhance port capacity of Yangon port (including Thilawa area) to meet sharply increasing cargo demands and to reduce dwelling time of cargoes and ships in the port.
- WT-02 Develop a deep seaport that can accommodate mother vessels in trunk routes to support the further increasing import and export of goods, at reasonable cost to users in the Central North-South Development Corridor.
- WT-03 Formulate a port master plan for each sea port and their hinterlands.
- WT-04 Invest in effective and efficient port management.

Inland Water Transport

- WT-05 Establish key sections of the inland waterways as navigable throughout the year.
- WT-06 Provide effective inland water transport network.
- WT-07 Redefine the role of IWT and develop a corresponding business plan.
- WT-08 Encourage the replacement of old vessels with safer and new environmentally-friendly vessels.



5.4 Civil Aviation Sector

Sector Vision

“Develop and strengthen the safe, secured, efficient, sustainable and environmentally friendly aviation industry in order to make Myanmar one of the major aviation hubs in Asia.”

Sector Strategic Objectives

- CA-01: Strengthen regulatory functions of the Department of Civil Aviation, so as to monitor and regulate the increasingly influential roles and activities of other organizations.
- CA-02: Develop a safe and efficient airport system for the Yangon metropolitan area as the country’s international prime gateway city to cope with increasing international and domestic air transport demand.
- CA-03: Develop a nationwide airport system in order to cope with increasing air traffic demand and contribute to balanced national socio-economic development.
- CA-04: Modernize Air Navigation Services in line with the ICAO GANP so as to provide seamless services and support safe and efficient air transport.
- CA-05: Allocate service provision functions currently under the Department of Civil Aviation to appropriate entities in order to improve effectiveness and efficiency of the service production and provision.



Chapter 6 Corridor-based Transport Infrastructure Development

6.1 Planning Approach

Multiple governmental agencies are involved for developing and maintaining transport infrastructure and for providing transport services, including MOT, MRT, MOC, and the Ministry of Border Affairs.

As noted in the key areas of consideration, there has been no definitive national level transport policy that can guide the country's transport sector to date. Accordingly, there has been no effective strategy to govern future development directions or corresponding investments in an integrated manner. While each of the transport ministries is responsible for a long list of infrastructure projects as part of a long-term development plan of each sector, and these projects have been rarely tested analytically for potential benefits or how they address sector priorities.

Corridor prioritization is a key strategy and at the same time it is an effective planning tool in integrating the transport sector, because the Government's ability to make an effective and integrated investment in the transport infrastructure has been hampered by a limited budget and competing priorities between the ministries.

Based on the corridor prioritization, a corridor based transport infrastructure development approach is employed in the MYT-Plan. This approach is effective in Myanmar, because once completed, would:

- provide a spatial focus to transport improvement, connecting growth centres and catalysing the development of surrounding locations;
- open up many opportunities for various types of investment;
- promote synergy and enhance the impact on regional economy;
- provide a mechanism for prioritizing and coordinating investments; and
- generate tangible demonstration effects.

6.2 Corridor Prioritization

The National Spatial Development Framework is foundation of the MYT-Plan, which is identified based on international, national, regional and city development policies and related transport networks and facilities. In this spatial development framework, core development centres are grouped into a three level hierarchy: national, regional, agro-industrial/special function.

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At the first hierarchy level, there are three national growth centres: Yangon, Mandalay and Nay Pyi Taw, where major concentrations of people, commerce, industry, and government activities exist. These national growth centres also perform the role of tourism hubs.

At the second level, seven regional growth centres are identified, including: Myitkyina, Sittwe, Kyaukpyu, Patheingyi, Bago (Hanthawaddy), Mawlamyine, and Dawei. In these centres, clusters of commerce and industry are common and state/regional-level government administration, education and health and other social services are also provided.

At the third level, major concentrations of agro-industry and commerce exist and are often related to the agricultural economic-base, border towns and other special function settlements.

Based on this spatial framework, ten (10) development corridors that connect strategic activity hubs (corridor F and K are combined into one) are identified. These development corridors include:

- A. Central North-South Corridor
- B. East - West Corridor
- C. Northern Corridor
- D. Mandalay - Tamu Corridor
- E. Second East - West Corridor
- G. East - West Bridging Corridor
- H. Delta Area Network
- J. Southern Area Development Corridor
- K. Western North-South Corridor (including F. Main River Corridor)
- L. Eastern North - South Corridor

Population and Gross Domestic Products (GDP)

Corridor development impacts, in terms of the number of beneficiaries (represented by population) and concentration level of economic activities (represented by GDP) are major determinants to select the priority corridors.

Among the 10 development corridors, larger populations and associated economic activity can be seen along A: Central North-South Corridor (41% of total population and 50% of GRDP), followed by K: Western North-South Corridor (33% of total population and 42% of GRDP), B: East – West Corridor (28% of total population and 35% of GRDP), and H: Delta Area Network (21% of total population and 27% of GRDP).

Table 1 Population and GDP by Development Corridor

Development Corridor	Section	Code	2012 Population (.000)	% of National Population	2012 GRDP (Kyat billion)	% of National GDP
A. Central North-South Corridor	Yangon-Nay Pyi Taw	A1	11,714	41%	13,170	50%
	Nay Pyi Taw-Mandalay	A2	6,323		4,457	
	Mandalay - Myitkyna	A3	7,035		5,648	
B. East - West Corridor	Yangon - Hpa-An - Myawaddy	B1	14,052	28%	14,543	35%
	Mawlamyine - Dawei	B2	2,753		2,039	
C. Northern Corridor	Mandalay - Muse	C1	6,042	10%	4,503	10%
D. Mandalay - Tamu Corridor	Mandalay - Tamu	D1	8,722	14%	6,992	15%
E. Second East - West Corridor	Tachilek - Meiktila - Kyaukpyu	E1	10,636	17%	6,938	15%
G. East - West Bridging Corridor	Hpasawing - Pyay	G1	2,664	12%	1,727	11%
	Loikaw - Magway	G2	4,767		3,214	
H. Delta Area Network	Yangon - Pathein	H1	8,992	21%	10,076	27%
	Pathein - Hinthada	H2	3,766		2,651	
J. Southern Area Development Corridor	Thanbyuzayat - Hpayarthonesu	J1	2,537	8%	1,482	8%
	Dawai - Thai Border	J2	811		781	
	Dawei - Kawthaung	J3	1,756		1,679	
K. Western North-South Corridor	Yangon - Pyay - Magway	K1	12,810	33%	14,388	42%
	Magway - Mandalay	K2	7,096		5,468	
L. Eastern North - South Corridor	Bilin - Loikaw	L1	3,896	12%	2,550	9%
	Loikaw - Nawngkho	L2	3,247		1,900	

Freight Transport Demand

In addition, freight transport demand is an important indicator of corridor functionality and form a basis to understand project impacts. Investments made in building capacity and increasing infrastructure quality will lead to improvements in the freight transport industry. In addition, improvements in specific modes of transport can change the transport market along corridors, resulting in modal shift.

Among the development corridors, A: Central North-South Corridor is shown to be the main freight transport corridor in Myanmar, because between Yangon and Mandalay, carrying 41.3 million ton-km of freight traffic per day; this accounts for 48% of all freight movement generated in Myanmar. In addition to this corridor, part of B: East-West Corridor (Yangon – Hpa An - Myawaddy), C: Northern Corridor (Mandalay – Muse), part of K: Western North – South Corridor (Yangon – Pyay – Magway) are major freight transport corridors in the country.

Table 2 Freight Demand and Modal Share by Development Corridor

Development Corridor	Section	Code	2013 Freight demand (million ton-km)	% of traffic demand along corridor	Modal Share (ton-km) in 2013		
					Road	Rail	River
A. Central North-South Corridor	Yangon-Nay Pyi Taw	A1	23.3	27%	93%	7%	0%
	Nay Pyi Taw- Mandalay	A2	15.4	18%	92%	8%	0%
	Mandalay - Myitkyna	A3	2.6	3%	67%	13%	20%
B. East - West Corridor	Yangon - Hpa-An - Myawaddy	B1	10.0	12%	95%	5%	0%
	Mawlamyine - Dawei	B2	0.4	0%	92%	8%	0%
C. Northern Corridor	Mandalay - Muse	C1	11.1	13%	98%	2%	0%
D. Mandalay - Tamu Corridor	Mandalay - Tamu	D1	1.4	2%	75%	7%	18%
E. Second East - West Corridor	Tachilek - Meiktila - Kyaukpyu	E1	2.4	3%	97%	3%	0%
G. East - West Bridging Corridor	Hpasawing - Pyay	G1	0.1	0%	100%	0%	0%
	Loikaw - Magway	G2	1.0	1%	100%	0%	0%
H. Delta Area Network	Yangon - Pathein	H1	1.4	2%	52%	0%	48%
	Pathein - Hinthada	H2	0.2	0%	97%	3%	0%
J. Southern Area Development Corridor	Thanbyuzayat - Hpayarhonesu	J1	0.0	0%	-	-	-
	Dawai - Thai Border	J2	0.0	0%	100%	0%	0%
	Dawei - Kawthaung	J3	0.1	0%	100%	0%	0%
K. Western North-South Corridor	Yangon - Pyay - Magway	K1	8.8	10%	61%	6%	33%
	Magway - Mandalay	K2	2.1	2%	12%	8%	80%
L. Eastern North - South Corridor	Bilin - Loikaw	L1	0.2	0%	100%	0%	0%
	Loikaw - Nawngkho	L2	0.1	0%	97%	3%	0%

Passenger Transport Demand

The corridor-based transport infrastructure development also contributes to the improvement of passenger transport by reducing travel time and costs. It also provides opportunities for diversified transport businesses/services along the corridor and improved passenger comfort and safety. The estimated demand in 2013 suggests the Corridor A: Central North-South Corridor, should be designated as the main passenger transport corridor in Myanmar, particularly between Yangon and Mandalay, which carry 44 million passenger-kilometres per day and accounts for 55% of all passenger demands (in terms of passenger-kilometres) generated in Myanmar. In addition to this corridor, B: East-West Corridor (Yangon ~ Hpa-An ~ Myawaddy) is another major passenger transport corridor.

Table 3 Passenger Demand and Modal Share by Development Corridor

Development Corridor	Section	Code	2013 Traffic demand (million person-km)	% of traffic demand along corridor	Modal Share				
					Air	Car	IWT	Rail	Bus
A. Central North-South Corridor	Yangon-Nay Pyi Taw	A1	21.6	30%	1%	13%	0%	6%	80%
	Nay Pyi Taw- Mandalay	A2	14.4	20%	0%	15%	0%	14%	70%
	Mandalay - Myitkyna	A3	6.8	5%	8%	10%	10%	60%	13%
B. East - West Corridor	Yangon - Hpa-An - Myawaddy	B1	7.8	12%	0%	23%	0%	14%	64%
	Mawlamyine - Dawei	B2	0.5	1%	0%	22%	0%	10%	68%
C. Northern Corridor	Mandalay - Muse	C1	4.0	5%	0%	41%	0%	21%	38%
D. Mandalay - Tamu Corridor	Mandalay - Tamu	D1	1.9	4%	2%	22%	0%	11%	65%
E. Second East - West Corridor	Tachilek - Meiktila - Kyaukpyu	E1	4.1	6%	5%	26%	0%	10%	58%
G. East - West Bridging Corridor	Hpasawing - Pyay	G1	0.0	0%	0%	0%	0%	0%	100%
	Loikaw - Magway	G2	2.1	0%	17%	0%	0%	46%	37%
H. Delta Area Network	Yangon - Pathein	H1	3.9	5%	1%	24%	14%	0%	61%
	Pathein - Hinthada	H2	0.6	1%	0%	24%	0%	17%	59%
J. Southern Area Development Corridor	Thanbyuzayat - Hpayarhonesu	J1	0.0	0%	0%	100%	0%	0%	0%
	Dawai - Thai Border	J2	0.0	0%	0%	46%	0%	0%	54%
	Dawei - Kawthaung	J3	0.9	1%	87%	9%	0%	0%	4%
K. Western North-South Corridor	Yangon - Pyay - Magway	K1	6.2	5%	0%	22%	0%	23%	55%
	Magway - Mandalay	K2	1.8	2%	1%	9%	0%	45%	45%
L. Eastern North - South Corridor	Bilin - Loikaw	L1	0.0	0%	0%	0%	0%	0%	100%
	Loikaw - Nawngghko	L2	0.2	0%	0%	17%	0%	79%	4%

Traffic Volume vs. Capacity

The importance and urgency of corridor development can be assessed by comparing the traffic volume (demand) with capacity (supply). Where the corridor V/C ratio is close to or exceeds 1.0, transport capacity for this corridor should be increased, or demand should be limited so as to not excessively exceed capacity.

The projected V/C ratios, as shown in Table 5.4, indicate how urgent improvement is required for capacity expansion. The corridors that require urgent capacity expansion include A: Central North-South Corridor (Yangon – Nay Pyi Taw – Mandalay), B: East-West Corridor (Yangon – Hpa An – Myawaddy), K: Western North-South Corridor (Yangon – Pyay – Magway) for both passenger and freight, C: Northern Corridor (Mandalay – Muse) for freight traffic and H: Delta Area Network (Yangon – Pathein) for passenger traffic.

Table 4 Volume Capacity Ratio by Development Corridor

Development Corridor	Section	Code	Freight Volume Capacity Ratio	Passenger Volume Capacity Ratio
A. Central North-South Corridor	Yangon-Nay Pyi Taw	A1	1.09	1.30
	Nay Pyi Taw- Mandalay	A2	1.09	1.49
	Mandalay - Myitkyna	A3	0.42	0.81
B. East - West Corridor	Yangon - Hpa-An - Myawaddy	B1	1.81	1.98
	Mawlamyine - Dawei	B2	0.16	0.09
C. Northern Corridor	Mandalay - Muse	C1	2.14	0.87
D. Mandalay - Tamu Corridor	Mandalay - Tamu	D1	0.19	0.48
E. Second East - West Corridor	Tachilek - Meiktila - Kyaukpyu	E1	0.18	0.32
G. East - West Bridging Corridor	Hpasawing - Pyay	G1	0.03	0.01
	Loikaw - Magway	G2	0.12	0.51
H. Delta Area Network	Yangon - Pathein	H1	0.67	1.45
	Pathein - Hinthada	H2	0.08	0.31
J. Southern Area Development Corridor	Thanbyuzayat - Hpayarhonesu	J1	0.00	0.00
	Dawai - Thai Border	J2	0.00	0.00
	Dawei - Kawthaung	J3	0.01	0.09
K. Western North-South Corridor	Yangon - Pyay - Magway	K1	1.67	1.05
	Magway - Mandalay	K2	0.94	0.60
L. Eastern North - South Corridor	Bilin - Loikaw	L1	0.03	0.01
	Loikaw - Nawngkho	L2	0.02	0.02

High Priority Corridors

The evaluation indicators in assessing the priority include “connectivity” between growth centres (a corridor having connection with a larger growth centre is given a high score), “contribution” to regional economy (a corridor having a larger existing and/or future GRDP generated in the sphere of influence along the corridor is given a high score), “traffic demand” (a corridor of higher traffic demand is given a high score) and “investment efficiency” (a corridor showing a higher volume capacity ratio is given a high score).

Each evaluation indicator ranges from 1 (low priority) to 5 (high priority) and a consolidated evaluation is made by averaging the score of each evaluation indicator.

Table 6.5 presents assessment results for each corridor and indicates development corridors of first priority, including:

- A: Central North-South Corridor (Yangon – Nay Pyi Taw – Mandalay)
- B: East-West Corridor (Yangon – Hpa An- Myawaddy)
- C: Northern Corridor (Mandalay – Muse)

K/F: Western North-South Corridor (Yangon – Pyay – Magway)

H: Delta Area Network

Table 5 Multi-criteria Analysis and Indicted Priority Development Corridors

Development Corridor	Section	Code	Growth Center	Contribution (Economy)	Investment Impact (Traffic)	Investment Efficiency	Average Score
A. Central North-South Corridor	Yangon-Nay Pyi Taw	A1	5	5	5	5	5.0
	Nay Pyi Taw- Mandalay	A2	5	3	5	5	4.5
	Mandalay – Myitkyna	A3	4	4	2	2	3.0
B. East - West Corridor	Yangon - Hpa-An – Myawaddy	B1	4	5	4	3	4.0
	Mawlamyine – Dawei	B2	3	1	1	1	1.5
C. Northern Corridor	Mandalay – Muse	C1	4	3	3	4	3.5
D. Mandalay - Tamu Corridor	Mandalay – Tamu	D1	4	4	2	1	2.8
E. Second East - West Corridor	Tachilek - Meiktila – Kyaukpyu	E1	3	4	2	1	2.5
G. East - West Bridging Corridor	Hpasawing – Pyay	G1	3	1	1	1	1.5
	Loikaw – Magway	G2	3	2	1	1	1.8
H. Delta Area Network	Yangon – Patheingyi	H1	4	4	3	4	3.5
	Patheingyi – Hinthada	H2	3	1	1	1	1.5
J. Southern Area Development Corridor	Thanbyuzayat – Hpayarhonesu	J1	3	1	1	1	1.5
	Dawai - Thai Border	J2	3	1	1	1	1.5
	Dawei – Kawthaung	J3	3	1	1	1	1.5
K. Western North-South Corridor	Yangon - Pyay – Magway	K1	4	5	3	4	4.0
	Magway – Mandalay	K2	4	4	2	3	3.3
L. Eastern North - South Corridor	Bilin – Loikaw	L1	3	1	1	1	1.5
	Loikaw – Nawngkhko	L2	3	1	1	1	1.5

■ First priority corridor

■ Second priority corridor

Source: JICA Study Team

6.3 Corridor-based Transport Infrastructure Development

Myanmar continues to grow fastest along the economic corridors where industry and commerce cluster, where connections to regional/state administrative capitals are strong and where major growth centres link into regional networks in Thailand, India, China and Bangladesh. Additionally, improvements of international gateways such as Yangon ports, Dawei port, international airports, and regional international airports are similarly important investments. Further development of these corridors and gateways must also consider the development of strategic employment - generating land use activities such as industrial zones (manufacturing) and Special Economic Zones.

While economic opportunities are promising, the development of these economic corridors present technical challenges, especially in terms of improving accessibility to rural regions, including management of road quality, cross-border facilities, landscape variations that constrain implementation, increased traffic flows, etc. While the MYT-Plan analysis indicates investment in corridors will yield returns, additional studies and data are needed to fully assess the potential of these economic corridors.

Generic Policy in Provision of Transport Services

Table 6.6 presents the generic requirements for transport services in response to the characteristics of each identified corridor, in terms of demographic condition, dominant industrial activities, scale of socio-economic activities, and physical conditions (distance between neighbouring centres, geographic conditions, etc.).

Table 6 Transport Demand and Needs of Development Corridors and Desired Mode of Transport Provided along Development Corridors

Development Corridor	Between National Growth Centres	Between National and Regional Growth Centres	Between Regional Growth Centres
Distance	300-600 km	100-400km	100-200km
Population of center city	1 - 8 million	200,000-500,000	100,000-300,000
Transport Demand and Characteristics	Over 100 mil pax-km per day	17 mil pax-km per day	3 mil pax-km per day
	Over 100 mil ton-km per day	20 mil ton-km per day	6 mil ton-km per day
	<ul style="list-style-type: none"> • Frequent business trip • Frequent and large freight transport demand • International freight movement (container) • Visitors from overseas • Exceed the existing traffic capacity along the corridor shortly 	<ul style="list-style-type: none"> • Frequent business trip (HQs and branch, etc.) • Freight distribution to/from national centres (Dry port / ICD – and centres) • Special purpose trip such as tourism (ex. Mandalay – Bagan) 	<ul style="list-style-type: none"> • Occasional business trip between neighbouring regional centres • Passenger and commodity movement within a limited sphere of influence.
Transport Needs	<ul style="list-style-type: none"> • High speed (P) • High capacity (F/P) • High frequency (F/P) • Redundancy (F/P) • Dedicated network/service (F) • Regular and punctual operation (F/P) • Multimode (F/P) 	<ul style="list-style-type: none"> • Regular speed (P) • Medium capacity (F/P) • Regular frequency (F/P) • Multimode (F/P) • Regional terminal facility (F/P) 	<ul style="list-style-type: none"> • Regular speed (P) • On-demand operation (F) • Vehicular traffic dominant (F/P)
Preferred transport services (Passenger)			
Expressway	A	B	B/C
Union Highway	B	A	A
High Speed Rail	A	C	D
Improved Railway	B	B/C	B/C
Inland Waterway	D	B/C	B/C
Air	A	B/C	D
Preferred transport services (Freight)			
Expressway	A	B	B/C
Union Highway	A	A	A
High Speed Rail	D	D	D
Improved Railway	A	B/C	B/C
Inland Waterway	A	B/C	B/C
Air	C	C	D

Note 1: A: Most appropriate, B: Appropriate, C: Slightly appropriate, D: Not appropriate

Note 2: P: for passenger movement, F: for freight movement

Source: JICA Study Team

Basic policy in infrastructure provision

The required generic features of transport facilities (by type of corridor) are summarized in Table 7.

Table 7 Transport Demand and Needs of Development Corridors and Desired Mode of Transport Provided along Development Corridors

Development Corridor	Between National Growth Centres	Between National and Regional Growth Centres	Between Regional Growth Centres
Proposed Infrastructure/Service			
Expressway and Highway, and related facilities	<ul style="list-style-type: none"> Expressway (4-8 lane, full-access controlled, toll) National Highway (4 -6 lane), heavy loaded road standard Bypass passing major cities Faster access to international nodes (ports and int'l airport) Logistics hub (dry port, ICD) Passenger terminal (mixed use building) Road monitoring and management system (ITS, etc) Road safety / emergency facilities Roadside station (Michi no Eki) 	<ul style="list-style-type: none"> Expressway (spur line, toll) National Highway (4 – 6 lane), heavy loaded road standard Freight terminal (rail and truck ICD) Regional Roads (2 - 4 lane) Passenger terminal (bus) Cross boarder facilities (one-stop service) Roadside station (Michi no Eki) 	<ul style="list-style-type: none"> National Highway (2 - 4 lane) Regional Roads (2 - 4 lane) Missing link improvement Passenger terminal (bus) Roadside station (limited)
HSR and Rail	<ul style="list-style-type: none"> High-speed Passenger Rail (HSR) Airport Rail Access Improved (faster) passenger rail Container Wagon (40ft high cube) Fuel Wagon Dry port / ICD and equipment International railway (SKRL Line) Modernized train operation and control system Multi-purpose station 	<ul style="list-style-type: none"> Rail access to major nodes (city/port/airport/SEZ) Dry port Multi-purpose station 	<ul style="list-style-type: none"> NA
Maritime / Inland water Coastal	<ul style="list-style-type: none"> Deep seaport and associated facilities Navigation channel improvement and maintenance River container / freight terminal River passenger terminal Navigation aid, security and safe improvement Ship building 	<ul style="list-style-type: none"> Major ports improvement / modernization River passenger terminal improvement Navigation aid, security and safe improvement Ship building 	<ul style="list-style-type: none"> NA
Air	<ul style="list-style-type: none"> New International airport Improvement of the existing international airports Logistics/passenger terminal improvement and development Upgrade of airport terminal security New air traffic control systems Upgrade of air navigation systems Introduction of Instrument Flight Rules (IFR) Meet Open Sky Policy (P) 	<ul style="list-style-type: none"> Upgrade selected local airports to international airports Other local airport improvements/ expansion Upgrade of airport terminal security New air traffic control systems Upgrade of air navigation systems Introduction of Instrument Flight Rules (IFR) 	<ul style="list-style-type: none"> NA

Source: JICA Study Team

Proposed Major Project Component

A. Central North-South Corridor

Considering the corridor developments needs and demand data, and the proposed infrastructure and services for the transport corridor between National Growth Centres, the following development strategy is proposed for the Central North-South Corridor development.

- Provide high-speed, high capacity, safe and reliable transport network and services as the primary corridor element
- Enable multi-modal transport
- Make efficient use of existing transport facilities
- Segregate inter- and intra-city traffic

Table 8 summarizes a range of priority transport projects along the Central North-South Corridor that will achieve the above corridor development strategies. These projects were developed using project assessments in ongoing transport studies.

B. East - West Corridor

Following development strategy is proposed for the East-West Corridor development.

- Improve connectivity (land transport, freight movement) between Myanmar and Thailand
- Contribute to the coastal development between Yangon and Mawlamyine
- Integrate the corridor with the new transport hub (Hanthawady International Airport)
- Use the existing transport facilities efficiently
- Provide safe/reliable transport network/service, particularly for freight transport

Table 9 summarizes a range of priority transport projects along the East-West Corridor that will achieve the above corridor development strategies.

C. Northern Corridor

Following development strategy is proposed for the Northern Corridor.

- Improve connectivity (land transport, freight movement) between Myanmar and Yunnan Province
- Contribute to the industrial development in Muse, Lashio, Mandalay / Sagain area
- Integrate the corridor with the new transport hub (Mandalay and Muse Dry port)
- Use the existing transport facilities efficiently
- Provide safe/reliable transport network/service, particularly for freight transport.

Table 10 summarizes selected road and railway sectors that will achieve the above corridor development strategies

K. Western North-South Corridor (including F. Main River Corridor)

Following development strategy is proposed for the development of the Western North-South Corridor.

- Provide high-speed, high capacity, safe and reliable transport network and services as the primary corridor element
 - Alternative routes for the central north-south corridor (to form two primary elements in the North-South network)
 - Enable multi-modal transport
 - Make efficient use of the existing transport facilities
 - Segregate inter- and intra-city traffic
-

Table 11 summarizes selected projects that will achieve the above corridor development strategies along the Western Northern Corridor

H. Delta Area Network

Given the current corridor developments needs and demand data, and the proposed infrastructure and services for the transport corridor between the Yangon metropolitan area and the Delta area, the following development strategy is recommended for the Delta Area development.

- Provide a safe and reliable transport network and related services, as the primary corridor element
- Enable intermodal-modal transport between water and land transport
- Make efficient use of existing water transport routes
- IWT to play a vital role in providing the water transport services

Table 12 summarizes selected projects that will achieve the above corridor development strategies along the Western Northern Corridor. These projects were developed using project assessments in ongoing transport studies.

The following discussion summarizes the project components of other development corridors of lower priority, listing the priority projects of the corridor.

D. Mandalay - Tamu Corridor

Table 13 summarizes a range of priority transport projects along the Mandalay - Tamu Corridor that will achieve the above corridor development strategies. These projects were developed using project assessments in ongoing transport studies.

E. Second East - West Corridor

Table 14 summarizes a range of priority transport projects along the Second East - West Corridor.

G. East - West Bridging Corridor

Table 15 summarizes a range of priority transport projects along the East - West Bridging Corridor.

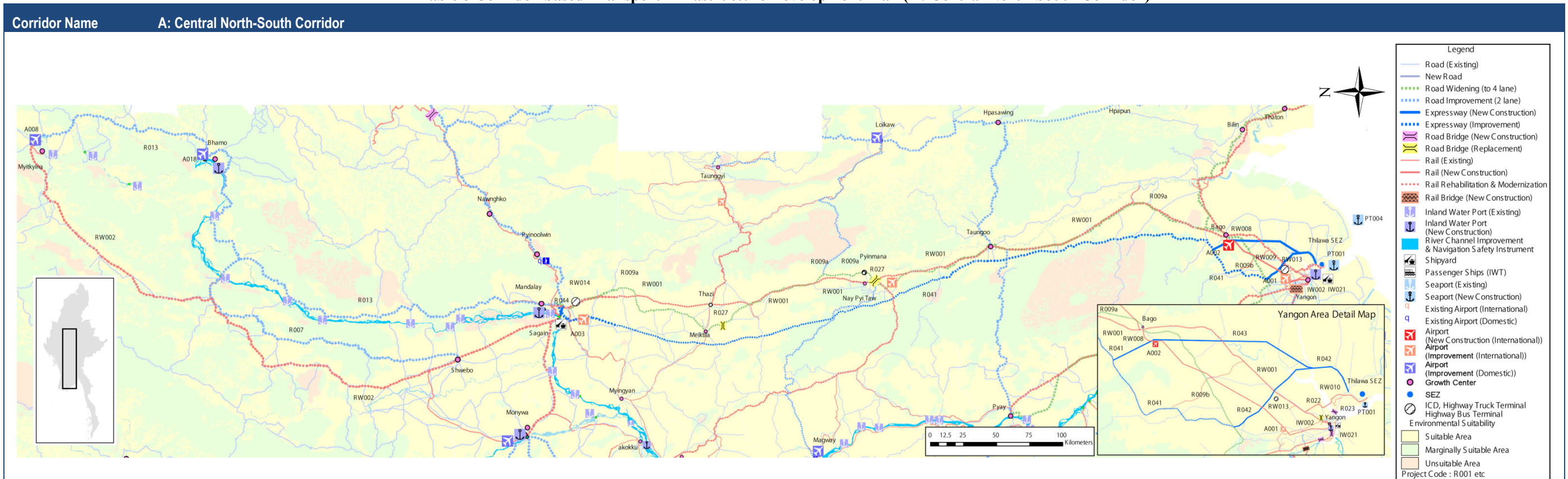
J. Southern Area Development Corridor

Table 16 summarizes a range of priority transport projects along the Southern Area Development Corridor.

L. Eastern North - South Corridor

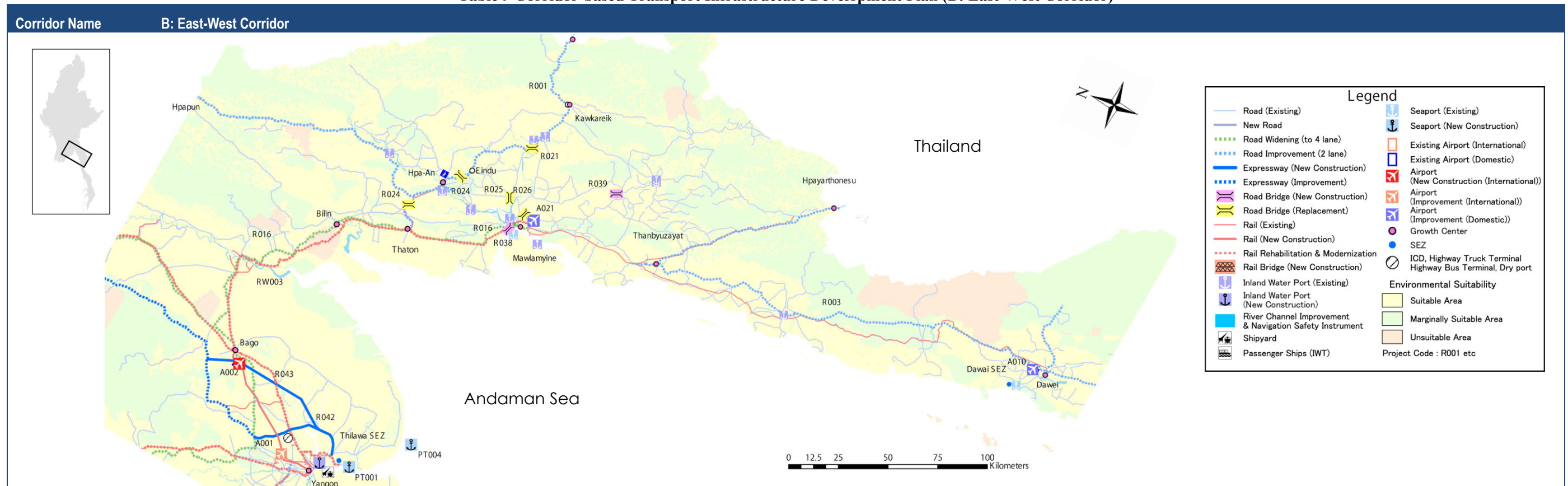
Table 17 summarizes a range of priority transport projects along the Eastern North - South Corridor.

Table 8 Corridor-based Transport Infrastructure Development Plan (A: Central North-South Corridor)



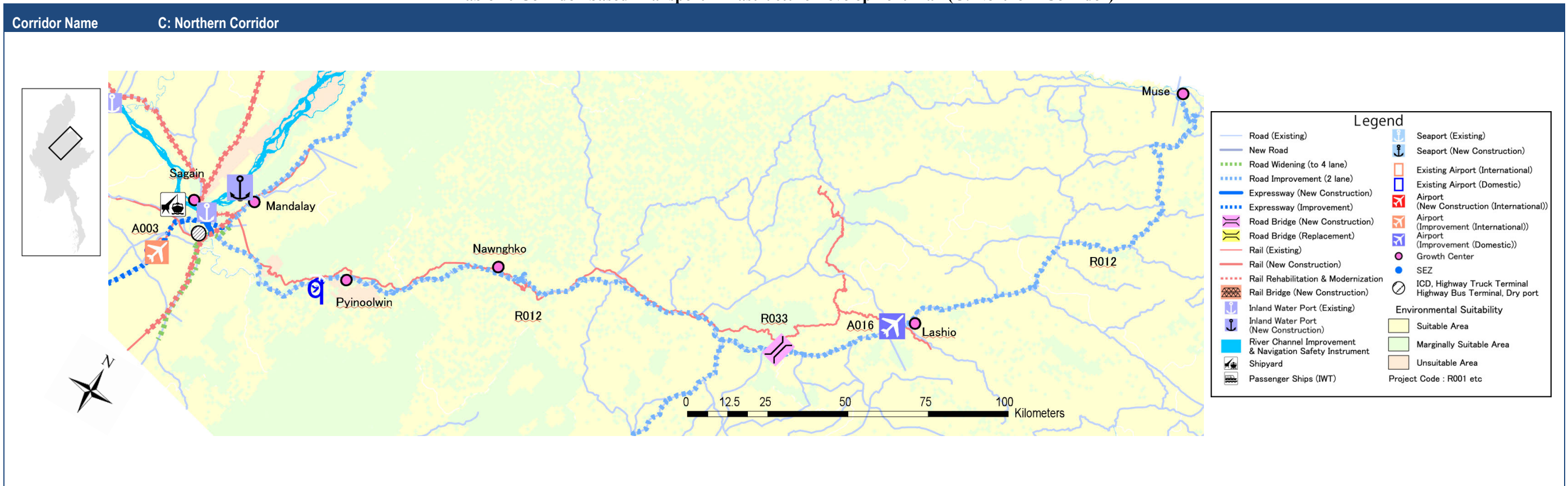
Socio-economic Condition		Modal Share	2014		2030		Selected Priority Actions / Projects	
Population (million)	25.1		Passenger (million person-km)					Road
GDP (trillion Kyat)	23.3	Cargo (million ton-km)						Road
Project Cost (Bil Kyat)			Passenger (million person-km)					Railway
		Cargo (million ton-km)						Inland Water
			Cargo (million ton-km)					Maritime
		Cargo (million ton-km)						Air

Table 9 Corridor-based Transport Infrastructure Development Plan (B: East-West Corridor)



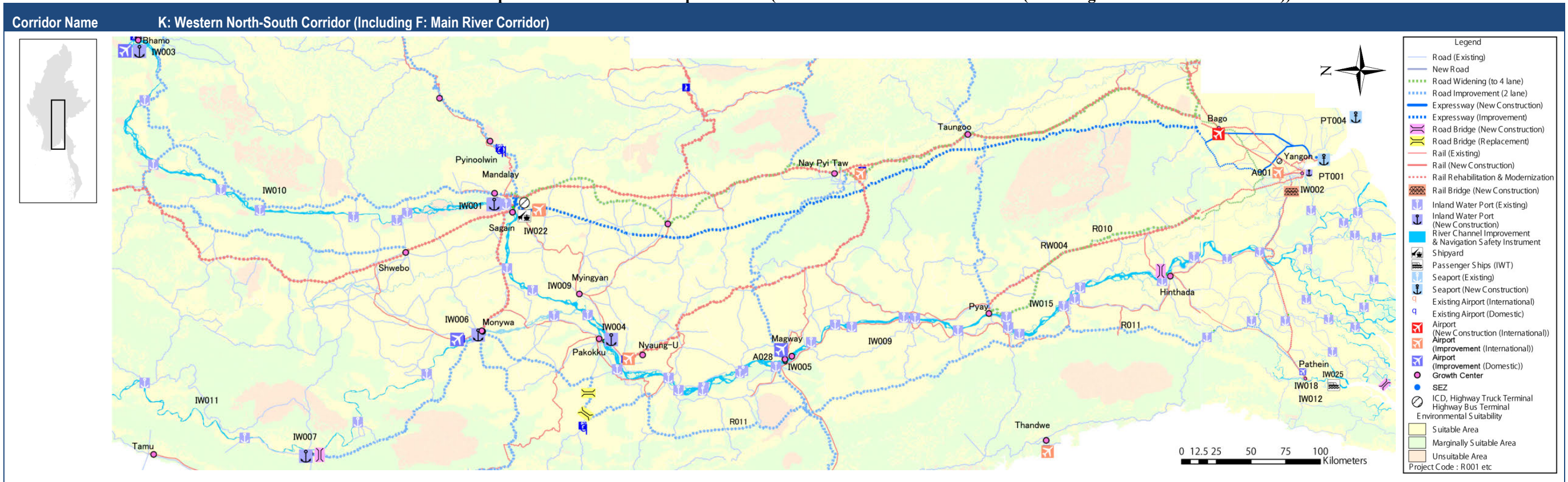
Socio-economic Condition		Modal Share	2014	2030	Selected Priority Actions / Projects		
Population (million)	16.8						
GDP (trillion Kyat)	16.6						
Project Cost (Bil Kyat)		Passenger (million person-km)			Road	Infrastructure	<ul style="list-style-type: none"> Upgrading and widening of roads along the EW Corridor Bypass at major cities along the EW corridor Heavy loaded roads/ bridges Dry port at Myawaddy
					Road	Service	<ul style="list-style-type: none"> Trade facilitation between Thailand and Myanmar (One-stop cross border facility and service, transit terminal) Roadside station (Michi no eki)
		Cargo (million ton-km)			Railway	Infrastructure	<ul style="list-style-type: none"> Rehabilitation between Bago and Mawlamyine
					Inland Water/ Maritime	Infrastructure	<ul style="list-style-type: none"> Yangon Port in Thilawa Area Development Off-shore deep seaport at the Yangon River mouth Mawlamyine port improvement Kalegawk port development Dawei port development
					Air	Infrastructure	<ul style="list-style-type: none"> Introduction of EDI (Port-MIS) Yangon Int'l Airport improvement Dawei Airport improvement (major domestic airport) Mawlamyine Airport improvement (domestic airport, PTB, TRW, TWY)
					Air	Service	<ul style="list-style-type: none"> A series of navigation modernization such as IFR

Table 10 Corridor-based Transport Infrastructure Development Plan (C: Northern Corridor)



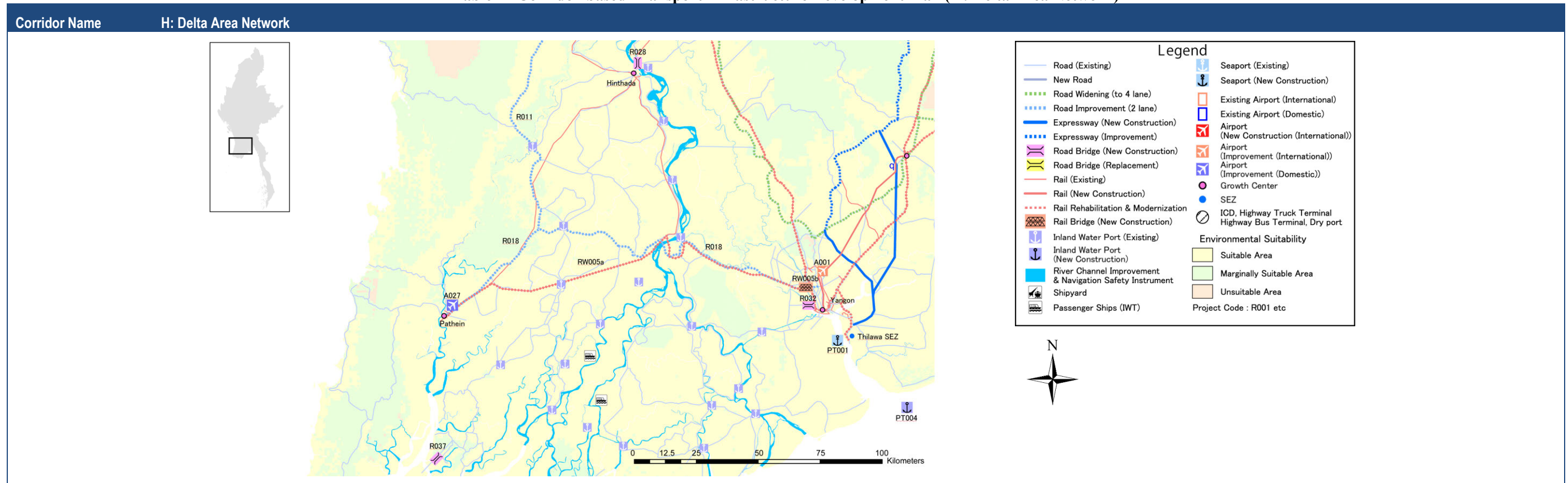
Socio-economic Condition		Modal Share	2014	2030	Selected Priority Actions / Projects	
Population (million)	6.0					
GDP (trillion Kyat)	4.5					
Project Cost (Bil Kyat)		Passenger (million person-km)			Road	<ul style="list-style-type: none"> Improvement of Mandalay – Lashio – Muse Road Dry port at Muse A series of bridge improvement
					Cargo (million ton-km)	
		Air	<ul style="list-style-type: none"> Lashio Airport Improvement (domestic: PAPI, PTB, TWR, TWY) Mandalay Airport Improvement (international) 			
					Air	<ul style="list-style-type: none"> A series of navigation modernization such as IFR

Table 11 Corridor-based Transport Infrastructure Development Plan (K: Western North-South Corridor (Including F: Main River Corridor))



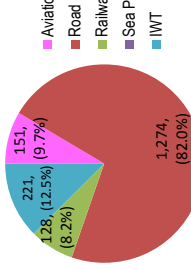
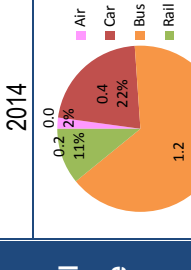
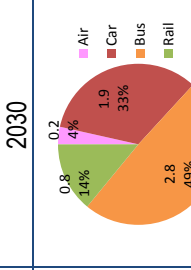
Socio-economic Condition		Modal Share	2014	2030	Selected Priority Actions / Projects	
Population (million)	19.9				Road	Infrastructure
GDP (trillion Kyat)	19.9	Passenger (million person-km)			<ul style="list-style-type: none"> Yangon – Pyay road improvement Pyay – Magway road improvement Magway – Mandalay road improvement Monywa – Patheingyi road 	
Project Cost (Bil Kyat)					Railway	<ul style="list-style-type: none"> Yangon – Pyay railway improvement Yangon – Hlawga urban rail improvement Procurement of DEMU
		Cargo (million ton-km)			Inland Water/ Maritime	<ul style="list-style-type: none"> Mandalay Port Yangon Port Pakkoku Port Magway Port Monyuwa Port
					Air	<ul style="list-style-type: none"> A series of vessel procurement Yangon International Airport Mandalay International Airport Nyaung U Airport (regional international airport) (Alternative as a regional international airport : Pakokku airport) A series of navigation modernization such as IFR

Table 12 Corridor-based Transport Infrastructure Development Plan (H: Delta Area Network)



Socio-economic Condition		Modal Share	2014	2030	Selected Priority Actions / Projects		
Population (million)	12.8						
GDP (trillion Kyat)	12.7						
Project Cost (Bil Kyat)		Passenger (million person-km)			Road	Infrastructure	<ul style="list-style-type: none"> Hinthada Bridge construction Hlaing Bridge construction Yangon – Pathein Road etc.
					Cargo (million ton-km)		
		Railway	Infrastructure	<ul style="list-style-type: none"> Yangon – Pathein railway improvement 			
		Inland Water/ Maritime	Infrastructure	<ul style="list-style-type: none"> Procurement of new vessels Connectivity improvement River channel improvement A series of river port improvements Navigation safety improvement 			
		Air	Service	<ul style="list-style-type: none"> Improve passenger and freight transport service by new vessels (IWT) 			
					Infrastructure	<ul style="list-style-type: none"> Pathein airport minor improvement 	
					Service	<ul style="list-style-type: none"> A series of navigation modernization such as IFR 	

Table 13 Corridor-based Transport Infrastructure Development Plan (D: Mandalay-Tamu Corridor)

Corridor Name		D: Mandalay-Tamu Corridor	
Socio-economic	Population (million)	8.7	
	GDP (trillion Kyat)	7.0	
	Project Cost (Bil Kyat)		
			
	Passenger (million person-km)	2014	2030
	Cargo (million ton-km)	2014	2030

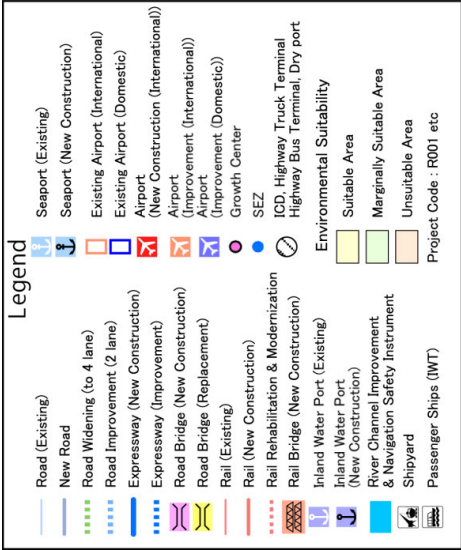
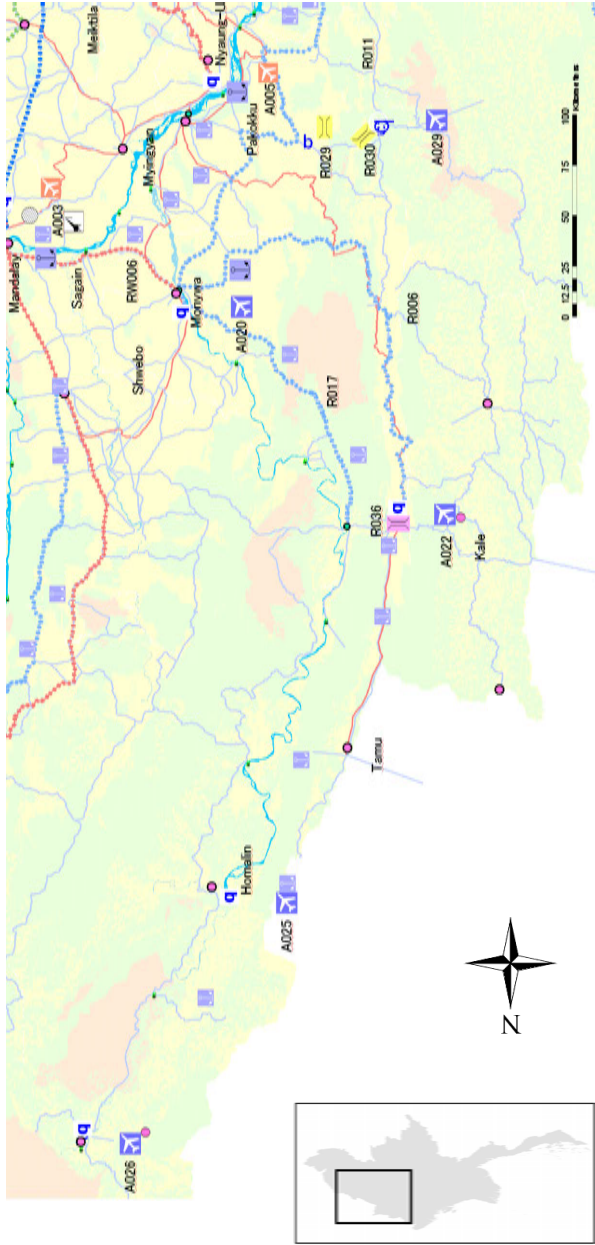


Table 14 Corridor-based Transport Infrastructure Development Plan (E: Second East-West Corridor)

Corridor Name		E: Second East-West Corridor	
Socio-economic	Population (million)	10.6	
	GDP (trillion Kyat)	7.0	
	Project Cost (Bil Kyat)		
Modal Share			
Passenger (million person-km)		2014	2030
Cargo (million ton-km)		2014	2030

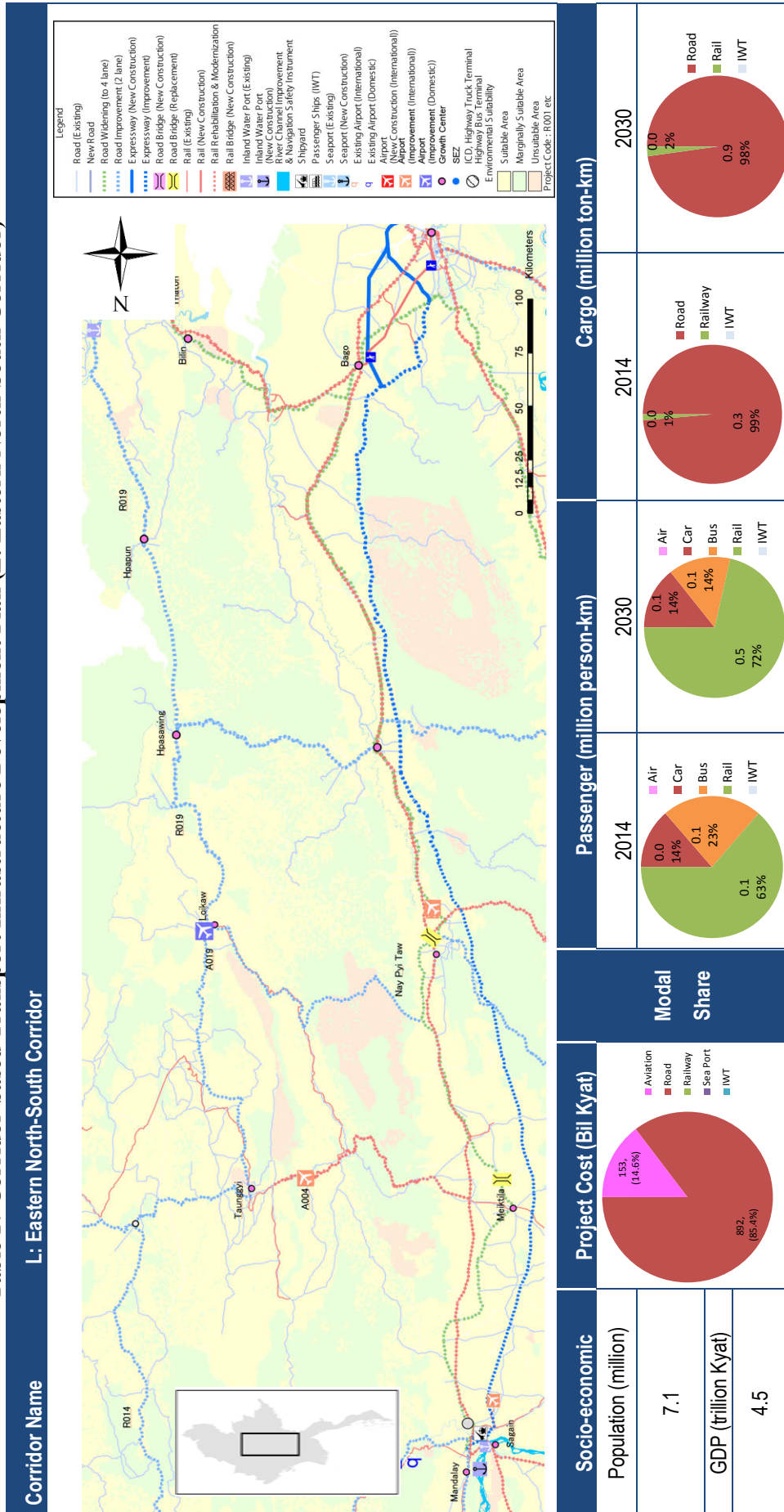
Table 15 Corridor-based Transport Infrastructure Development Plan (G: East-West Bridging Corridor)

Corridor Name		G: East-West Bridging Corridor						
Socio-economic Population (million) 7.4 GDP (trillion Kyat) 4.9	Project Cost (Bil Kyat) 	Modal Share	Passenger (million person-km) 2014 	Passenger (million person-km) 2030 	Cargo (million ton-km) 2014 	Cargo (million ton-km) 2030 		
			Legend					
			Road (Existing), New Road, Road Widening (to 4 lane), Road Improvement (2 lane), Expressway (Improvement), Expressway (New Construction), Road Bridge (Replacement), Rail (Existing), Rail (New Construction), Rail Rehabilitation & Modernization, Rail Bridge (New Construction), Inland Water Port (Existing), Inland Water Port (New Construction), River Channel Improvement & Navigation Safety Instrument, Shipyard, Passenger Ships (IWT), Seaport (Existing), Seaport (New Construction), Existing Airport (International), Existing Airport (Domestic), Airport (New Construction (International)), Airport (Improvement (International)), Airport (Improvement (Domestic)), Growth Center, SEZ, ICD, Highway Truck Terminal, Highway Bus Terminal, Dry port, Environmental Suitability, Suitable Area, Marginally Suitable Area, Unsuitable Area, Project Code : R001 etc					

Table 16 Corridor-based Transport Infrastructure Development Plan (J: Southern Area Development Corridor)

Corridor Name		J: Southern Area Development Corridor	
Socio-economic		Project Cost (Bil Kyat)	
Population (million)	3.3		
GDP (trillion Kyat)	2.3	Modal Share	
		Passenger (million person-km)	
		2014	2030
		Cargo (million ton-km)	
		2014	2030

Table 17 Corridor-based Transport Infrastructure Development Plan (L: Eastern North-South Corridor)



Chapter 7 Implementation Strategy

7.1 Proposed Project Components

The Master Plan is a companion piece to Myanmar's National Comprehensive Development Plan (NCDP), which guides overall development and growth in Myanmar. The MYT-Plan analysis informs that 48 trillion Kyat of Gross Fixed Capital Formation (GFCF) will be required to fund the needed transport sector investments including national, urban and rural transport systems, through to 2030. There are two investment programs of the MYT-Plan: a five-year plan (2014 to 2020) focusing on the national level trunk transport systems and a ten-year balanced national and urban/rural level plan (2020 to 2030). The investment for the national-level transport systems is allocated to two programs: 1) a six-year program (2014 – 2020) that will see 87% of the total GFCF in the transport sector; and 2) a ten-year program (2020 – 2030) that includes an investment allocation (pattern) that is “well-balanced” between national systems and urban/rural systems.

Table 18 Gross Fixed Capital Formation in the Transport Sector and the Investment to the National Level Transport Systems

Unit: Billion Kyat at 2013 constant prices

	2014-2020	2020-2030	2014-2030
Investment in the national level transport systems	10,144	16,544	26,688
	87%	45%	56%
Transport Sector Capital Formation	11,678	36,390	48,068

Table 19 Proposed Investment by Sectors

Unit: Billion Kyat at 2013 constant prices

Sector	Investment				2014 - 2030 (Bil. MMK)	2014 - 2030 + over 2030 (Bil. MMK)
	- Y2015	Y2016 - Y2020	Y2021 - Y2030	Over Y2030		
Air	319	1,155	922	0	2,396	2,396
Road	588	2,788	8,285	2	11,660	11,662
Rail	327	1,994	4,204	413	6,525	6,938
Seaport	501	1,872	2,354	1,796	4,727	6,523
Inland water	39	562	779	372	1,380	1,752
Total	1,774	8,371	16,544	2,582	26,688	29,271

Table 20 Investment Program (Air Sector)

Sector	Corridor	Project ID	Project	Implementation Schedule												Budget			Total Project Cost (Bil. MMK)	Contents																																					
				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Y2015 - Y2020	Y2021 - Y2030	Over Y2030																					
Aviation	A1,B1,H1,K1	A001	Yangon International Airport																																	49.0	146.0	0.0	0.0	195.0	Improvement by PPP concessionaire On-going																
	A1,B1	A002	Hanthawaddy International Airport																																	263.0	439.0	701.0	0.0	1,403.0	Construction by PPP concessionaire																
	A2,A3,C1,D1,K2	A003	Mandalay International Airport																																	0.0	21.0	0.0	0.0	21.0	Improvement by PPP concessionaire																
	E1,L2	A004	Heho International Airport																																0.0	119.0	27.0	0.0	146.0	Runway pavement, TWY, PTB, Apron, Control Tower, Administration building, AGL, Rescue and Fire-fighting, Utilities																	
	K2,D1	A005	Nyaung U International Airport (Alt Pakokku)																																0.0	88.0	19.0	0.0	107.0	Runway pavement, TWY, PTB, Apron, Control Tower, Administration building, AGL, Rescue and Fire-fighting, Utilities																	
	Other	A006	Thandwe International Airport																																0.0	46.0	11.0	0.0	57.0	Runway pavement, TWY, PTB, Apron, Control Tower, Administration building, AGL, Rescue and Fire-fighting, Utilities																	
	E1	A007	Tachileik Airport (major domestic)																																0.0	54.0	22.0	0.0	76.0	Runway, PTB, Apron, TWY, RWY Renewal of PAPI, SALS																	
	A3	A008	Myitkyna Airport (major domestic)																																0.0	17.0	7.0	0.0	24.0	Installation of PAPI, SALS Expansion of PTB, Renewal of RWY, TWY, Apron Lights																	
	E1	A009	Sitwue Airport (major domestic)																																0.0	15.0	6.0	0.0	21.0	Extension of runway and apron, fire-fighting, renewal of SALS/PAPI/TWY/Apron lights																	
	B2,J2,J3	A010	Dawei Airport (major domestic)																																0.0	26.0	11.0	0.0	37.0	Relocation of apron, TWY, fire-fighting engine, expansion of apron, renewal of RWY lights																	
	J2,J3	A011	Myeik Airport (major domestic)																																0.0	32.0	13.0	0.0	45.0	Expansion of Apron and PTB Renewal of PAPI, RWY, TWY, Apron Lights																	
	J3	A012	Kawthoung Airport																																0.0	6.0	3.0	0.0	9.0	PTB, Apron, Taxiway																	
	Other	A013	Puao Airport																																0.0	5.0	2.0	0.0	7.0	PTB, Apron, Taxiway																	
	E1	A014	Amn Airport																																0.0	5.0	2.0	0.0	7.0	PTB, Apron, Taxiway PAPI, SALS																	
	E1	A015	Kyaukphyu Airport																																0.0	6.0	2.0	0.0	8.0	PTB, Apron, Taxiway PAPI, RTIL, SALS																	
	C1	A016	Lashio Airport																																0.0	5.0	2.0	0.0	7.0	PTB, Apron, Taxiway PAPI, SALS																	
	E1	A017	Kengtung Airport																																0.0	4.0	1.0	0.0	5.0	PTB, Apron, Taxiway																	
	A3	A018	Bhamo Airport																																0.0	6.0	3.0	0.0	9.0	PTB, Apron, Taxiway																	
	E1,G2,L1,L2	A019	Loikaw Airport																																0.0	5.0	2.0	0.0	7.0	PTB, Apron, Taxiway PAPI, RTIL, SALS																	
	D1	A020	Monywar Airport																																0.0	5.0	2.0	0.0	7.0	PTB, Apron, Taxiway PAPI, RTIL, SALS																	
	B1,B2,J1	A021	Mawlamyine Airport																																0.0	1.0	1.0	0.0	2.0	Minor improvement																	
	D1	A022	Kalay Airport																																0.0	3.0	1.0	0.0	4.0	PTB, Apron, Taxiway SALS																	
	J3	A023	Bokpyinn Airport																																0.0	5.0	2.0	0.0	7.0	PTB, Apron, Taxiway PAPI, RTIL, SALS																	
	E1	A024	Mong Hsat Airport																																0.0	1.0	1.0	0.0	2.0	PTB, Apron, Taxiway PAPI, RTIL, SALS																	
	D1	A025	Hommalin Airport																																0.0	4.0	1.0	0.0	5.0	PAPI, RTIL, SALS																	
	D1	A026	Kantti Airport																																0.0	4.0	1.0	0.0	5.0	PTB, Apron, Taxiway PAPI, RTIL, SALS																	
	H1	A027	Patheingyi Airport																																0.0	1.0	1.0	0.0	2.0	Minor improvement																	
	E1,G2,K1,K2	A028	Magway Airport																																0.0	1.0	1.0	0.0	2.0	Minor improvement																	
	K1,K2,D1	A029	Kyaikto Airport																																0.0	1.0	1.0	0.0	2.0	PAPI, RTIL, SALS																	
	Other	A030	Coco Island Airport																																0.0	1.0	1.0	0.0	2.0	PAPI, RTIL, SALS																	
	Common	A031	Soft Component																																5.0	80.0	75.0	0.0	160.0	A series of projects for improvement of CNS/ATM systems (refer to the technical note on the aviation sector)																	
	Common	A032	Soft Component																																	2.0	3.0	0.0	0.0	5.0	A series of TA and other actions for DCA reorganization (refer to the technical note on the aviation sector)																
			Total																																	319	1,155	922	0	2,396																	

Projects in the first priority corridor
Projects outside the priority corridor, but of higher priority (projects in the regional centers, etc.)
Projects in the second priority corridor

Table 21 Investment Program (Road Sector)

Sector	Corridor	Project ID	Project	Implementation Schedule												Budget			Total Project Cost (Bil. MMK)	Contents																						
				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040									
	B1	R001	Thaton - Eindu - Kawkaek - Myawaddy Road																																			0.0	192.0	0.0	0.0	L: 198km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)
	J1	R002	Three Pagoda Pass																																			0.0	101.0	0.0	0.0	L: 104km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)
	B2, J3	R003	Thabzayay - Dawei - Myelik - Kawthong Road																																			0.0	907.0	0.0	0.0	L: 934km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)
	E1	R004	Taunggyi - Lolim - Kyaingon Road																																		110.0	548.0	0.0	0.0	L: 677km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	E1	R005	Kyaingon - Mongla Road																																		0.0	90.0	0.0	0.0	L: 93km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	D1	R006	Monywa - Pale - Gangaw - Kalaymyo Road																																		0.0	302.0	0.0	0.0	L: 311km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	A3	R007	Shwebo - Myikyina Road																																		0.0	462.0	0.0	0.0	L: 476km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	E1	R008	Minbu - Ann - Kyauktaw - Sitwe Road																																		0.0	463.0	0.0	0.0	L: 477km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	A1, A2	R009a	Bago - Mandalay Road																																		0.0	880.0	0.0	0.0	L: 804km, 4-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	A1, A2	R009b	Yangon (from toll gate) - Bago Road																																		0.0	84.0	0.0	0.0	L: 50 km, 4-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	K1	R010	Yangon - Pyay - Mandalay Road																																	0.0	1,139.0	0.0	0.0	L: 782km, 4-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	D1, K1, H1	R011	Monywa - Patheingyi Road																																	0.0	700.0	0.0	0.0	L: 721km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	C1	R012	Mandalay - Lashio - Muse Road																																	0.0	440.0	0.0	0.0	L: 459km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	A3	R013	Mandalay - Thabeikkyin - Tagaung - Bhamo Road																																		0.0	274.0	0.0	0.0	L: 282km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	L2	R014	Thibaw - Lolim Road																																	0.0	232.0	0.0	0.0	L: 239km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	J2	R015	Dawei - Phumayon Road																																	0.0	128.0	0.0	0.0	L: 132km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	B1, B2	R016	Payegyi - Mawlamyain - Thabzayay Road																																		0.0	393.0	0.0	0.0	L: 270km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)	
	D1	R017	Monywa - Yargyi - Kalewa Road																																	0.0	181.0	0.0	0.0	L: 186km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	H1	R018	Yangon - Patheingyi Road																																	0.0	124.0	0.0	0.0	L: 128km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	L1	R019	Taunggyi - Lolikaw - Hpaun - Phaa Road																																	0.0	660.0	0.0	0.0	L: 680km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	J3	R020	Tamitharyi - Mawlaung Road																																	0.0	107.0	0.0	0.0	L: 110km, 2-lane single carriageway Improvement (roughness, pavement, scholder, etc.)		
	B1	R021	Gyaing (Kawkaek) Bridge																																		0.0	21.0	0.0	0.0	Replacement L: 450m	
	Urban	R022	New Thakeka Bridge																																	0.0	15.0	0.0	0.0	Replacement L: 190m		
	Urban	R023	Bago Bridge																																	24.0	121.0	0.0	0.0	Replacement L: 3000m		
	B1	R024	Don Tha Mi and Naung Lon Bridge																																	0.0	16.0	0.0	0.0	Replacement L: 200+120m		
	B1	R025	Gyaing (Zarthayin) Bridge																																	0.0	34.0	0.0	0.0	Replacement L: 870m		
	B2	R026	Atran Bridge																																	0.0	17.0	0.0	0.0	Replacement L: 433m		
	A2	R027	2 bridges on Yangon-Mandalay Road																																	0.0	10.0	0.0	0.0	Replacement L: 100+100m		
	H1, H2	R028	Hinhata Bridge																																	0.0	141.0	0.0	0.0	Replacement L: 3620m		
	D1	R029	Yaw Chaung (Yepyay) Bridge																																	0.0	39.0	0.0	0.0	Replacement L: 1000m		
	D1	R030	Yaw Chaung (Ohn Taw) Bridge																																	0.0	29.0	0.0	0.0	Replacement L: 760m		
	Urban	R031	Dala Bridge																																	0.0	121.0	0.0	0.0	New bridge L: 1210		
	H1	R032	Hlaing River Bridge																																	0.0	58.0	0.0	0.0	New bridge L: 1200m		
	C1	R033	New Goat twin Viaduct																																	0.0	35.0	0.0	0.0	New bridge L: 910m		
	J3	R034	Tha Mouk Bridge																																	0.0	14.0	0.0	0.0	New bridge L: 350m		
	Urban	R035	Welaya Bridge																																	0.0	30.0	0.0	0.0	New bridge L: 500m		

Projects in the first priority corridor
Projects outside the priority corridor, but of higher priority (projects in the regional centers, etc.)
Projects in the second priority corridor

Table 22 Investment Program (Road Sector)(Cont.)

Sector	Corridor	Project ID	Project	Implementation Schedule												Budget			Total Project Cost (Bil. MMK)	Contents																		
				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Y2015 - Y2016	Y2016 - Y2020	Y2021 - Y2030	Over Y2030	
Road	D1	R036	Chindwin (Kalaywa) Bridge																														0.0	0.0	23.0	0.0	23.0	New bridge L: 600m
	H1	R037	Thekal Thung Bridge																														0.0	0.0	29.0	0.0	29.0	New bridge L: 760m
	B2	R038	Thanlwin (Chaugstone) Bridge																														0.0	0.0	23.0	0.0	23.0	New bridge L: 600m
	B1	R039	Chaungnikwa Bridge																														0.0	0.0	14.0	0.0	14.0	New bridge L: 360m
	Urban	R040	Thanlwin (Tarsophya) Bridge																														0.0	0.0	12.0	0.0	12.0	New bridge L: 305m
	A1	R041	Yangon - Mandalay Expressway																													193.0	483.0	0.0	0.0	676.0	Improvement (surface, alignment, safety facilities, lighting, etc.) L: 50km	
	B1	R042	Yangon City - Thilawa Port Expressway																													0.0	243.0	0.0	0.0	243.0	New expressway L: 50km	
	B1	R043	Yangon City - Hanthawaddy - Existing Expressway																														0.0	0.0	388.0	0.0	388.0	New expressway L: 80km
	A2,A3	R044	Mandalay Circular Expressway																													0.0	0.0	340.0	0.0	340.0	New expressway L: 70km	
	Other	R045	Road Asset Management Improvement																													1.0	5.0	10.0	1.0	17.0	Database development, survey, training	
	Other	R046	Road Sector Administration Improvement																													0.5	2.5	5.0	0.5	8.5	Technical assistance (TA) and training, procurement of PC etc.	
	G2	R048	Loikaw - Magway Road																													0.0	0.0	363.0	0.0	363.0	L: 380km, 2-lane single carriageway improvement (roughness, pavement, shoulder, etc.)	
G1	R049	Hepasawing - Pyay Road																													0.0	0.0	283.0	0.0	283.0	L: 300km, 2-lane single carriageway improvement (roughness, pavement, shoulder, etc.)		
				Total												329	3,068	8,264	2	11,662																		

Projects in the first priority corridor

Projects outside the priority corridor, but of higher priority (projects in the regional centers, etc.)

Projects in the second priority corridor

Table 23 Investment Program (Rail Sector)

Sector	Corridor	Project ID	Project	Implementation Schedule												Budget			Total Project Cost (Bil. MMK)	Contents																
				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
																Y2015 - Y2015	Y2016 - Y2020	Y2021 - Y2030			Over Y2030															
Railway	A1, A2	RW001	Yangon - Mandalay																												219.0	1,097.0	439.0	0.0	1,755.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	A3	RW002	Myohaung-Mythikya																												91.0	455.0	365.0	0.0	912.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	B1	RW003	Bago-Mawmyine																												0.0	183.0	183.0	0.0	366.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	K1	RW004	Yangon-Pyay																												0.0	162.0	270.0	0.0	432.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	H1	RW005a	Yangon-Pathain																												0.0	30.0	209.0	0.0	239.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	H1	RW005b	Bridge																												0.0	4.0	25.0	0.0	29.0	New rail bridge crossing the Hlaing River.
	D1	RW006	Myohaung-Monywa																												0.0	0.0	37.0	91.0	128.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	E1	RW007	Pyanbwe-Shwenyaung																												0.0	0.0	64.0	322.0	386.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	A1	RW008	Bago-Hanhanwaddy																												12.0	17.0	0.0	0.0	29.0	Spur line from Bago to Hanhanwaddy International Airport (single track)
	A1	RW009	Yangon - Hanhanwaddy																												0.0	0.0	2,000.0	0.0	2,000.0	New Airport Rail Access Project
	Other	RW010	Togyang-Thilawa																												0.0	0.0	56.0	0.0	56.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	Other	RW011	Naypyitaw - Bagan																												0.0	0.0	556.0	0.0	556.0	Railway improvement and modernization (rail track, signal and communication, level crossing, trains, etc.)
	A1	RW013	Yangon MR ICD, Workshop, etc.																												3.0	37.0	0.0	0.0	40.0	DEMU, Locomotive workshop in Ywathargyi area, New Inland Container Depot (ICD), YCDC truck terminal, etc.
	A2, A3	RW014	Mandalay MR ICD, truck terminal, etc.																												2.0	8.0	0.0	0.0	10.0	New Inland Container Depot (ICD), truck terminal, etc.
			Total																											327	1,994	4,204	413	6,938		

Projects in the first priority corridor
 Projects outside the priority corridor, but of higher priority (projects in the regional centers, etc.)
 Projects in the second priority corridor

Table 24 Investment Program (Maritime Sector)

Sector	Corridor	Project ID	Project	Implementation Schedule												Budget			Total Project Cost (Bil. MMK)	Contents																					
				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040								
																Y2015 - Y2015	Y2016 - Y2020	Y2021 - Y2030			Over Y2030																				
Sea Port	A1, B1, H1, K1	PT001	Yangon Port in Thilawa (Phase 1)																																223.0	0.0	0.0	0.0	223.0	New port construction in Thilawa area.	
	A1, B1, H1, K1	PT001a	Yangon Port in Thilawa (Phase 2)																																	10.0	500.0	44.0	0.0	554.0	New port construction in Thilawa area.
	A1, B1, H1, K1	PT001b	Yangon Port in Thilawa (Phase 3)																																	0.0	0.0	194.0	0.0	194.0	New port construction in Thilawa area.
	A1, B1, H1, K1	PT002	Yangon Port Capacity and Connectivity Improvement																																5.0	200.0	0.0	0.0	205.0	Capacity expansion of the existing Yangon port including and connectivity improvement between inland water transport and sea transport.	
	A1, B1, H1, K1	PT003	Yangon Port in Thilawa (Post Thilawa)																																0.0	0.0	388.0	97.0	485.0	New port construction in Thilawa area (south of the Thilawa SEZ).	
	A1, B1, H1, K1	PT004	Offshore Yangon River (Deep Seaport)																																0.0	0.0	728.1	1,698.9	2,427.0	New deep seaport construction at the river mouth of the Yangon River.	
	B2, J2, J3	PT006	Dawei Port																																0.0	1,000.0	1,000.0	0.0	2,000.0	New deep sea port construction in Dawei.	
	B1, B2, J1	PT007	Kalegaug Port																																10.0	39.0	0.0	0.0	49.0	New seaport construction in Kalegaug.	
	B1, B2, J1	PT008	Mawlamyaing Port																																10.0	39.0	0.0	0.0	49.0	Improvement of the existing port in Mawlamyaing.	
	H1, H2, F1	PT009	Pathain Port																																10.0	39.0	0.0	0.0	49.0	Improvement of the existing port in Pathain.	
	E1	PT011	Sittwe Port																																209.0	0.0	0.0	0.0	209.0	Port and facility improvement of the Sittwe port.	
	Common	PT013	Yangon Port Channel Navigation																																5.0	20.0	0.0	0.0	25.0	Navigation safety facilities installation.	
	Common	PT015	Law & Regulation updates and TA																																2.0	10.0	0.0	0.0	12.0	Review and update the existing laws and regulations and TA	
	Common	PT016	Statistics development and TA																																2.0	10.0	0.0	0.0	12.0	Statistics development, procurement of equipment and TA	
	Common	PT017	EDI : Yangon Port & Other ports																																15.0	15.0	0.0	0.0	30.0	EDI (Port-MIS) installation, including river ports	
				Total																															501	1,872	2,354	1,796	6,623		

Projects in the first priority corridor
 Projects outside the priority corridor, but of higher priority (projects in the regional centers, etc.)
 Projects in the second priority corridor

Table 25 Investment Program (Inland Water Transport Sector)

Sectbr	Corridor	Project ID	Project	Implementation Schedule											Budget			Total Project Cost (Bil. MMK)	Contents																				
				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026			2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Y2015 - Y2015	Y2016 - Y2020	Y2021 - Y2030	Over Y2030		
IWT	F1,F2	M001	Mandalay Port																															2.0	39.0	43.0	39.0	123.0	New river port construction in Mandalay.
	F1,H1	M002	Yangon Port (Including Connectivity)																															2.0	99.0	103.0	99.0	303.0	Port expansion for river transport including backyard facilities
	F1	M003	Bhamo Port																			Extension												0.0	41.0	26.0	26.0	93.0	New port construction in Bhamo.
	F1,F2	M004	Pakokku Port																															0.0	12.0	10.0	0.0	22.0	New port construction in Pakokku.
	F1	M005	Magway Port																															0.0	12.0	10.0	0.0	22.0	New port construction in Magway.
	F2	M006	Monywa Port																															0.0	0.0	21.0	0.0	21.0	New port construction in Monywa.
	F2	M007	Kalewa Port																															0.0	0.0	21.0	0.0	21.0	New port construction in Kalewa.
	Other	M008	Other 10 Ports construction																															0.0	0.0	87.0	58.0	145.0	New port construction in other 10 locations.
	F1,H1	M009	Yangon - Mandalay channel improvement																															4.0	61.0	61.0	61.0	187.0	Comprehensive navigation channel improvement for future container transport.
	F1	M010	Mandalay - Bhamo channel improvement																															0.0	0.0	65.0	65.0	130.0	Navigation channel improvement for all seasons.
	F2	M011	Monywa - Upstream channel improvement																															0.0	0.0	22.0	14.0	36.0	Navigation channel improvement for all seasons.
	F1,H1	M012	Ayeyarwady Delta channel improvement																															2.0	32.0	10.0	10.0	54.0	Navigation channel improvement for all seasons.
	Other	M013	Rakhaing River channel improvement																															0.0	13.0	41.0	0.0	54.0	Navigation channel improvement for all seasons.
	Other	M014	Thaniwin River channel improvement																															0.0	13.0	41.0	0.0	54.0	Navigation channel improvement for all seasons.
	F1	M015	Yangon - Mandalay Navigation safety improvement																															0.0	10.0	10.0	0.0	20.0	Navigation channel improvement for all seasons.
	F1	M016	Mandalay - Bhamo Navigation safety improvement																															0.0	8.0	12.0	0.0	20.0	Navigation channel improvement for all seasons.
	F2	M017	Monywa - Upstream Navigation safety improvement																															0.0	4.0	16.0	0.0	20.0	Navigation channel improvement for all seasons.
	F1,H1	M018	Ayeyarwady Delta Navigation safety improvement																															0.0	8.0	12.0	0.0	20.0	Installation of navigation safety systems
	Other	M019	Rakhaing River Navigation safety improvement																															0.0	0.0	20.0	0.0	20.0	Installation of navigation safety systems
	Other	M020	Thaniwin River Navigation safety improvement																															0.0	0.0	20.0	0.0	20.0	Installation of navigation safety systems
	F1,H1	M021	Dalla Shipyard modernization																															24.0	24.0	0.0	0.0	48.0	Capacity development of the existing Dalla Shipyard and modernization
	F1,F2	M022	Mandalay Shipyard modernization																															0.0	18.0	12.0	0.0	30.0	Capacity development of the existing Mandalay Shipyard and modernization
	F1,H1	M025	Ayeyarwady Delta IWT vessels																															0.0	20.0	0.0	0.0	20.0	Procurement of IWT vessels
	F1	M026	Mandalay - Upstream IWT vessels																															0.0	12.0	0.0	0.0	12.0	Procurement of IWT vessels
	F2	M027	Chindwin River IWT vessels																															0.0	3.0	2.0	0.0	5.0	Procurement of IWT vessels
	Other	M028	Rakhaing River IWT vessels																															0.0	3.0	2.0	0.0	5.0	Procurement of IWT vessels
	Other	M029	Thaniwin River IWT vessels																															0.0	3.0	2.0	0.0	5.0	Procurement of IWT vessels
	Other	M030	IWT barge and tugs																															0.0	100.0	100.0	0.0	200.0	Procurement of IWT barge and tugs.
	Common	M031	Vessel safety improvement and TA																															0.0	10.0	0.0	0.0	10.0	Vessel safety related systems installation and TA.
	Common	M032	Navigation safety improvement and TA																															3.0	7.0	0.0	0.0	10.0	Navigation safety systems installation and TA.
	Common	M033	Statistics Development																															1.0	4.0	0.0	0.0	5.0	River transport statistics development and TA.
	Common	M034	Port operation and management improvement and TA																															1.0	4.0	0.0	0.0	5.0	River port operation and management improvement and TA.
	Common	M035	Container transport system installation and TA																															0.0	2.0	10.0	0.0	12.0	Systems for river container transport and TA.
																																		39	562	779	372	1,752	

Projects in the first priority corridor
Projects outside the priority corridor, but of higher priority (projects in the regional centers, etc.)
Projects in the second priority corridor

7.2 Institutional development

The capital investment is one of the important elements in meeting future needs and stimulating growth. While, Myanmar's policies and regulations that guide and manage this investment are important facilitators.

Capable and well-resourced government stakeholders at the national and state/regional levels must support new transport initiatives. Ministries and Departments will require improved capacity to plan and implement coordinated activities. This includes human resources development through work with educational opportunities, investment in research and development, international exchanges, etc.

Regulations to govern Public Private Partnerships, foreign investment, environmental legal systems/processes, standards for freight transport, regional connectivity and cross-border facilities are just a few examples of areas where Myanmar must invest in institutions' ability to formulate and implement policy, to maximize growth opportunities.

7.3 Partnerships

Though GDP is expected to grow as much as 7% real growth per year, the heavy investment needed in the sector will require financing and experience from the international donor community, such as JICA and the private sector, including both foreign and domestic partners.

New agreements will be required for investments in major corridors, such as those with catalyst development donors like JICA, and through PPP agreements and domestic and foreign private financial resources. Myanmar will require legislation and regulations to govern PPP arrangements.

Chapter 8 MYT-Plan Report in Brief

The main report of the Myanmar's National Transport Master Plan (called "MYT-Plan") is composed of 11 Chapters that contain the elements needed to develop an Action Plan to implement the transport sector's vision to 2030. The Report begins with an Introduction that notes the opportunity and growth potential in Myanmar, if the transport sector is reformed and strengthened with legislative support. The balance of the Report, Chapters 2 through 11, include analysis, findings and recommendations that describe a path that can secure a positive future for Myanmar's transport sector.

Chapter 2 is a critical first step in realizing this future as it establishes the Socio-Economic Framework, used to supply analysis for the transport demand forecast and other elements of the MYT-Plan. This analysis is also needed to support the demand forecasts and policy strategies in later Chapters. The Socio-Economic Framework uses a cohort change methodology to analyze current demographic trends and future population estimates, both nationally and at state/region levels. The Socio-Economic Framework also includes analysis of Myanmar's Gross Domestic Product (GDP) trends at the national and state/region levels, including forecasts through to 2040. These future GDP and Gross Regional Domestic Product (GRDP) forecasts consider a number of important factors, including future population growth, necessary levels of investment to achieve certain levels of GDP growth (e.g. fixed capital formation), and the transportation experiences of Myanmar's peer countries in the ASEAN region, including Japan. A Macro Economic Framework in Chapter 2 also includes analysis of Public Private Partnerships in Myanmar's transport sector. These agreements, between government and the private sector, are critical to achieving the necessary investment levels for Myanmar's transport sector. This Chapter provides an overview of PPPs, description of the regulations that facilitate private investment in Myanmar, a comparative overview of PPP projects in peer countries, as well as a way forward in applying PPP principles to MYT-Plan recommended investments.

Chapter 3 presents an Environmental Framework, including the environmental legal systems that are currently under development in Myanmar. The Environmental Conservation Law, which is the core law for protecting and enhancing Myanmar's environmental sustainability, was issued in March 2012. The Ministry of Environmental Conservation and Forestry (MOECAF) is currently preparing Environmental Conservation Rules, Environmental Impact Assessment (EIA) Procedures and environmental quality standards with assistance from the Asian Development Bank (ADB). As of May 2013, Environmental Conservation Rules had been submitted to the President's Office and are expected to be enacted shortly; however the first two sets of regulations will require a longer implementation period.

Chapter 4 describes the scope of the National Spatial Development Framework (NSDF) and includes an overview of Government Ministries and Agencies involved in spatial planning and related legislation. This Chapter also summarizes the key objectives and policies of relevant Ministries and Agencies with an interest in land development, based on employment, economic activity, agriculture and agro-industries, industry and industrial zones, Special Economic Zones (SEZ), tourism and the environment. The Chapter also analyses aspects of urbanization, via the

proposed distribution of future populations at the state/region and Traffic Analysis Zone (TAZ) levels.

This analysis provides the basis for a future NSDF in Myanmar. The NSDF would provide a spatial development framework to support the MYT-PLAN, which would guide future transport investment at the national and state/regional levels. The NSDF would also inform key transport sector stakeholders about linkages and connectivity among their own plans, policies and programs so that stakeholders can take these forward more efficiently for future action and implementation.

Chapter 5 summarizes the current institutional framework, including the role of each Ministry and Agency related to the transport sector. This Chapter informs the base for the possible future re-organization or re-arrangement of the transport sector's planning and administration.

Chapter 6 describes the role of the ASEAN Transport Agreement and sector-wide Transport Action Plan and explores strategies and actions of all transport sectors listed in the Brunei Action Plan, including priority actions for the Myanmar Government to take by 2015.

Chapter 7 provides an overview of the Myanmar transportation sector, including roads and road transport, railway, inland waterways and maritime facilities, and aviation. For each of these transport sub-sectors includes a Technical Note with analysis of sector funding and private sector participation, planning and coordination, resources and policies needed to implement and maintain, and safety and environmental considerations.

Chapter 8 explains the MYT-Plan's demand forecast for the transport sector, developed from the existing demand and transport analysis and the socio-economic framework. This analysis is also used for numerical calculations and the proposed projects recommended in Chapter 10.

Chapter 9 provides an overview of the key transport sector issues in Myanmar's transport policies and strategies, and cites analysis by the Asia Development Bank and conducts a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis for the sector nationwide. This analysis also notes key areas for consideration in terms of planning, operations, institutions and regulatory environment, pricing and resource allocation, and human and environmental considerations. The Chapter also describes the proposals for a comprehensive Transport Sector Vision, Strategies and corresponding Actions.

Chapter 10 describes the recommended component projects, based on the proposed corridor cluster development approach and the strategies. These proposals are designed to achieve the planned transport sector Vision and Objectives.

Finally, Chapter 11 of the report summarizes financing requirement over the next fifteen years (until 2030), and includes recommended actions for the actual implementation of the MYT-Plan.