



New Yangon City

Final Master Plan Report

24 May 2019



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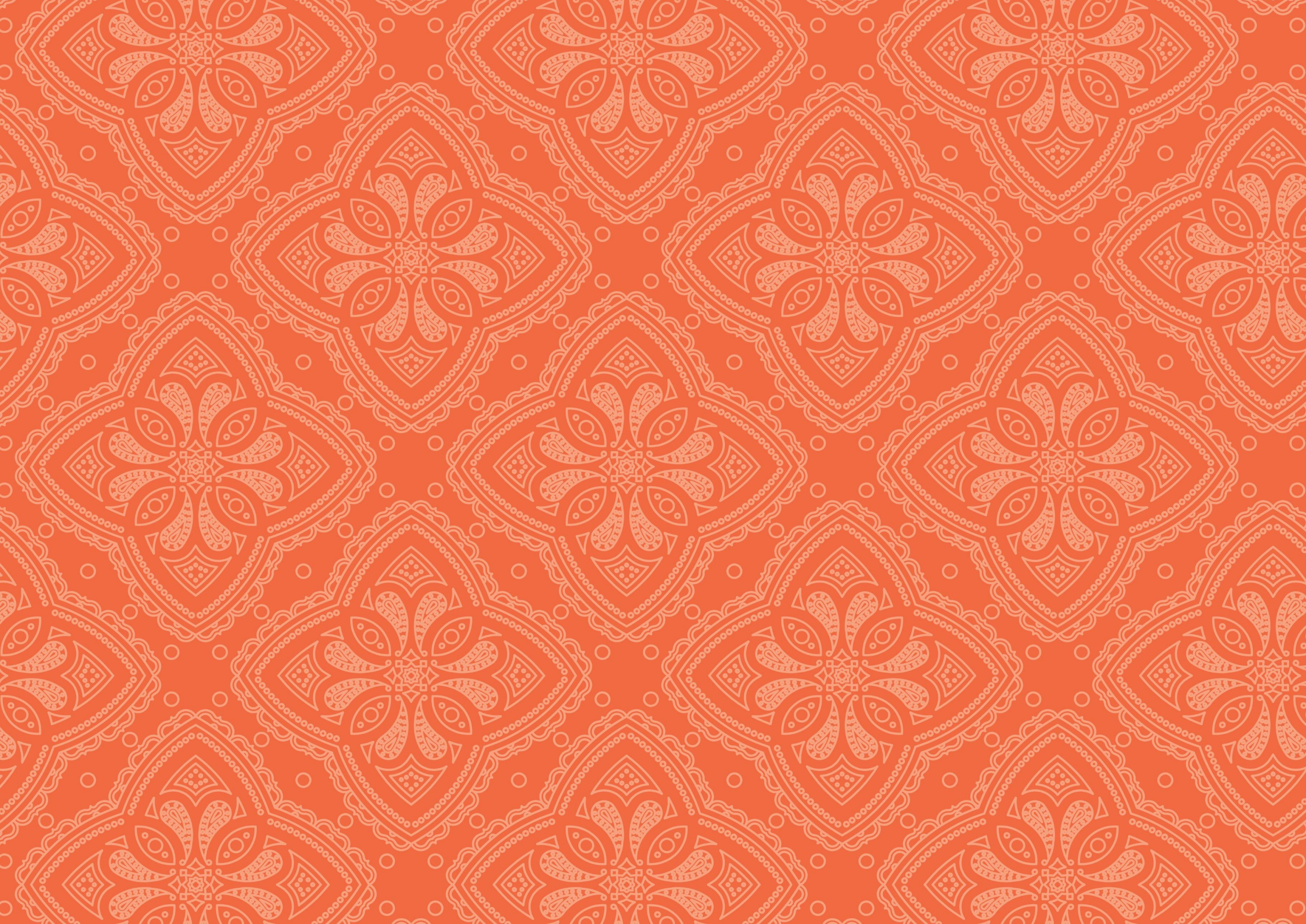
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1

Introduction

- 1.1 Project Background
- 1.2 Consultant Team
- 1.3 Project Scope

1.1 Project Background

Yangon (formerly known as Rangoon), the largest city in Myanmar is often recognized as the commercial center, ever since the capital moved to Naypyidaw in 2005. With a population of over 7.0million (Census 2014), Greater Yangon is several times larger than the next biggest city in Myanmar, Mandalay. It is anticipated that the city will continue to be the gateway of Myanmar in the foreseeable future. The country has seen an upsurge in tourism in the past two decades and needs to develop various sectors of the economy. Yangon will play a major role in this growth to attract companies and talent to its shores.

Yangon will compete with other Southeast Asian cities in the region who have had a head-start in development. However, New Yangon has the advantage of starting with a cleaner slate and harness knowledge from lessons in the past decades. Keeping the country and city's needs in the forefront, the planning for New Yangon City shall be based on a contemporary paradigm, adaptable & future-proofed, attractive to invest and serve as a catalyst for transformation in the region.

The expansion of Yangon City across the river is a strategic initiative to introduce new development land for growth. Much of the recent expansions have been towards the north closer to the airport and in the northwest. This project would be a major push towards expanding in the west in phase 1 and thereafter in the south in phase 2. A comparison of areas and population of the other cities in the region illustrates that Yangon, with the addition of New Yangon, will be similar in area. The attractiveness of Yangon in the next few decades is expected to see the population grow to similar levels as cities shown here. It is imperative that the master plan of New Yangon is able to accommodate such a capacity without compromising on sustainability and livability of the built environment.

The most critical aspect of the master plan for New Yangon is expected to be the implementation framework that allows extensive participation of the private sector in developing various facilities, amenities and public infrastructure (apart from industrial, housing and commercial areas). While some of gaps are expected to be filled by the public sector, it is imperative that the master plan framework, while allowing private enclaves, maintains a seamless public realm for physical and social connectivity in the New Yangon City.

Future projects in Yangon, such as the Hantharwaddy Airport (Bago City) and proposed multi-purpose sea port in Kawhmu township, can be considered, which will influence the regional transportation network and connectivity. The additional port at Twantay Creek will have critical synergies with the existing and new industrial areas, impacting the need for logistics and transportation. New Yangon City will open new horizons for the Yangon and the country by unlocking its development potential and creating a unique position in the region and the world.

We understand New Yangon City will have to fulfill the following key objectives:

- Position Yangon as the 'gateway' of Myanmar establishing a unique identity for the city in the region and the world
- Act as a catalyst for growth and transformation of Yangon into a City of the Future
- Cater to the growing needs of industry, housing, and commercial space contributing to the growing economy of Myanmar
- Integrate with and become a showcase for Myanmar's rich cultural diversity and heritage

New Yangon City is a major step towards the expansion of Yangon, which, while alleviating some pressure of the existing city, may create new development issues. At the onset, the issues surrounding urbanization and growth of cities will have to be addressed throughout the process of this project and further evolution of the master plan in later stages of the city.

The master plan presents a pragmatic roadmap for initiating development of Phase I of New Yangon City. It lays down a framework of the city complete with public transportation and infrastructure. There is a significant amount of flexibility built into the plan to consider alternate alignments for internal roads, public transit, and land use, but within parameters of the plan that need to respect adjacencies, future traffic conditions, and carrying capacity of infrastructure.

Future expansion of the city west of the outer ring road and south of Twantay Canal has been considered and incorporated into the fabric as well as connectivity requirements. It is acknowledged that projects and proposals in those area have not been firmed up, hence it is difficult to pin point exact requirements, however, future expansion in those areas will need to be aware of this master plan and its proposals, and integrate with the framework to develop a truly cohesive urban environment.

1.1 Project Background

The area designated for this project is approximately 88.30sqkm (21819.41 acres) of land on the west bank of Yangon River, across from the existing Yangon city.

AECOM Singapore Pte Ltd was appointed by the New Yangon Development Company Limited (NYDC) to prepare the Master Plan and Strategic Plan for the New Yangon City (NYC) in September 2018. AECOM worked closely with NYDC and relevant stakeholders for the duration of the project to deliver a comprehensive and strategic master plan. Concurrently, NYDC appointed consultants to advise on overall flood risk assessment and for transportation planning. Other consultants were appointed for environmental and social assessments.

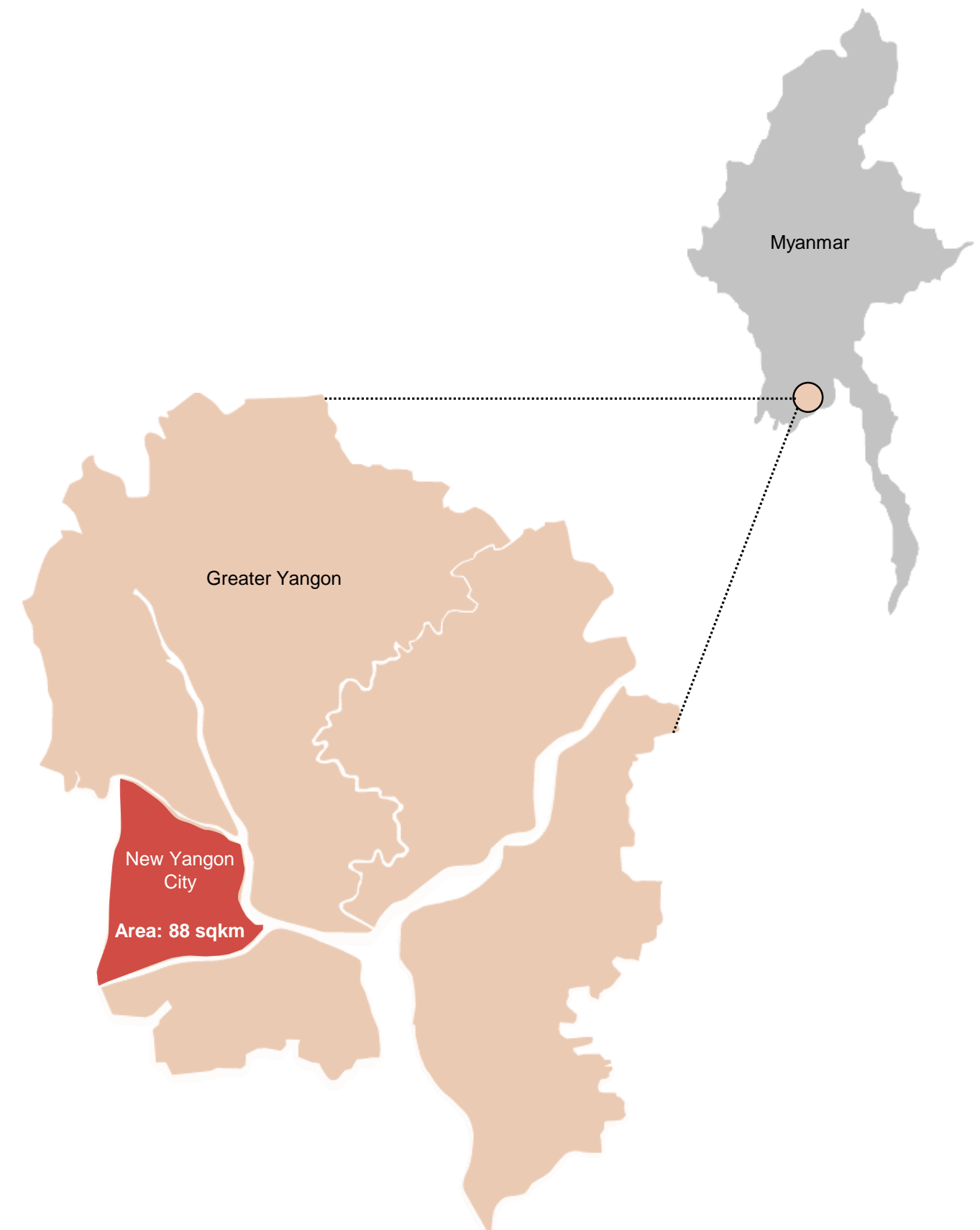
Prior to appointing AECOM, a socio-economic study was conducted for NYDC for advice on the target economic/ industrial sectors. The study advised on key considerations and strategies for the new city, and identified four key industrial sectors for early stages of the city – Garments, Furniture, Electronics, and Logistics. Most importantly, the study provided a roadmap for development of the master plan coining a tagline for the city – ‘Productive City, Liveable City’. The master plan, while adopting the principles, develops a spatial framework of development allowing for those goals, objectives, and industry sectors to thrive and prosper in NYC.

The mission is to:

‘Establish New Yangon as a hub of growth and innovation at par with other cities in Southeast Asia by harnessing local potential based on international best practices.’

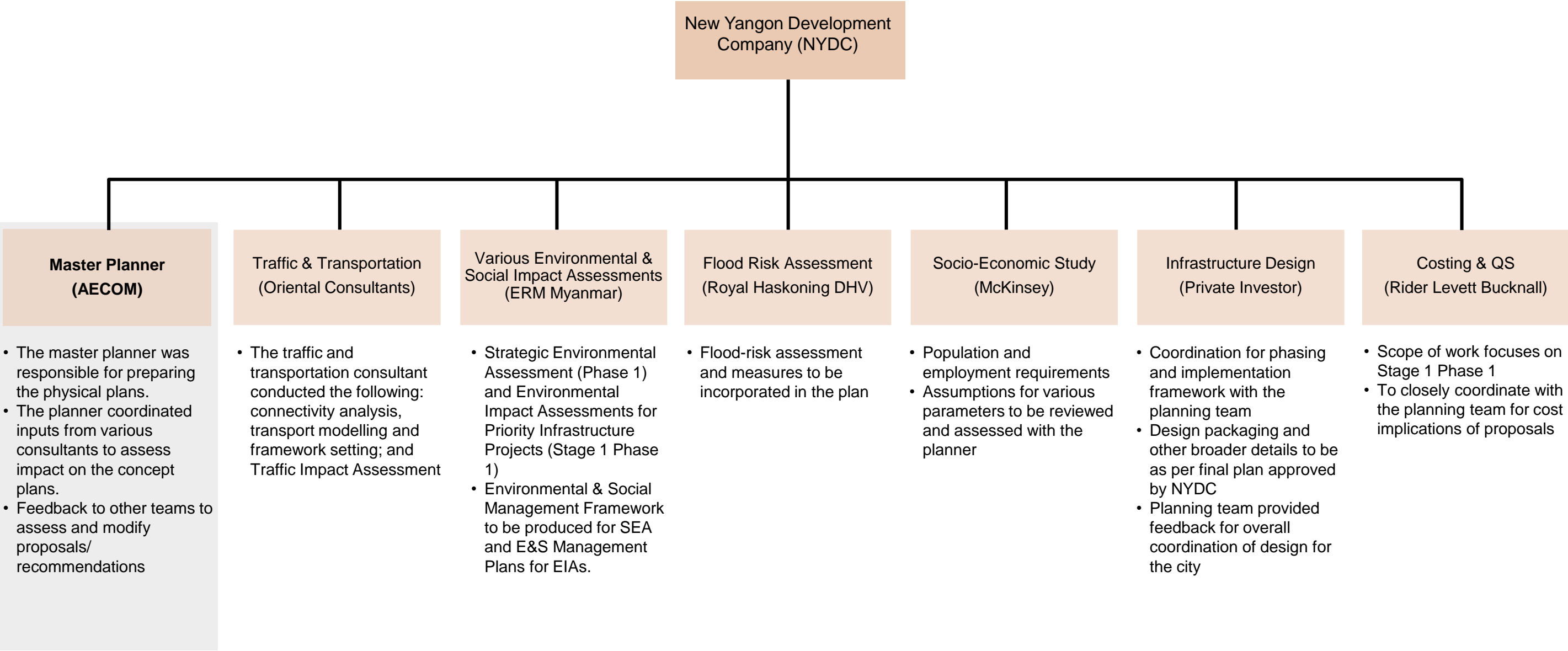
Some of the key goals of NYC include:

- Create a future ready industrial ecosystem that allows for incremental growth towards higher-order sectors
- The city should be home to over 900,000 jobs in fully built state which include primary, secondary, and tertiary sector jobs
- The implementation framework should allow participation of private sector



Location of Yangon City in Myanmar

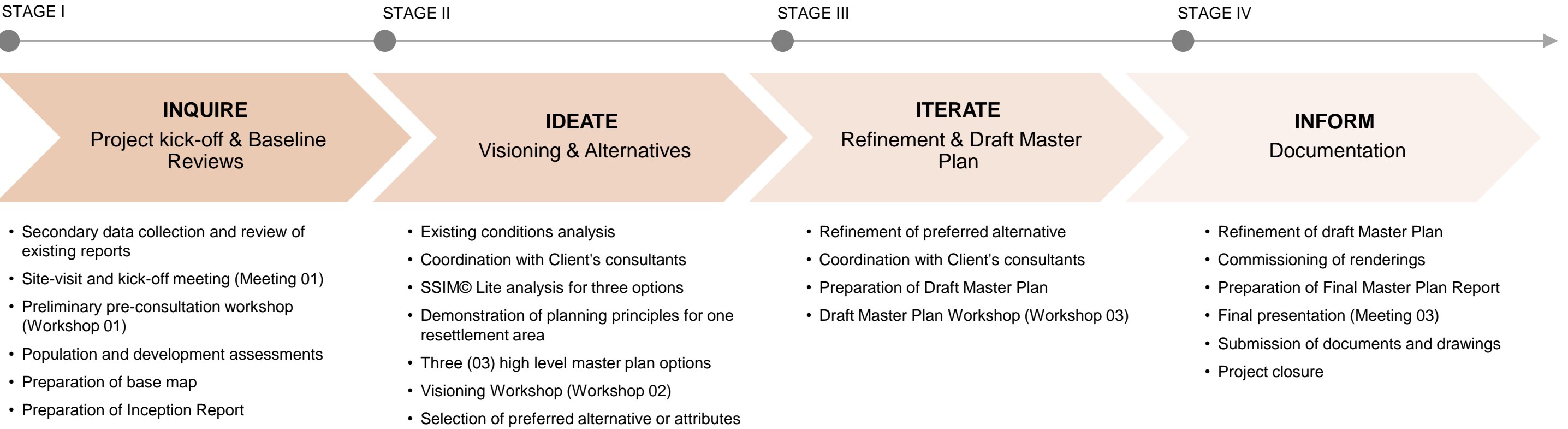
1.2 Consultant Team

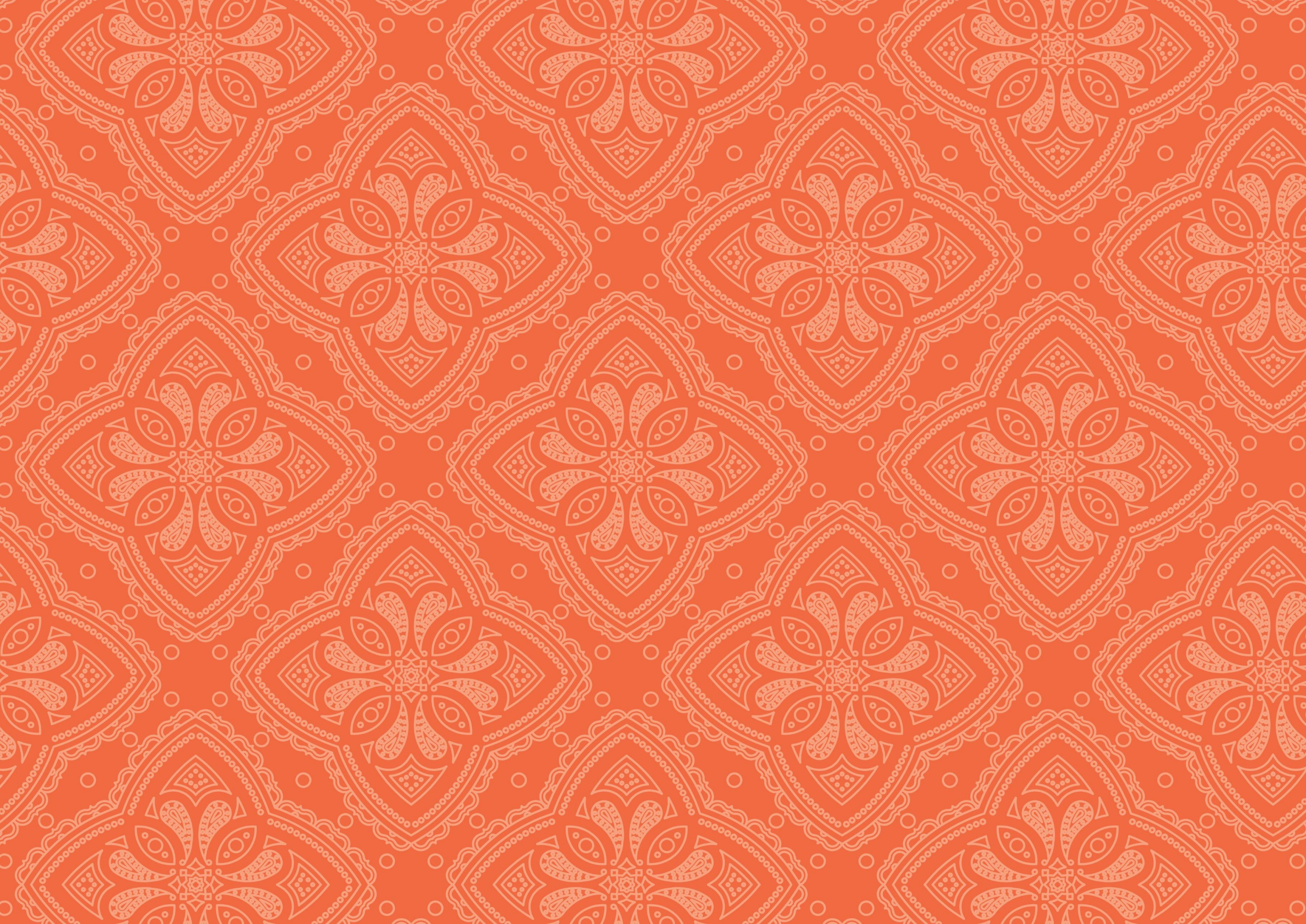


Indicative flowchart of various disciplines/ teams engaged in New Yangon City (updated as of February 2019)

1.3 Project Scope

The overall scope of work for the assignment had been sub-divided into four stages of work. The first stage aimed towards developing a comprehensive understanding of the project and key risks associated with the development. Based on this, in the second stage, three options were developed and presented to the Client and relevant stakeholders during a Visioning Workshop. The team used a proprietary SSIM© lite tool to assess the options based on selected Key Performance Indicators (KPI) that benchmarked spatial adjacencies and connectivity. The Client and stakeholders provided feedback on the options and selected a set of attributes for further refinement and development of the master plan in the third stage. The last stage brought together various inputs from all disciplines into the final master plan report.





2

Existing Conditions

This chapter studies and reviews the existing site conditions drawing critical lessons from various factors that influence the master plan. Connectivity at the regional level is critical for stitching the site to the rest of Yangon since the new city is surrounded by rivers/ canals on three sides. To the north is Pan Hlaing river that brings water from the hinterland. Yangon River in the east divides the site from existing Yangon city and currently, there are no bridges connecting to the existing city. To the south is Twantay Canal built during British rule in 1883 shortening the distance between Irrawaddy River and Yangon city. The site is connected to the existing city via the bridge over Hlaing River Road which connects to the existing highway/ future Outer Ring Road, that also delineates the western boundary of the site. At present, there is no rail based mass transit in Yangon, however, plans prepared by Japan International Cooperation Agency (JICA) in 2018 identify a number of alignments. The site can potentially be connected to those proposed alignments in future. Flooding is the primary hazard for any urban development within the site as most of the site is quite low lying. A number of existing village settlements within the site and along the periphery of Yangon River need to be integrated with future urban development, without disturbing the existing settlements. There is also a need for identifying 'resettlement land' against existing land holdings that will be a form of compensation to land owners. A comprehensive site analysis in this chapter captures key challenges and opportunities for spatial planning and for the overall master plan.

This will be delivered through:

- 2.1 Regional Context
- 2.2 Site Context
- 2.3 Environmental Conditions
- 2.4 Development Suitability Analysis
- 2.5 Benchmark Summary
- 2.6 Site Analysis

2.1 Regional Context

Global Connectivity

Centrality & Connectivity

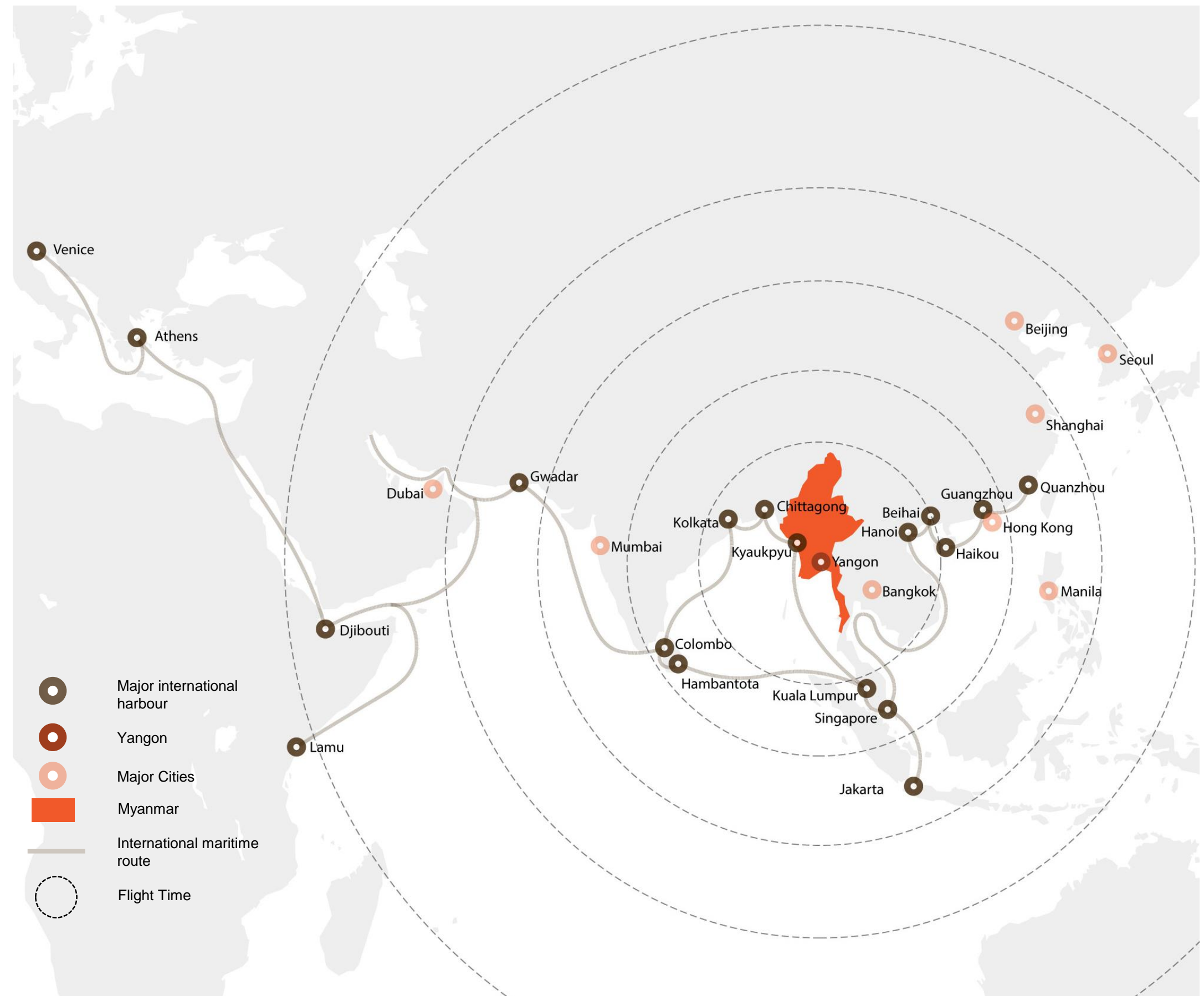
Due to its strategic location on the northern coast of the Andaman Sea zone, Myanmar benefits from a competitive advantage in the view of its geographical location for regional connections. Yangon and New Yangon as economic vibrant hearts will capture the commercial potential from shipping, logistics as well as services sectors buffering China and European market zone.

Air Traffic

Myanmar air connectivity allows the country to capture more than 4bn people and access major metropolis in South East Asia and South Asia within a four hour flight zone, through the Yangon International Airport, creating notable opportunities for businesses and tourism development to grow in New Yangon City.

Maritime Connectivity

Both Maritime and hinterland water resources position Yangon as a future important node to act as a shipping and commercial interface as well as a future tourism destination. Indeed, the activation of the ambitious Special Economic Zones Plan (ADB) and other active development funds creates opportunities for the Myanmar sea interface to initiate large coastal infrastructure development. Yangon and Kyauk Phyu ports act as major anchors on the Myanmar seaside already entertain trading relationship with neighbours such as Kolkata and Singapore.



Myanmar Context

One-belt One-road Initiative

Located along the One Belt One Road Initiative corridor, Myanmar has a strong waterfront development potential, and more by connecting its sea ports to its hinterland through the water canal system.

Rapid Population Growth

The results of the 2014 Myanmar Census show that the total population is over 50 million. The rapid demographic growth between 1950 and 2000 calls for urban infrastructure upgrade to Yangon and its immediate regional surroundings.

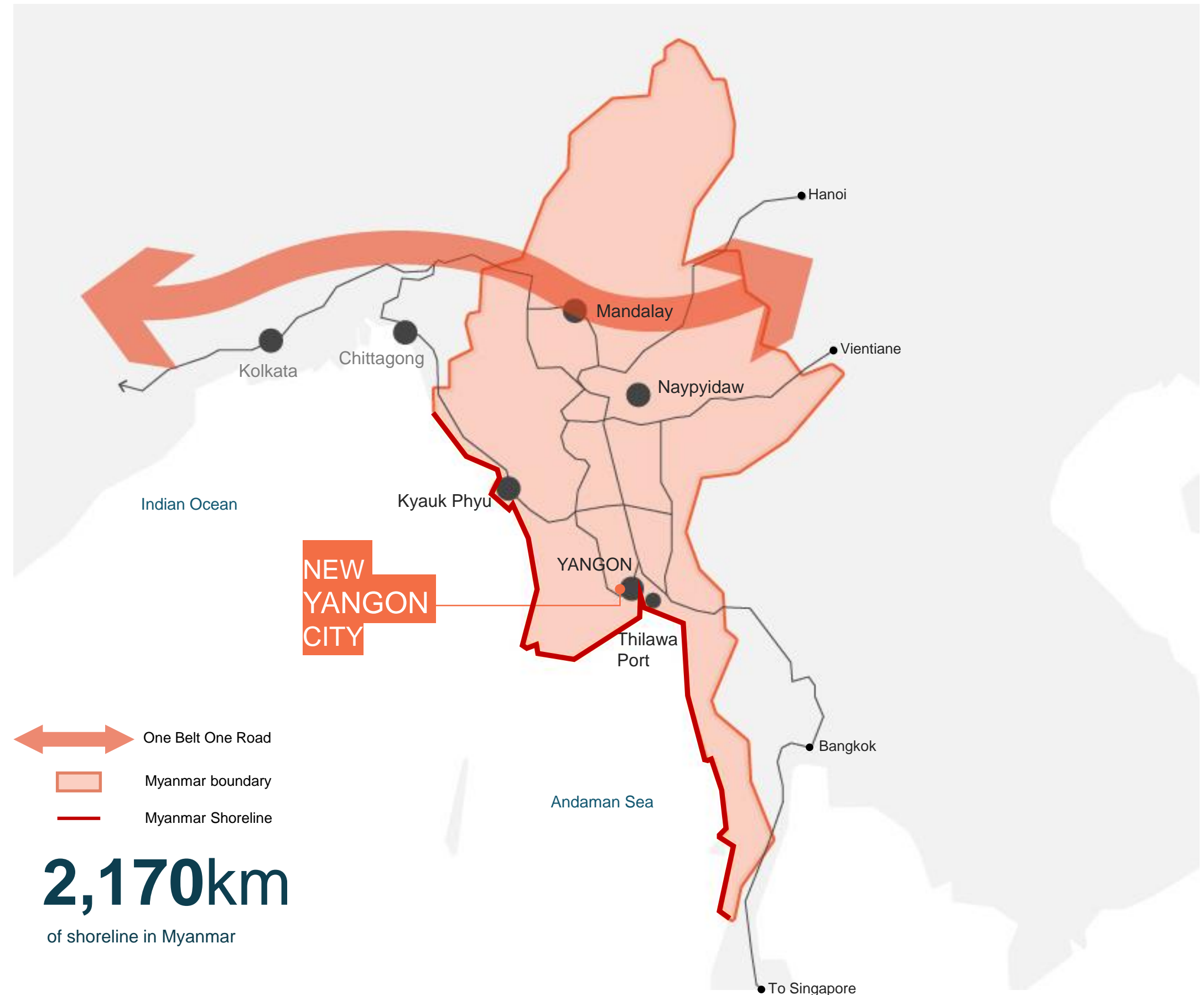
Other major cities in Myanmar

There are only three other major cities in Myanmar with Yangon being the largest. Yangon has the largest contribution to Myanmar's GDP and attracts large populations from the rest of Myanmar. Consequently, urbanization of Yangon is expected to be more rapid than other cities in the region putting tremendous pressure on the existing infrastructure.

Industrialization as an engine of development

Myanmar has made long strides in developing higher order industrial estates to create jobs for its rapid growing population and economy. Myanmar's economy grew* at 6.8% in 2017/18 driven by strong performance in domestic trade and telecommunications. However, the GDP* is expected to grow at a rate of 6.6% in 2019 and 6.8% in 2020.

**GDP projections based on ADB's Economic report of Myanmar*



2.1 Regional Context

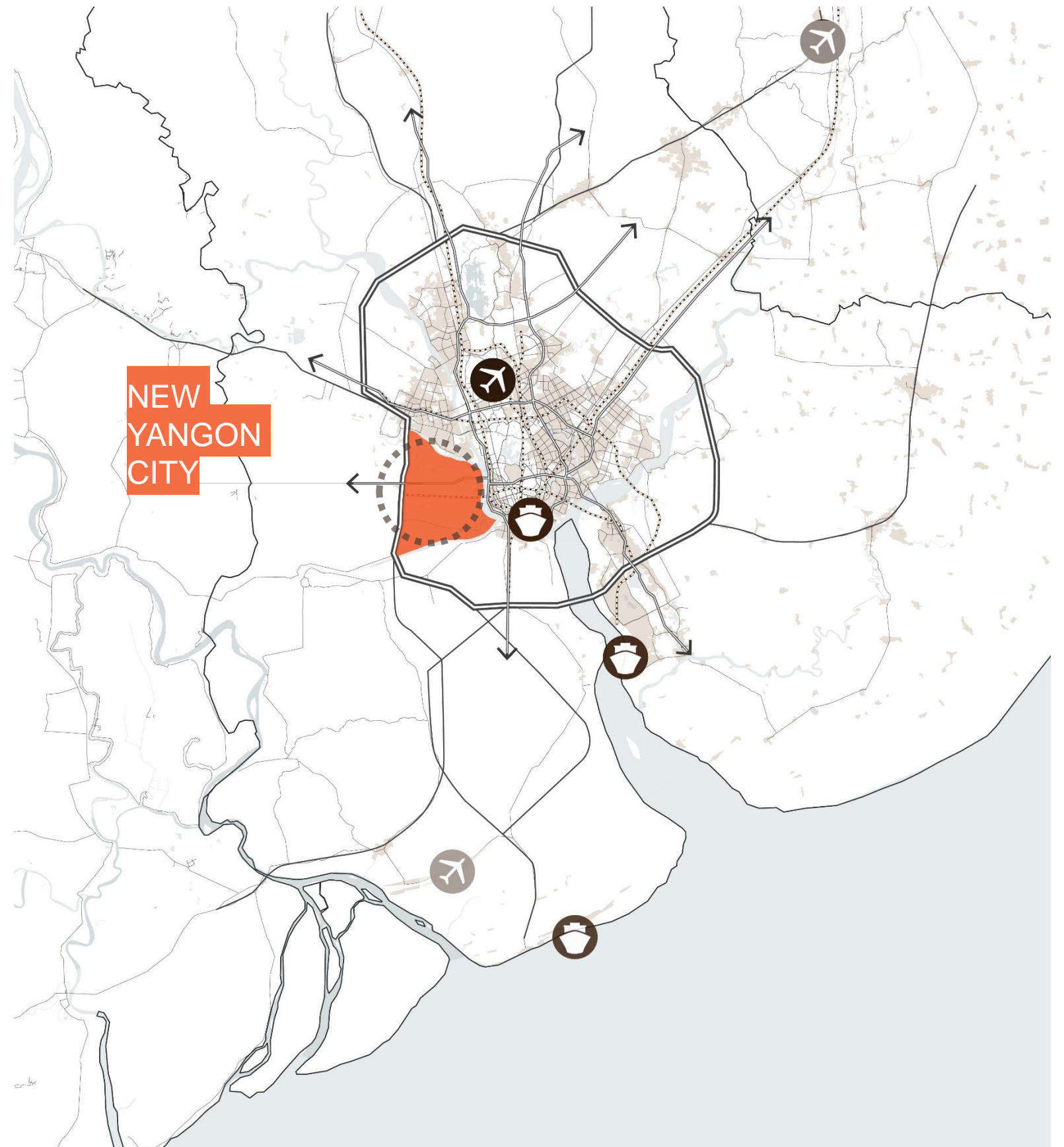
Southern-Yangon Region Connectivity

Air & Sea Connectivity

In addition to the existing international airport in Yangon, a new airport is planned near Bago northeast of existing Yangon city. In future, an airport and deep seaport is proposed in the south as part of New Yangon Phase II development. The Southern Yangon Region benefits from prime connectivity and access to the Andaman sea peninsula area. From Thilawa port to the central Yangon shipping terminal, NYC can connect to the wider maritime routes. However, during initial stages of development, Yangon Port would provide a more economical route for movement of goods.

Land Connectivity

The existing highway that delineates the western boundary of Phase I provides the only means of land based connectivity to surrounding land. In future, the highway is proposed to become part of a larger Outer Ring Road network connecting the rest of Yangon.



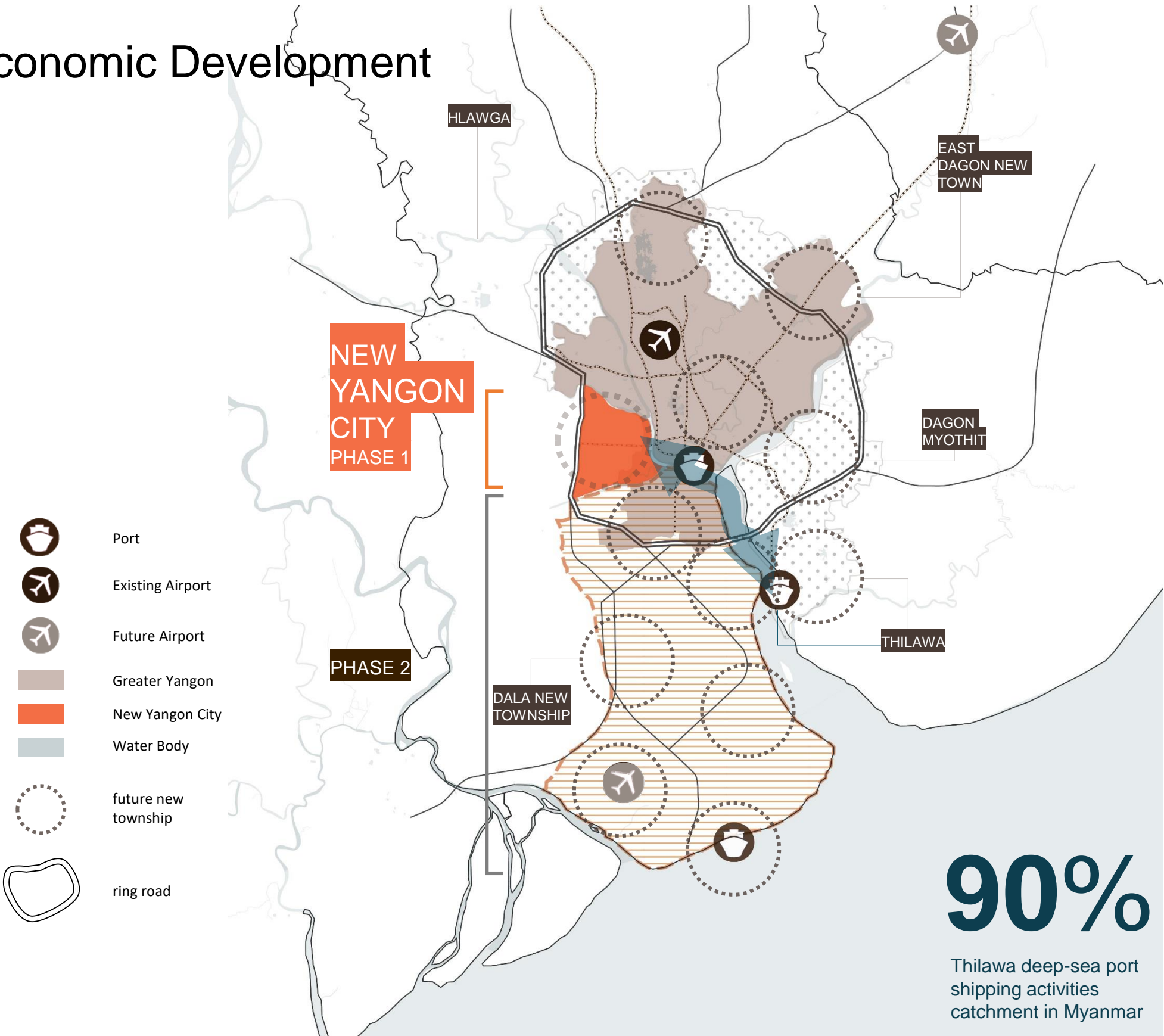
Southern-Yangon Region Economic Development

New Yangon City Phase I will form part of a larger corridor-based development plan taking roots along side the proposed Outer Ring Road. NYC will act as the start-up phase of the long term expansion of Yangon urban.

With a set of new townships in Yangon, the Phase 2 of NYC aims to develop major nodes such as a future airport, a special economic zone, and a new deep sea port.

The main aim of New Yangon Phase I and II plans is to create a robust urbanization framework that allows creation of approximately 2.0 million jobs. These will be in addition to jobs created in other proposed townships in Yangon.

The plans accommodate flexibility to absorb changes to market conditions such that higher order industries and service sector opportunities can be developed within NYC and surrounding new areas.



2.1 Regional Context

Greater Yangon

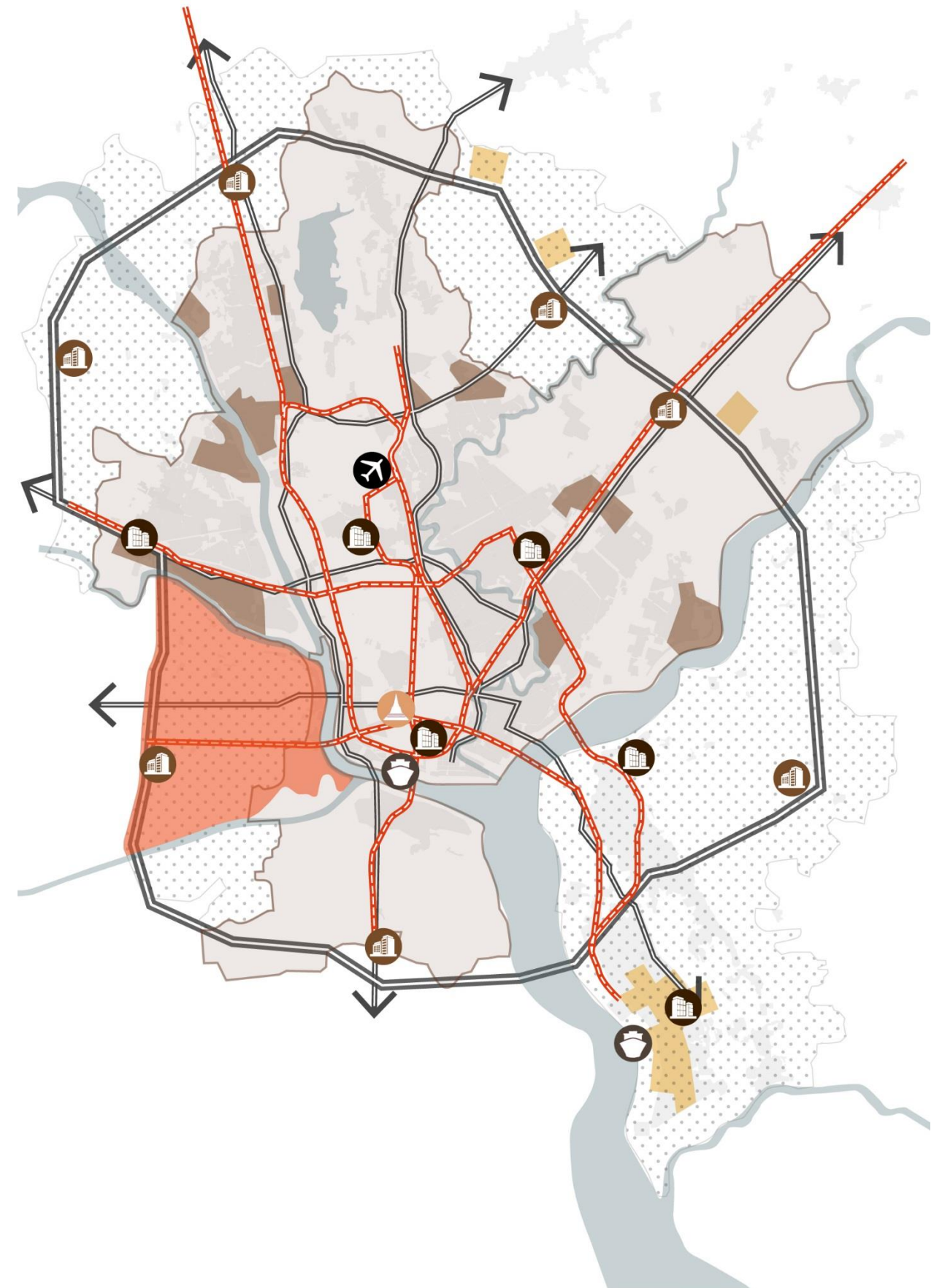
The Greater Yangon Area comprises of Yangon City and six surrounding townships. The six identified townships have a direct dependence on Yangon City for jobs and livelihood, but are sparsely populated. The study conducted by Japan International Cooperation Agency (*A Strategic Urban Development Plan of Greater Yangon, 2013*) identifies many of the eastern and western areas including Hlaing Tharya as 'new suburbs' with potential for infill.

The JICA (2018) plan identifies future expansion areas for the city including East Dagon to the north-east, Dagon Seikkan to the east, Dala to the south, Thilawa Port and SEZ to the south-east and Kyee Myin Daing to the west. The Kyee Myin Daing township falls within the proposed New Yangon City development site.

A Comprehensive Urban Transport plan of Greater Yangon (YUTRA) was conducted by JICA (2015) which identified a number of MRT alignments. This master plan takes those plans into consideration to propose extension or connection to the network.

Greater Yangon area economic growth is mainly driven by industrial activities (existing and planned industrial zones): shipping, logistics, manufacturing, etc. To favour the development of these activities, industrial corridor's growth will boost the NYC development by attracting businesses, and new populations *in situ*.

With a population of over 7.0million (2014) in Greater Yangon Region, Yangon City is home to approximately 5.0 million inhabitants. The overall population of Yangon Region is expected to grow to over 10.0 million by 2040 (based on goal outlined on 2013 Urban Development Conference in Yangon City). It is anticipated that most of that growth will be concentrated within Greater Yangon Area.





Yangon City viewed from the site (October 2018)

2.2 Site Context

Surrounding Context

Hlaing Tharyar
One of the largest and most populated townships in Myanmar, Hlaing Tharyar is home to the country's elite families and biggest Industrial Zone.

NEW
YANGON
CITY



Shwedagon Pagoda

Shwedagon is the utmost sacred pagoda in Myanmar. The 360 ft gilded pagoda serves as a renowned identity marker of Yangon City.

Yangon Port

It is the oldest port of Myanmar handling 90% of country's exports and imports throughput

Downtown Yangon

Planned on a grid system during the British rule, downtown functions as the backbone of Yangon's economic activities.

Dala New Town

Located across the existing CBD, Dala is primarily rural settled by low income communities. The only transport connection to Yangon City is through ferry.

Thanlyin

As a major port city of Myanmar, it also the location of the country's largest port, Thilawa.

2.2 Site Context

Existing Settlements & Infrastructure

A number of existing settlements in the form of villages are spread across the site. The population is primarily dependent on agriculture with an increasing trend towards seeking employment in main Yangon city. The population of Kyee Myin Daing township along the periphery of Yangon River appears to be primarily dependent on Yangon City and the river for their livelihood.

The existing settlements/ villages will be integrated within the new urban fabric of the city. The master plan proposes strategies for physical integration to foster economic and social integration.

Most of the existing settlements do not have access to municipal services such as power, water supply, and sewage disposal. The site has a few power line alignments that supply electricity to Yangon city across the river. The site also has gas pipelines passing north-south along the highway and east-west through the southern portion of the site. The gas and power alignments are to be retained in the master plan.

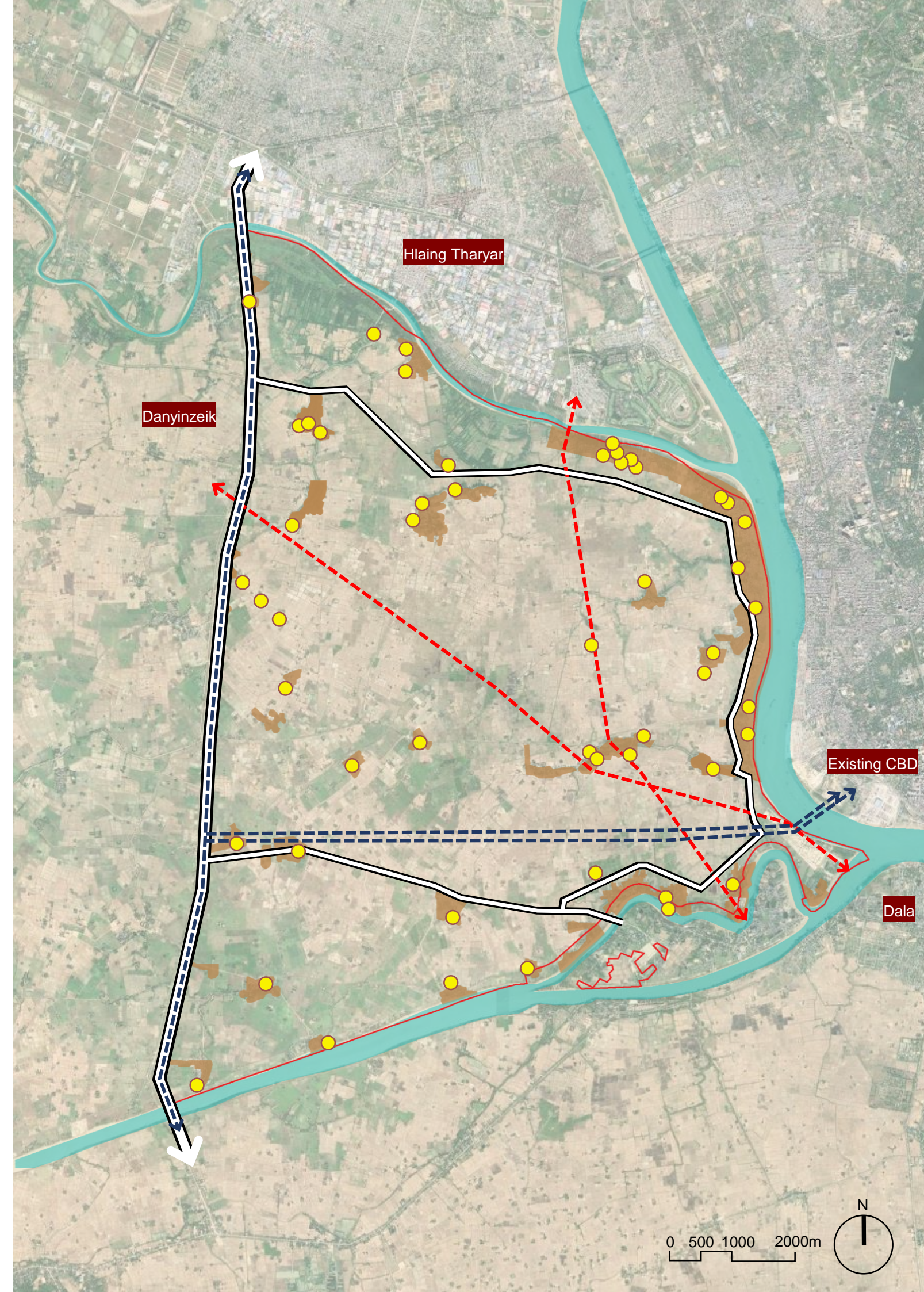
- Existing Villages/Townships
- Pagoda
- Power Lines
- Gas Pipelines
- Road



Existing Police Station in Kyee Myin Daing township



Existing fabric of settlements



Surrounding Land Use

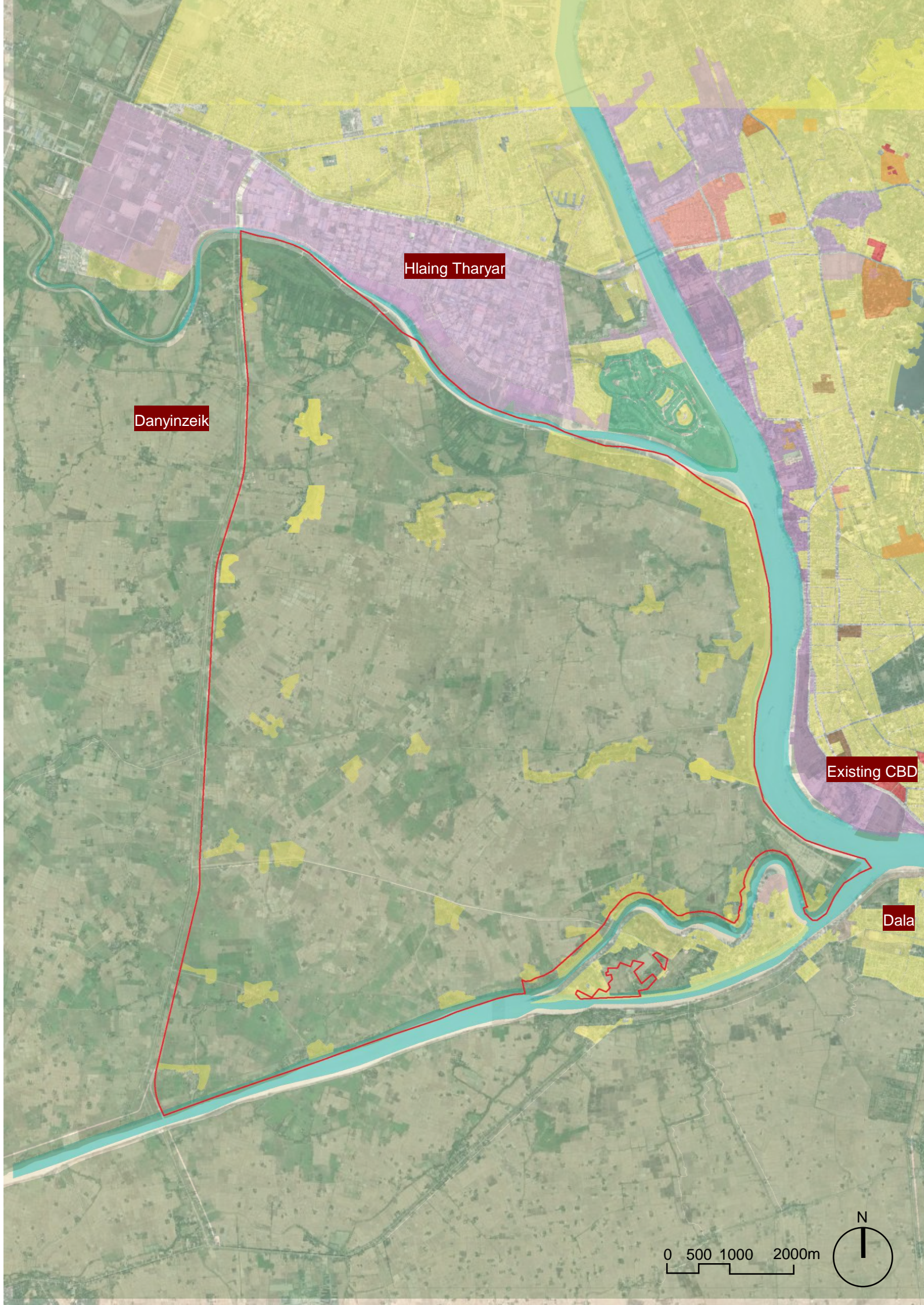
While the site for New Yangon City is separated from the existing city by rivers and canals, it is important to review adjacencies and synergies that can potentially be incompatible or could be harnessed.

Across Pan Hlaing River in the north, the Hlaingtharya area is primarily industrial with the exception of Pun Hlaing Golf Estate at the fork with Yangon River. Activities immediately adjacent would be subject to unfavourable views and perhaps pollution. A number of informal settlements have been identified in the industrial area in Hlaingtharya.

The area across Twantay Canal in the south is primarily agricultural, however, is expected to urbanize as Phase 2 of NYC kicks in. Strategies for controlling urbanization in this area, as well as west of the highway (also agricultural) need to be considered.

The Yangon River in the east has an approximate width of 500m and presents panoramic views of the city skyline. Although the edge of the river along the existing city is primarily industrial or ports, the distance from NYC and presence of existing Kyee Myin Daing on the east bank which is to be retained, will have a buffering effect. The skyline of Yangon City is expected to further develop in the next few decades. This edge of the site also offers views to the Shwedagon Pagoda.

- Residential
- Industrial
- Business Area
- Open Space
- Education & Culture Facilities
- Commercial Area
- Agriculture Land



2.2 Site Context

Initial Brief





Prior to commissioning this assignment, the Yangon Regional Government conducted studies to ascertain initial requirements for kick-starting development of the city. One of the prime considerations amongst those was to compensate existing land owners with serviced land parcels in proportion to their original holdings. The second prime consideration was location of initial industrial area and utilities.

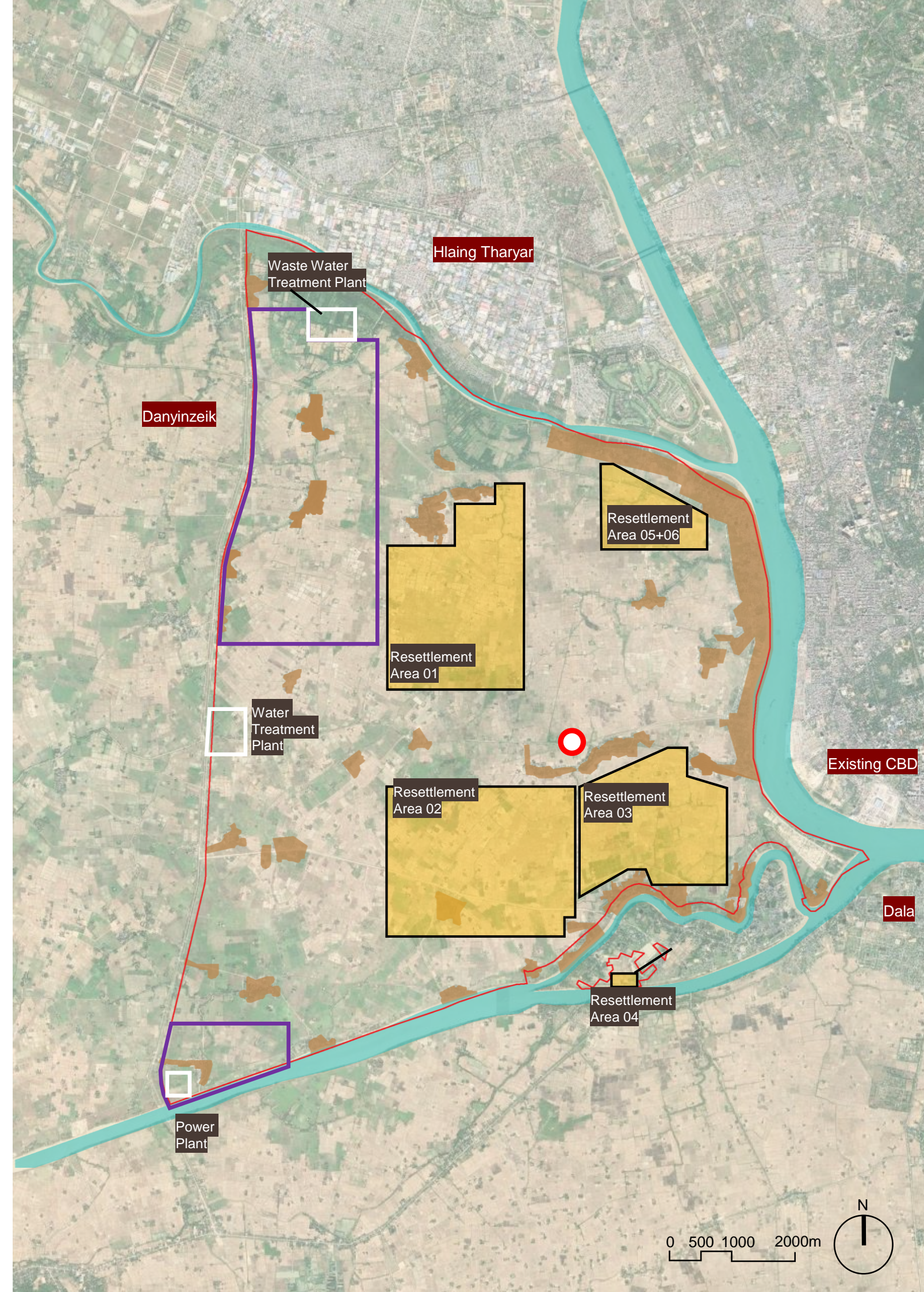
The policy currently adopted by the government mandates returning 20% of original land holding as net serviced and developable land. Location of clusters of such land had been broadly identified subject to changes based on the master plan. The total area of such resettlement land to be identified is approximately 20 sqkm.

An initial development area was also identified based on feedback from various stakeholders and private sector. This 13sqkm area would have to be an industrial estate complete with required facilities and amenities. Recognizing the challenges of attracting industries and businesses, location of utility plants were also identified early-on such that supply and distribution plans can be aligned in time for the kick-off phase of the new city.

The initial development area is proposed to be connected with the existing city through Bridge 1 over Yangon River. The existing bridge over Pan Hlaing River (Bridge 2) is proposed to be upgraded with additional capacity.

Last but not least, the location of a Pagoda has been identified that will be central to the new city as focus of religious and cultural activities.

-  Resettlement Area
-  Industrial Area
-  Utility Site
-  Proposed Main Pagoda



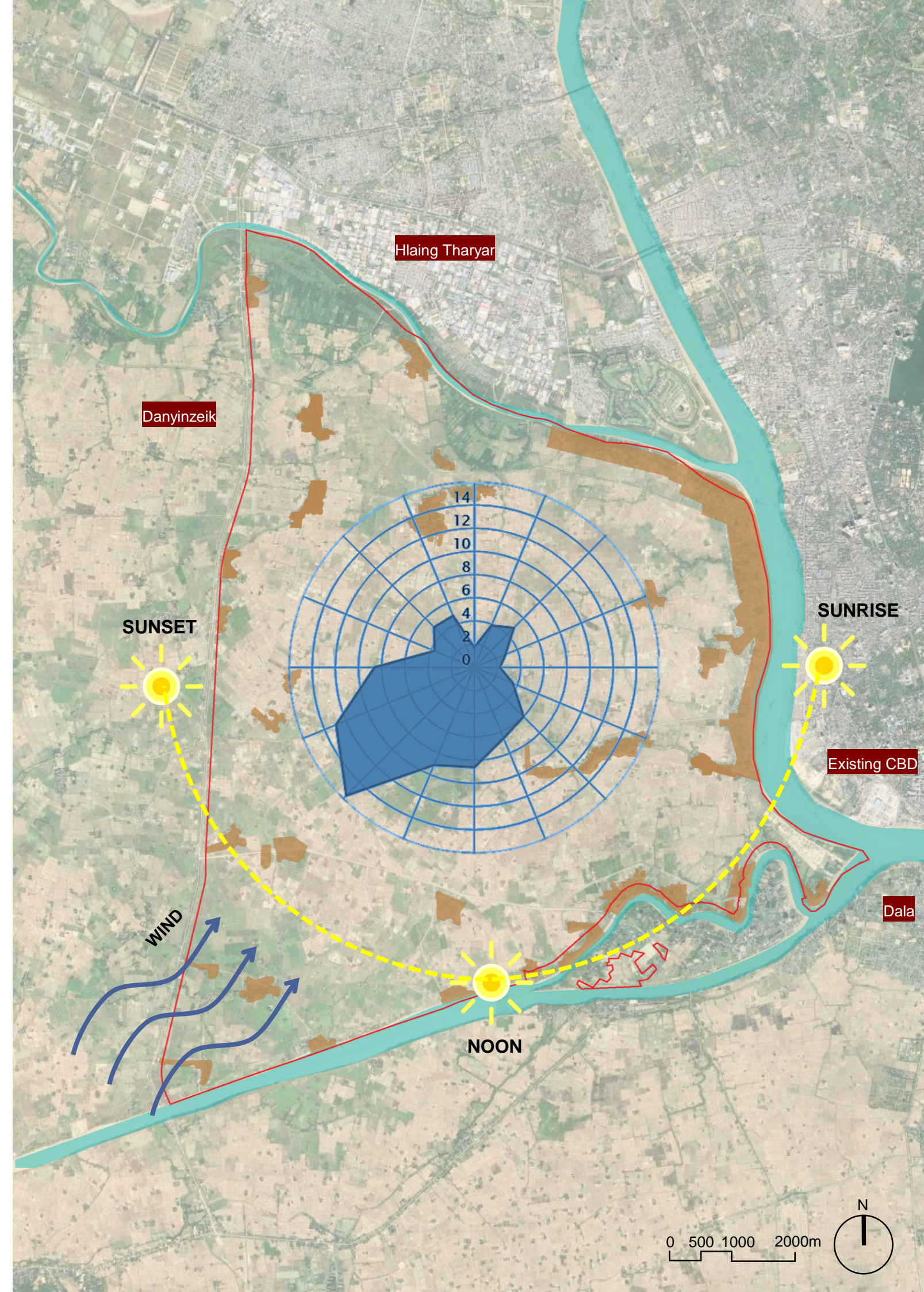
Climatic Influence

Yangon has a tropical monsoon Climate with four distinguishable hydrological seasons: monsoon (Mid-May to Mid-October), post-monsoon (Mid-October to Mid-November), cold weather winter (Mid-November to February) and pre-monsoon (March to Mid-May). However, being close to the tropics, humidity in Yangon relatively high all throughout the year. The average daily temperature is around 27 degC with the highs of 37 degC between March to June and lows of 17 degC in December. Prevailing wind direction is South-Southwest with speeds of around 10 km/h. The city experiences more than 20 days of rain per month from June to September.

Such climatic conditions require responses that have long been adopted in the architecture of the houses in the region. Shade is of primary importance as protection from the rain and as means of creating comfortable living temperature. Along with shade, sustained wind flow is equally important to create thermal comfort.

The master plan adopts specific strategies in response to these climatic conditions. Primary amongst those are:

- A north-south/ east-west orientation of roads to allow angular capture of prevailing winds
- Location of industrial uses in relation to prevailing wind conditions
- The north-south/ east-west orientation allows creation of structure with minimum surface areas on the east and west reducing solar insolation
- Recommending creation of shaded walkways or colonnades along streets integrated with buildings especially in public areas



2.3 Environmental Conditions

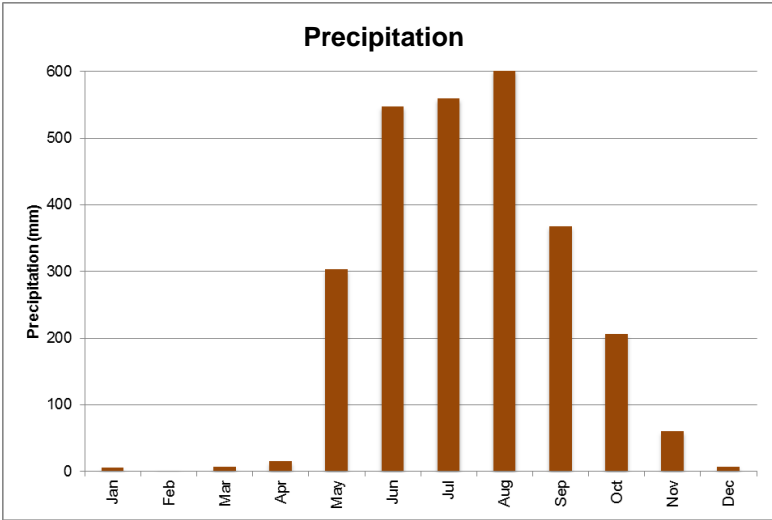
Climatic Conditions

Season *

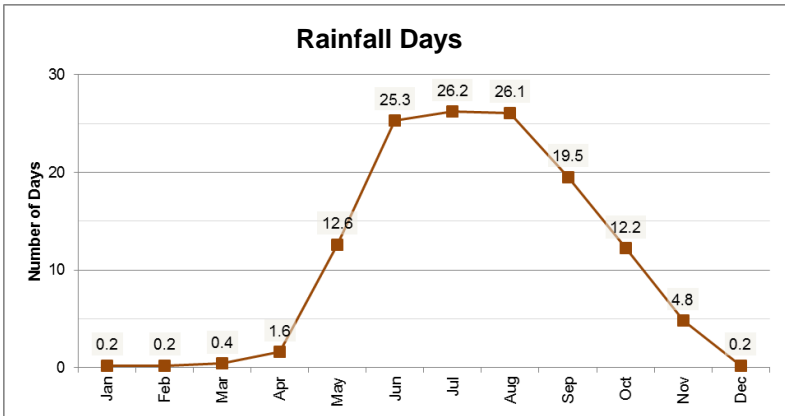
Yangon experiences a tropical monsoon climate four distinguishable hydrological seasons: monsoon (Mid-May to Mid-October), post-monsoon (Mid-October to Mid-November), cold weather winter (Mid-November to February) and pre-monsoon (March to Mid-May).

The average annual rainfall is 2,681mm, of which 96.4% fall during the wet season and the remaining 3.6% fall during the dry season.

There are a total of 129.3 rain days throughout the year, with only 7.4 of rain days during the dry season and 121.9 days during the wet season.



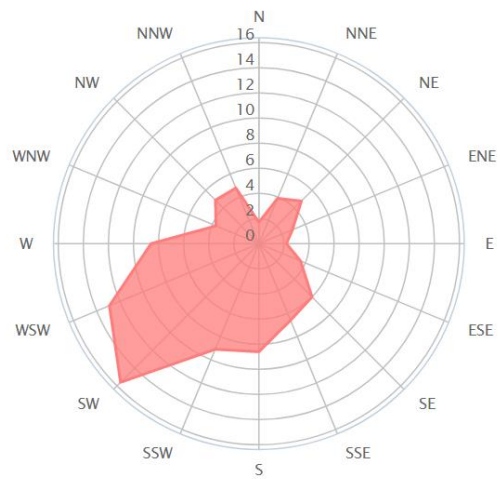
Rainfall data at Yangon



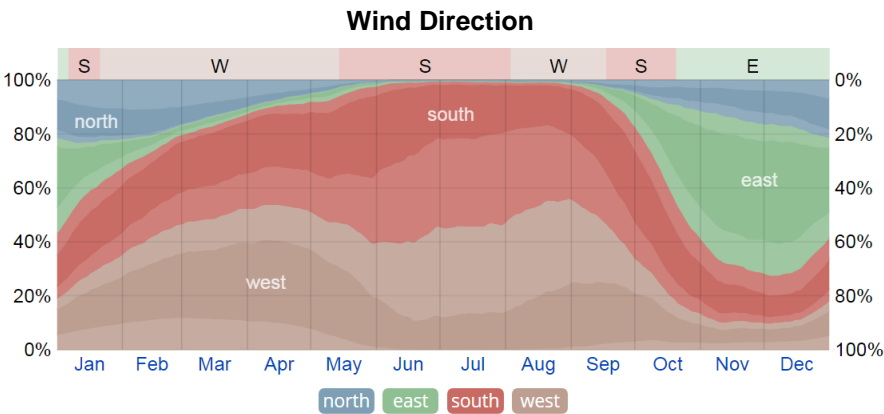
Number of rain days at Yangon

Wind Direction **

The predominant wind throughout the year is SSW. The prevailing wind is from the North-West (NW), North and North-East (NE) from November to January, and the South and South-West direction from February to October.



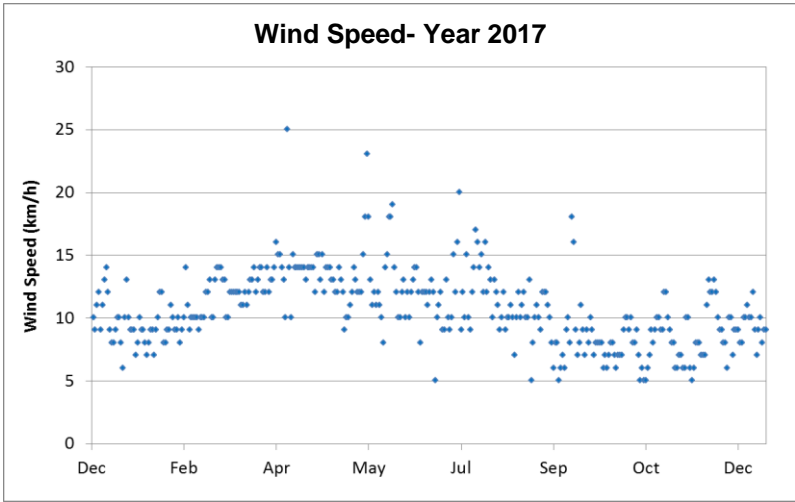
Wind Direction throughout the year (In %)
Source: AECOM



Wind Direction throughout the year
Source: AECOM

Seasonal Wind **

From May to October (Wet season), wind speed is mainly higher than 10 km/h with an average of 11.0 km/h from the SSW direction. From November to April (dry season), the wind speed is mainly lower than 10km/h with an average of 10.3 km/h from the South direction.

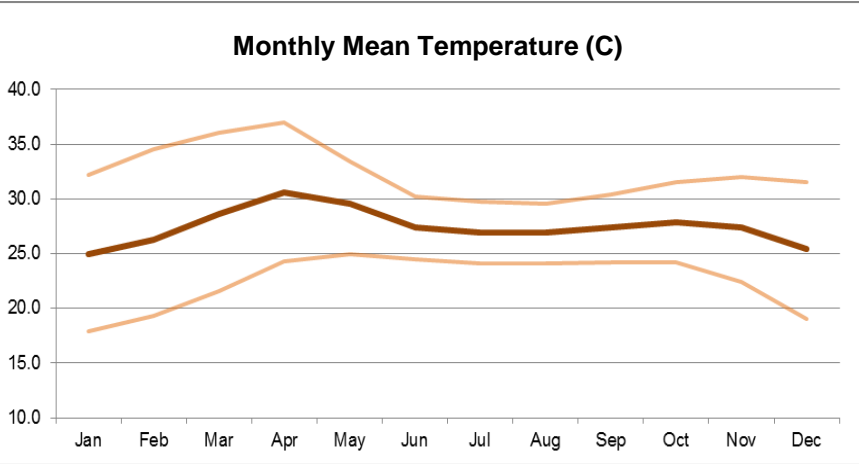


Wind Speed data at Yangon

* weather-atlas.com (source used by this website is from the Department of Meteorology and Hydrology in Myanmar)
** NASA's MERRA-2 Modern Era Retrospective Analysis

Temperature

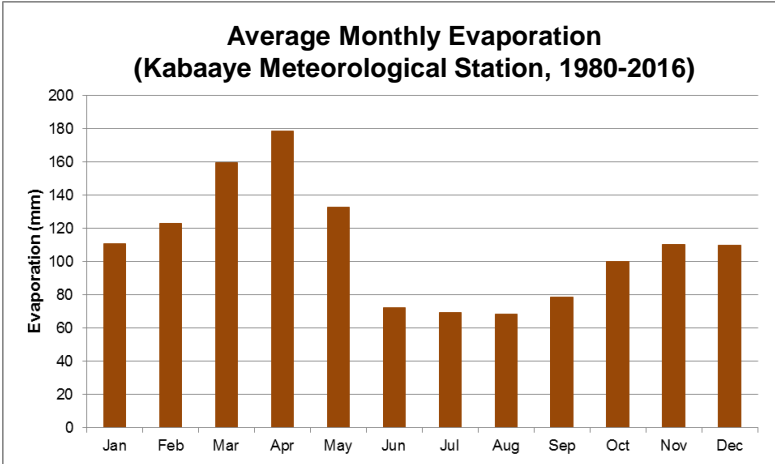
The average daily temperature in Yangon is 27.3°C. In the warmer months from March to May, the mean maximum temperature is around 37.0°C whereas in the cooler months from November to January, the minimum temperatures is around 17.0°C. The average temperate ranges from 24.8°C to 30.3°C throughout the year.



Temperature data at Yangon
Source: AECOM Analysis

Evaporation *

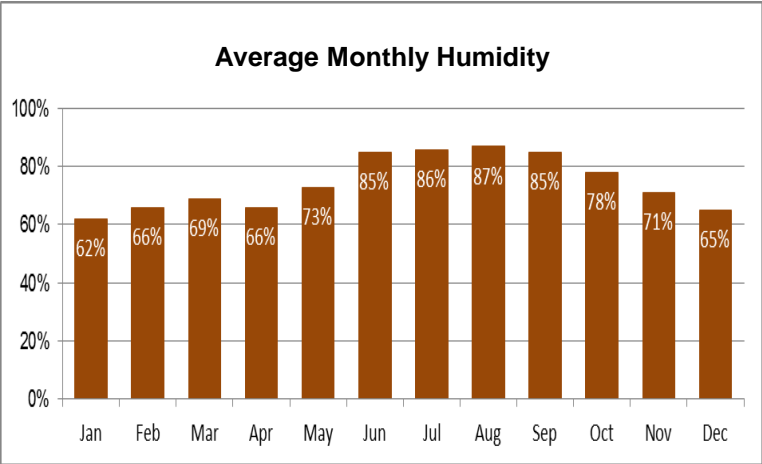
Due to low humidity and low cloud cover, evaporation is relatively higher from November to May. The average high evaporation (179 mm) occurs in April.



Average Evaporation (Monthly)
Source: AECOM Analysis

Humidity

Humidity is high in Yangon, ranging from 62 – 87%. The annual average humidity is around 74.4%.



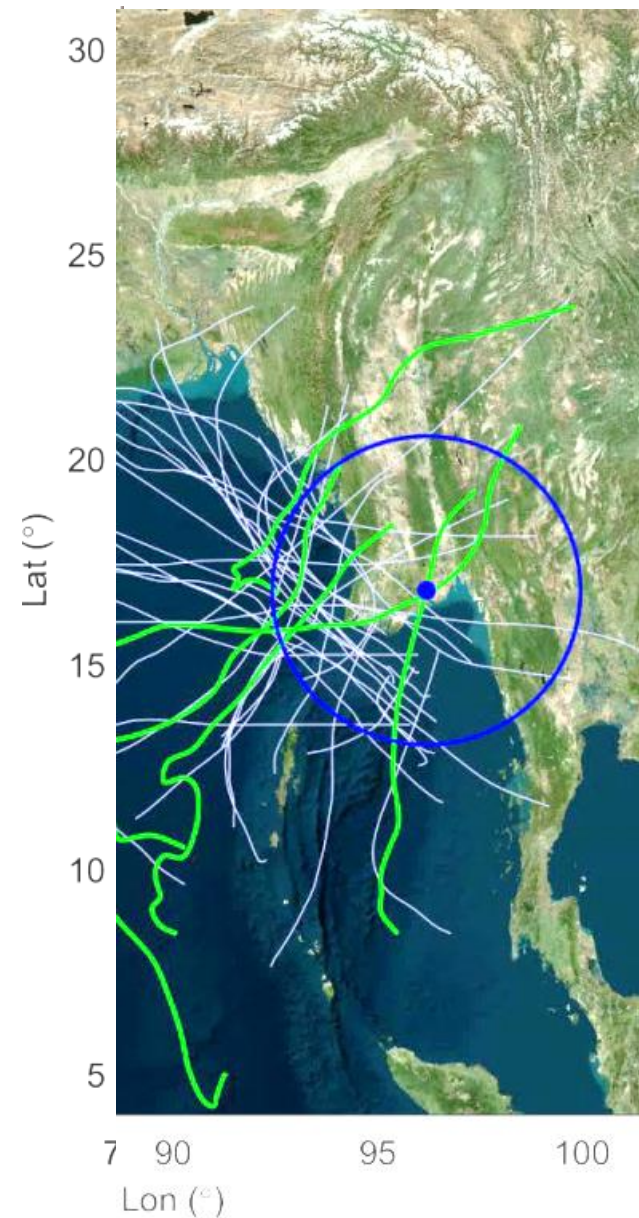
Relative Humidity data at Yangon
Source: AECOM Analysis

* Strategic Flood Risk Assessment New Yangon City (Royal Haskoning DHV, 2019)

2.3 Environmental Conditions

Hazard

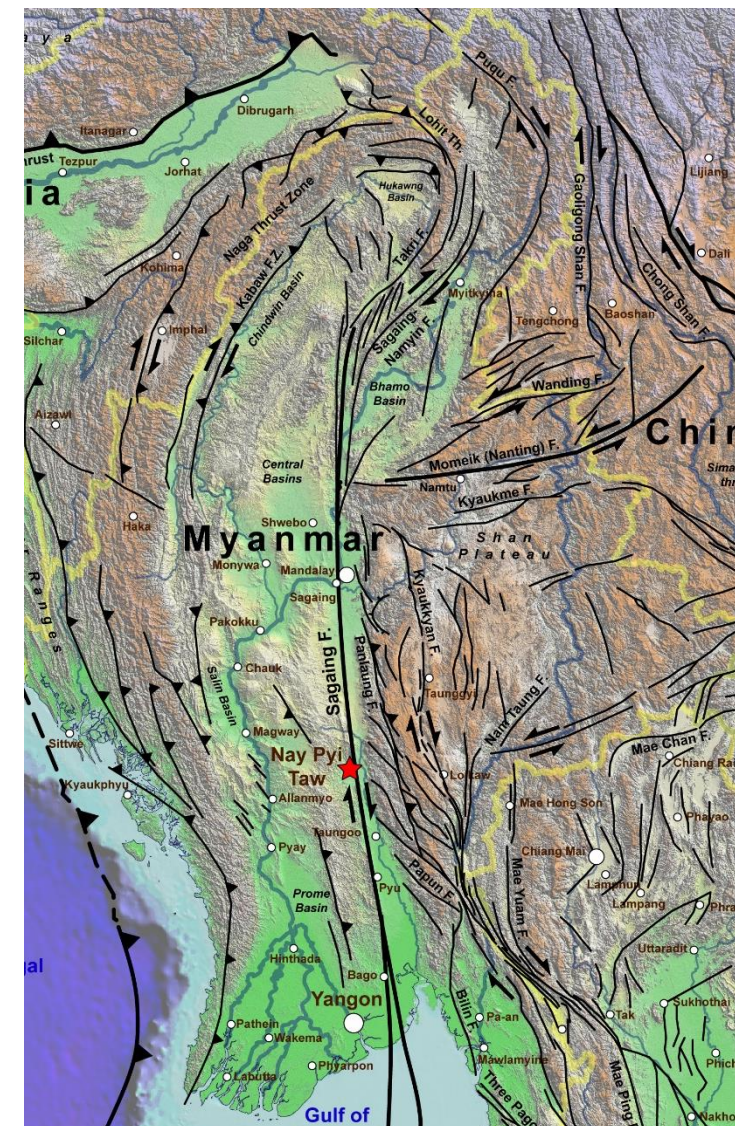
Cyclone & Storm Surges



40 Storms within 400 km search radius at 16.77 degree, 96.2 degree (Lat/Lon). Source: Joint Typhoon Warning Center, taken from RHDV Report 2018

Yangon is exposed to cyclones and storm surges from the Bay of Bengal. Cyclone activities peak before and after the monsoon (May – October) from April - May and Oct – November. They are accompanied by heavy rain and strong winds, resulting in increased water level within the system and severe coastal flooding. In early May 2008, Cyclone Nargis created a landfall in Myanmar. The storm surge reached a height of 1.5 – 2 metres. It was recorded as the worst natural disaster in Myanmar's history. An estimate of 140,000 people were killed and 800,000 were displaced. Yangon was one of the many cities affected by Cyclone Nargis.

Earthquakes



Bagan (500km from Project Site). Aug 2016

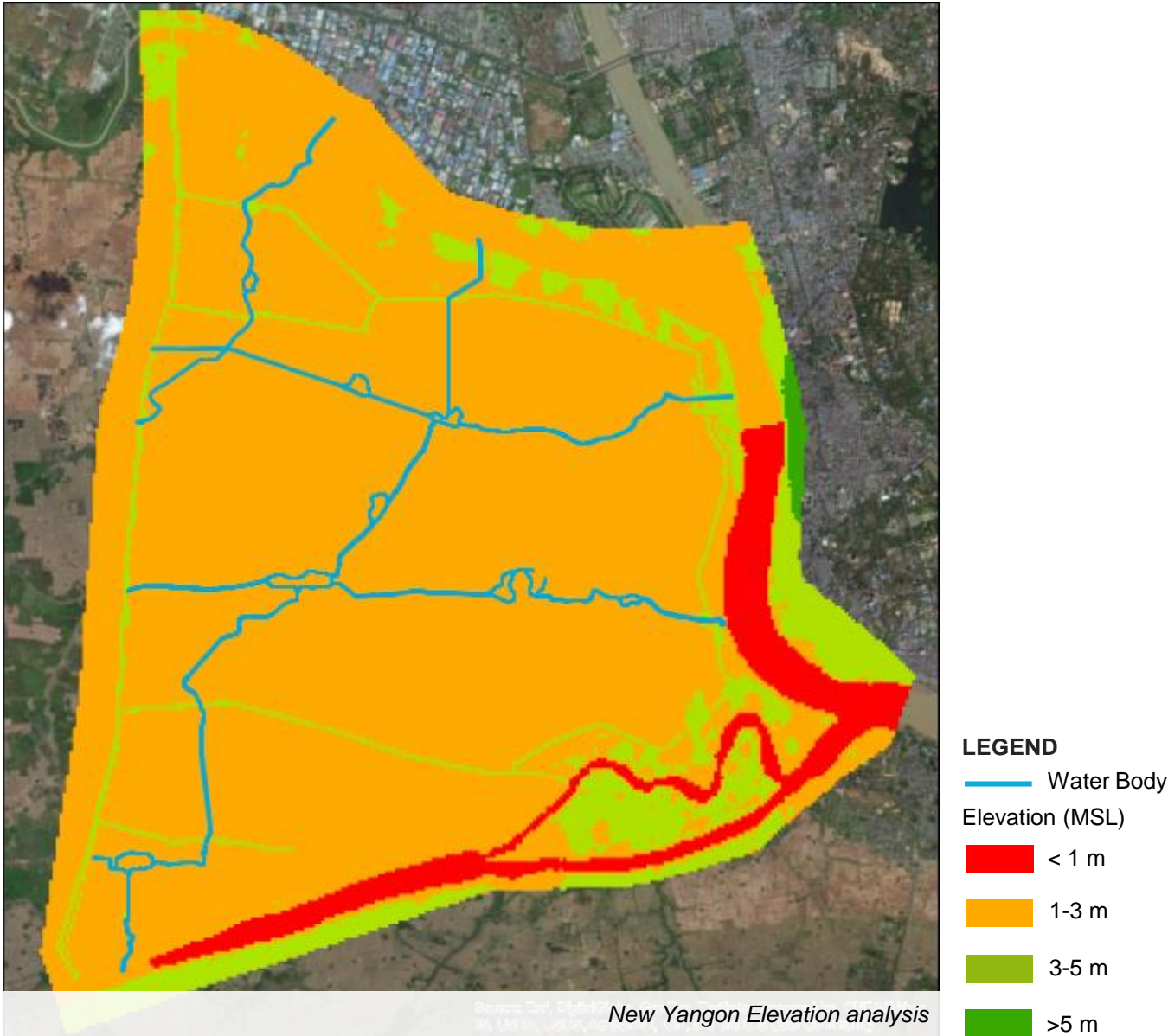


Taik Kyi (60km from Project Site). Mar 2017. Source: <https://www.voanews.com>

Yangon is located near the Sagaing Fault which is due for a major earthquake (>7.0 magnitude) in 10 – 30 year. A strong earthquake of 6.0 magnitude struck on the 12th of January 2018, preceding one of 4.2 magnitude later in the year on the 18th of April.

Topography

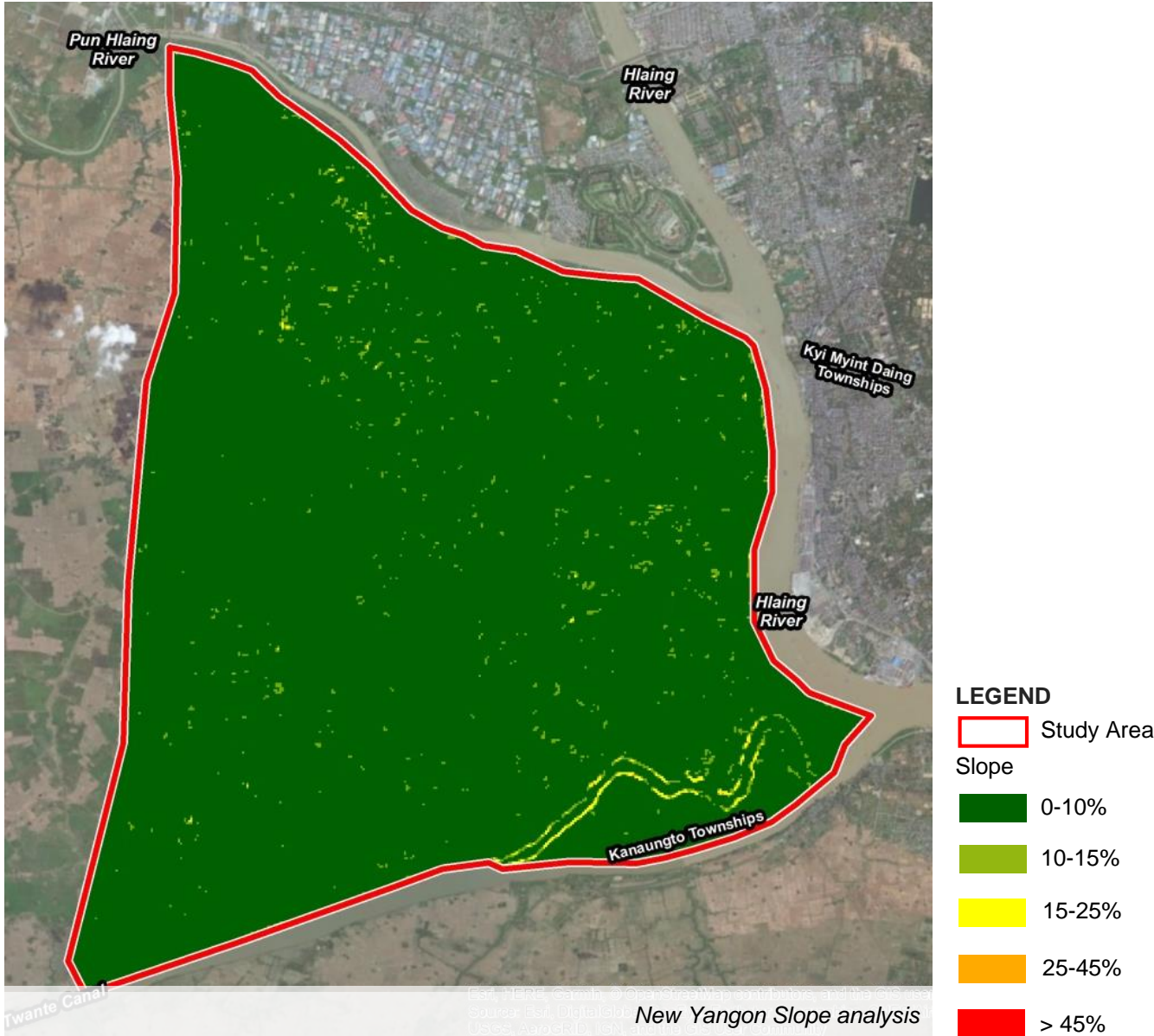
Elevation



Elevation (MSL)	Area (ha)	Area (%)
< 1 m	762	6.1%
1 - 3 m	10,226	81.8%
3 - 5 m	1,459	11.7%
> 5 m	55	0.4%
	12,502	100%

More than 99% of the project area (12,447 ha) is below 5 m from MSL. Hence, proper flood control is required for future development.

Slope



Percent rise	Percentage
0 – 10%	79.4%
10 – 15%	17.1%
15 – 25%	3.40%
25 – 45%	0.05%
> 45%	0%

The land at the project site is highly suitable for development as 80% of the land has a slope of 10% rise of less. The average slope is 4% and the maximum is 27.6%.

Source: Topography data were formulated using GIS, using DEM obtained from Strategic Flood Risk Assessment New Yangon City (Royal Haskoning DHV, 2019)

2.3 Environmental Conditions

Flooding & Drainage

Currently, there are several flood outlets and sluice gates functioning to drain stormwater from the site to the bordering main rivers/canals and to control the water level in the drainage network within the site.

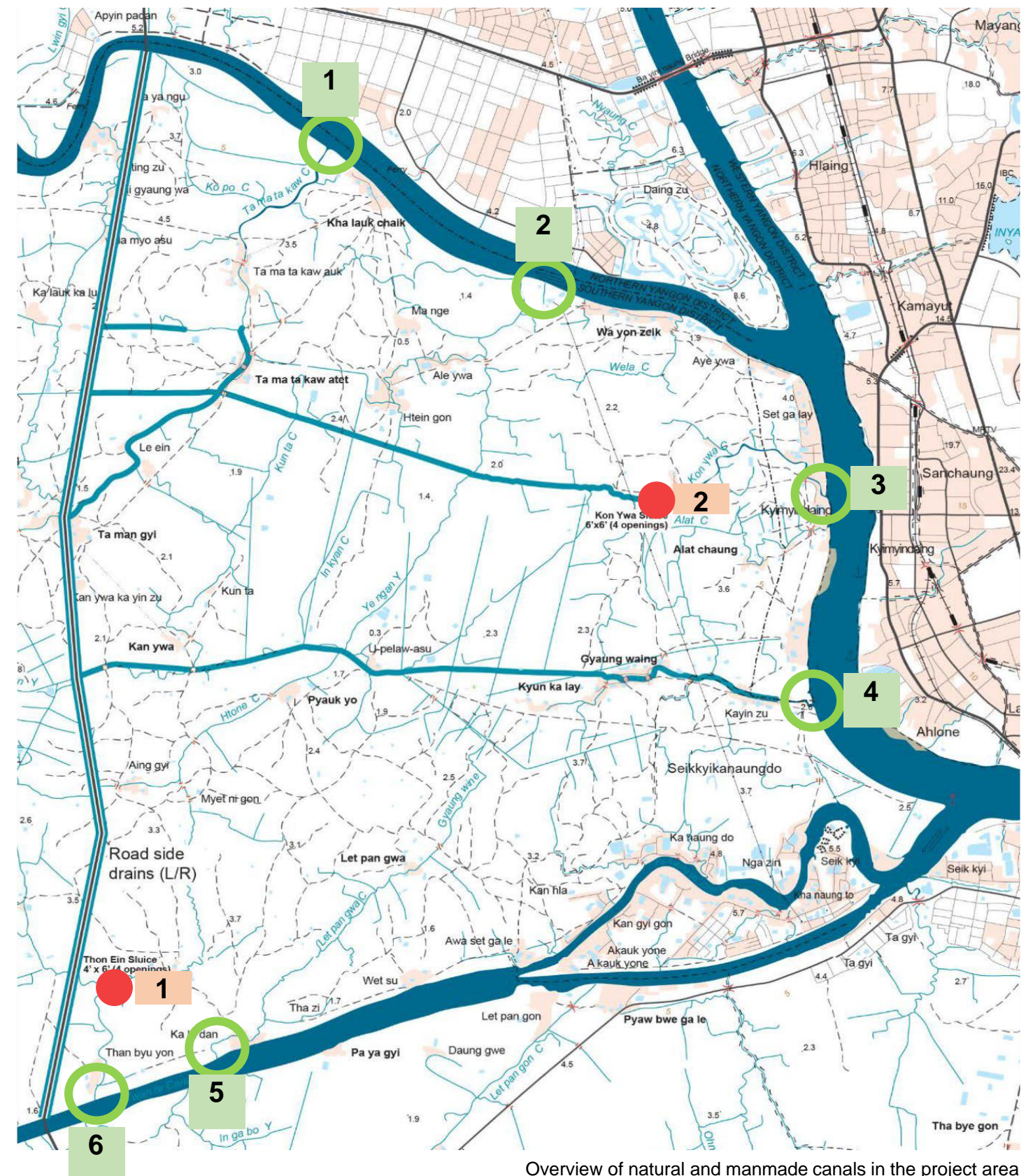
Outlet 1 (Tamata Kaw C Canal) and 2 (Unnamed small creek) drains irrigation water from the agricultural land to the Pan Hlaing River in the North. Outlet 3 (Kon Ywa C, connected to Kon Ywa sluice gate) and 4 (Gyaung Waing Creek) discharge water from both irrigation and human settlements into the Hlaing River. Similarly, outlet 5 (Near Ka La Dan Village , approximately 6.1 miles from Twante Canal) and 6 (Near Bridge connected to Thon Ein sluice gate approximately 7.1 miles from Twante Canal) drains into the Twante Canal

There are two operating sluice gates, 1 (Thon Ein) and 2 (Kon Ywa), that control water discharge in the canal system.

The master plan needs to take these structures and their importance into account as changes in land use will affect their efficacy to regulate water levels should any flooding occur.

LEGEND

-  Flood Outlet
-  Sluice Gates



Overview of natural and manmade canals in the project area

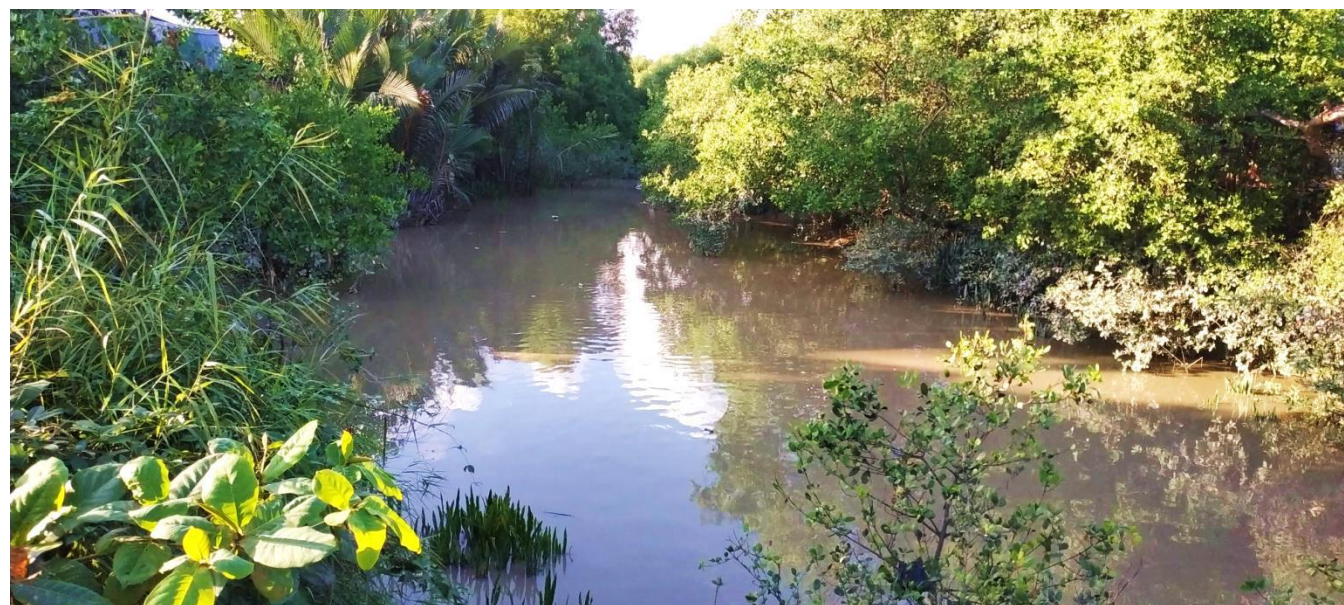
Source: Strategic Flood Risk Assessment New Yangon City (Royal Haskoning DHV, 2019)

Ecological Conditions

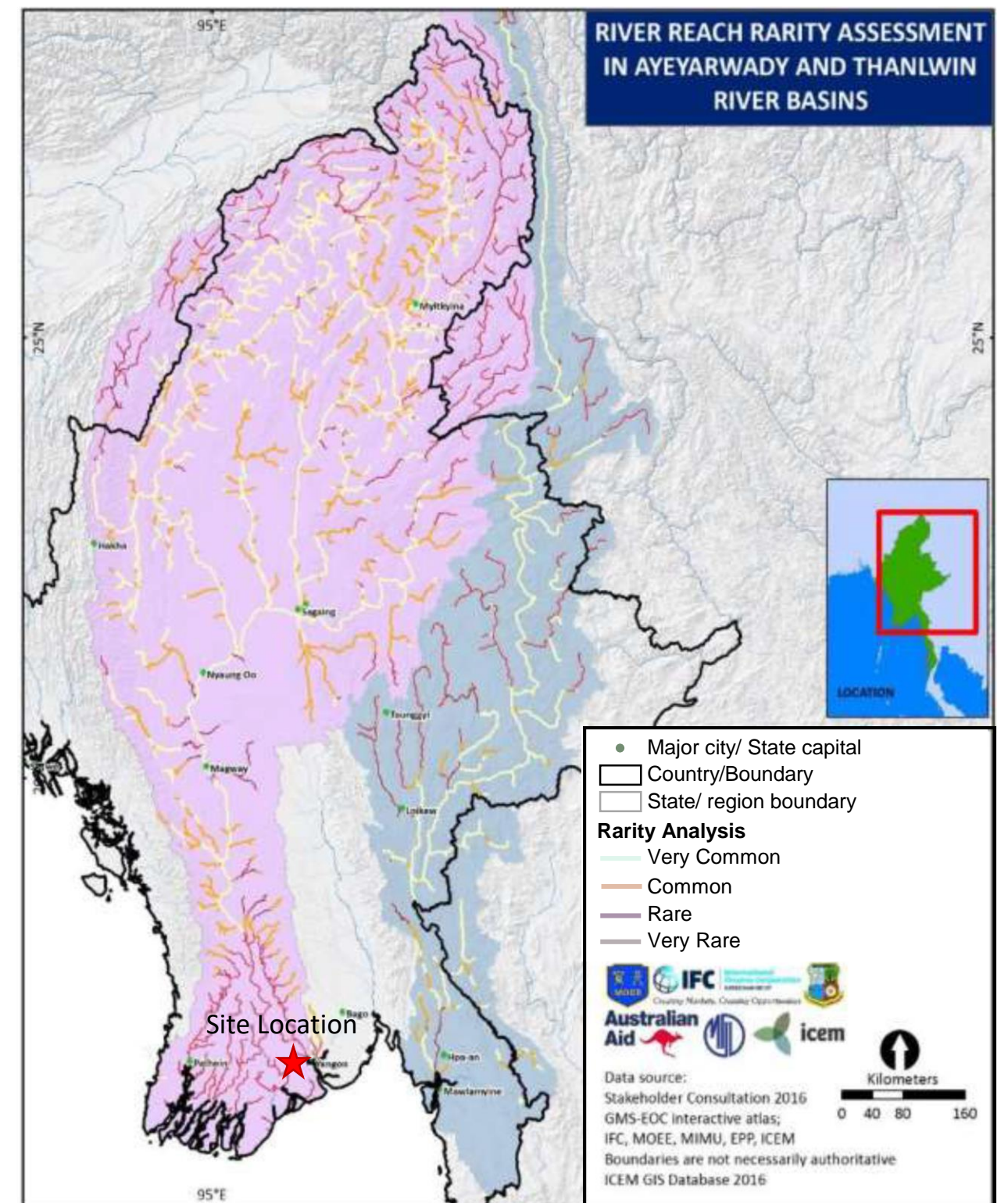
The site is situated at the lower part of Ayeyarwady river basin where the ecosystem is dominated by Myanmar coast mangroves, Irrawaddy freshwater swamp forests, and Myanmar coastal rain forests. The lower Ayeyarwady has seen a general decline in biodiversity with much of the area converted to agriculture. Deforestation presents a major ongoing problem throughout the region. The coast mangroves ecoregion, for example, is endangered as a result of agricultural and aquaculture encroachment, urban expansion, and timber harvesting for fuelwood. The Irrawaddy freshwater swamp forests are listed as endangered and the Myanmar coastal rainforests are vulnerable.

Within the site, most of the site area has been converted to agricultural lands before 1980s which mainly is for rice cultivation. However, mangroves have been observed along natural streams especially at their outlets. Mangrove area have been also observed at the northern edge of the site along Pan Hlaing River. According to IFC (2018), the river system at lower Ayeyarwady basin is classified as high eco-sensitive area. IFC also classified the rarity of river reaches in Ayeyarwady basin in terms of their Bio-physical location - elevation, the steepness of the slope of the river reach, and the original ecological zone (coniferous, moist deciduous forest, dry deciduous forest, mangrove forest) and reaches flowing through karst limestone. The rarity of the river reach is used to present the ecological sensitivity to identify where the rare river reach types are distributed. Rare river reaches may be important because they could contain unique habitats that support endemic aquatic species. It can be seen that most of river reaches at lower Ayeyarwady basin is classified as rare, which may provide important ecological functions or hold specialized biodiversity.

Therefore, the master plan needs to take into account the ecological conditions of existing natural streams within the site and surrounding the site to propose appropriate ecological conservation and enhancement strategies for the habitat of the area. NYDC's Environmental Consultant will assess biodiversity (flora & fauna) impact as part of Strategic Environmental Assessment for Phase 1.



Mangroves observed at outlet of natural stream within the site



River reach rarity assessment for Myanmar rivers
Source: Strategic Environmental Assessment of the Hydropower Sector in Myanmar (IFC, 2018)

2.4 Development Suitability Analysis

Land Suitability Analysis

The following detail environmental analyses were conducted for the land suitability study of the New Yangon City development. The objective of the land suitability analysis is to develop a comprehensive approach to large scale planning, to determine the optimum site location for activities and to minimize negative impacts on the environment. The result from this analysis will provide useful information to identify unsuitable locations of proposed development in the site.

Land suitability analysis using Geographic Information System (GIS) was conducted to avoid siting the development on inappropriate locations and to make use of opportunities of existing land use of the site. To conduct land suitability analysis for the site, some key factors such as elevation, land use, hydrology and ecology overlaid to analyze the overall environmental sensitivity of the Project Area, each weighted differently depending on its significance on the sensitivity of the environment and of the proposed site development.

Site climate and hydrology conditions, such as seasonal variation of rainfall, humidity, and sun exposure are important environmental factors for the design. In addition, existing land use, ecology, topography and hydrology can lead to areas with less development suitability. Therefore, it is important to understand the environmental baseline of the existing conditions in order to maximize the design while being sensitive to the natural conditions.

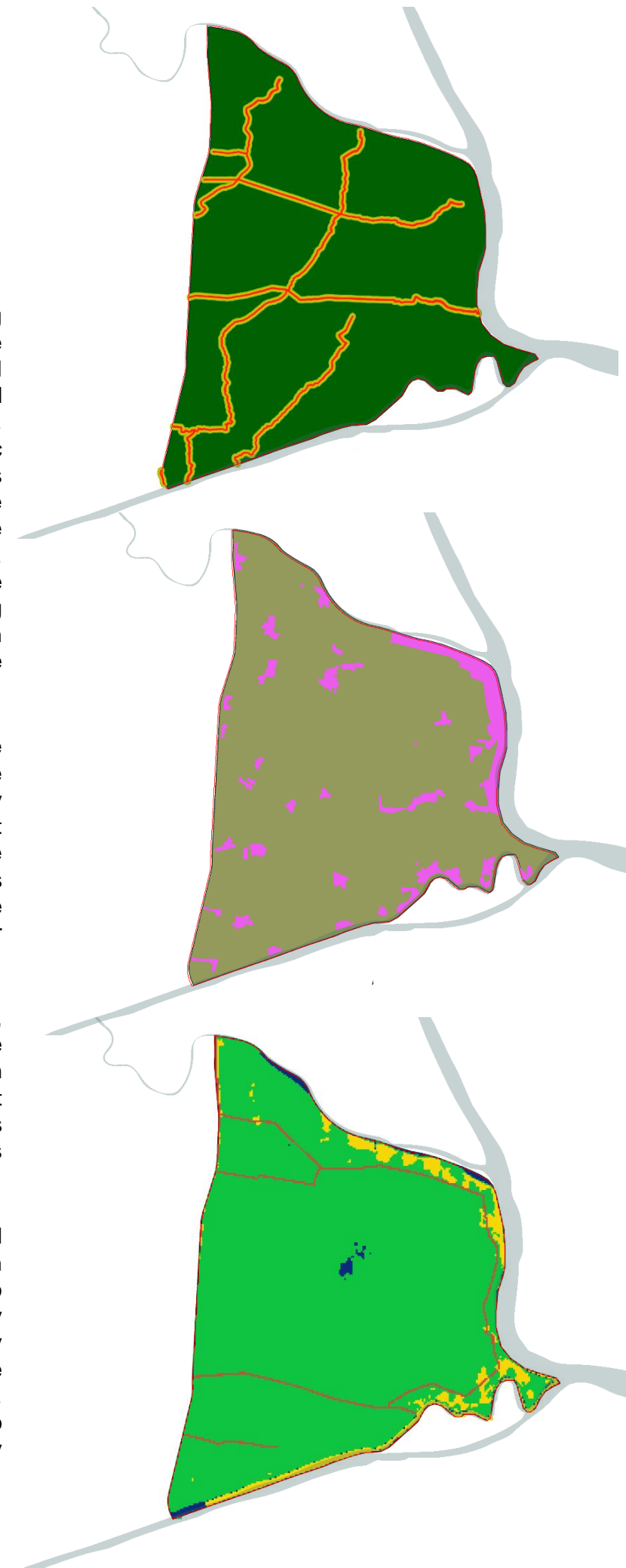
As the site is quite flat with majority of the site area has slope less than 10%, therefore only elevation will be use as a factor representing for the site topographic in the suitability analysis.

The site elevation is also relevant to flooding risk of the site in which low lying area will be more prone to flood. In this study, we will classify the suitability of site elevation based on the flooding risk that could happen on site. Royal Haskoning undertook detailed Strategic Flood Risk Assessment for Phase 1. This identified that high water levels in the surrounding system are caused by strong tide and storm surges as well as sea level rise. The pluvial system also provides large amounts of rainfall with high intensities during the monsoon periods. Flood mitigation measures are required to manage these hazards and risks.

In the ecological baseline analysis, the existing main natural stream within the site and their outlets contain high biodiversity value. Hydrological network is also important for it flood conveying purpose. Therefore, the hydrology factor which consists main streams within the site should be considered in the Suitability Analysis to reflect area with higher biodiversity and hydrological value.

Beside the elevation and hydrological factors, existing land use is also a main factor to be used in the suitability analysis even though most of the site is agricultural land but existing villages as well as existing pagodas should be considered as sensitive receptors in the analysis.

In total, three factors of Elevation (combined with flooding risk), Hydrology (combined with Biodiversity) and Land Use are overlaid to analyze the overall environmental sensitivity of the Project Area, each weighted differently depending on its significance on the sensitivity of the development to the area. The map areas were reclassified according to the three factors (i.e. elevation, hydrology land use) in the following sections.



Hydrological Suitability Legend

High	Mid Low
Mid High	Low

Distance from the river	Suitability	Description
< 25m	Low	River and ecological buffer zone along river – frequently inundated
25 – 50m	Mid Low	Transition zone between the riparian and inland area – might be inundated during high tide
50-100m	Mid High	Inland area with lower riparian ecological value – lesser impacted by riparian flood
> 100m	High	Inland area – lesser impacted by riparian flood

Elevation Suitability Legend

High
Low

Elevation (MSL)	Suitability	Description
< 1	Low	Above mean sea level but below mean high tidal level
1 - 2	Mid Low	Above mean sea level but below mean high tidal level
2 - 3	Mid High	Above mean high tidal level
> 3	High	Above the 100-year Pluvial flood level and High Tidal level

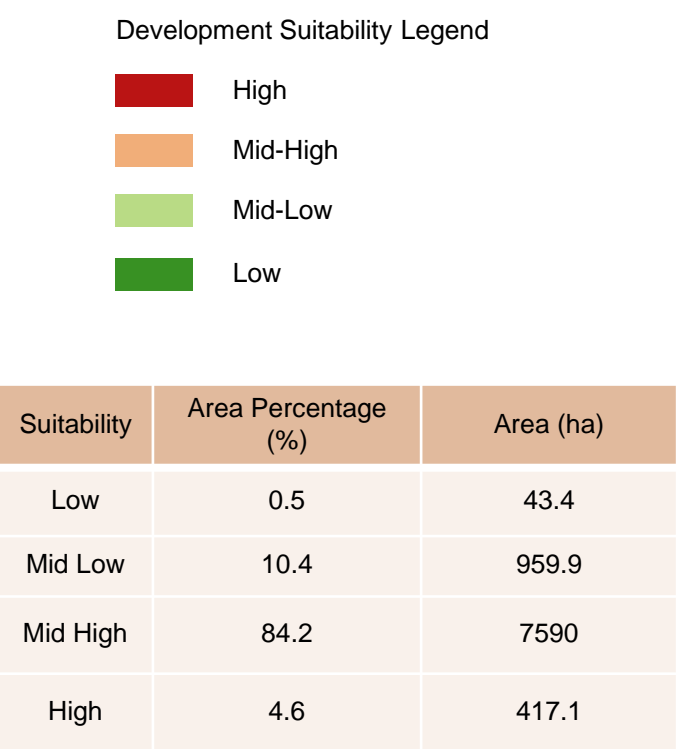
Land use Suitability Legend

High	Mid Low
Mid High	Low

Land Use Type	Suitability
Existing villages, existing pagodas	Low
Agriculture lands, existing roads etc.	High

The composite sensitivity analysis of existing environment shows the areas with different degrees of development suitability. High sensitivity area with low and mid-low development suitability are located along the main natural streams and existing villages which account for around 11.2% of the site area . The suitable areas with 8,006 ha (88.9%) for development are more in existing agricultural areas, existing roads and area with higher elevation. Based upon the environmental analysis, we have formulated environmental strategies to guide the development in a technically feasible and environmentally sustainable manner. The success of the city development is dependent on the continued health of the surrounding environment and ecosystems. It is therefore important to consider the development's impact on the environment and incorporate measures that will mitigate these impacts for a sustainable development.

For areas with relatively higher suitability, it is more suitable for high-density development activities, such as township, industrial area, etc. However, as it is also located within the plain area and downstream of rivers, flood mitigation measures and storm management systems should be put in place. Due to heavy rainfall and typhoons resulting flooding risks to the low-lying may occur in the wet season, it is recommended to integrate flood mitigation strategies into the site development, such as constructing flood retention ponds or wetlands to reduce the peak flow. The flood retention system could also be integrated to the water storage systems to supply domestic water demand for the development. In addition, environmental and ecological designs should be applied to minimize negative environmental impacts.



Suitability Analysis for the NYC

2.5 Benchmark Summary

Examples of city scale development in Asia are numerous, but few have been successful in the past decades. In order to identify the key success factors, the AECOM team identified the best practices in terms of city positioning, products typology, land development governance, economic model and design highlights. Rather than being exhaustive in the greenfield development sector, curated case studies have helped to define preliminary “Smart governance” parameters to harness the future New Yangon City endeavours in the making of a liveable and sustainable city.

Case studies come from both in China and Vietnam where large scale projects have been planned and consistently implemented based on integrated governance system. Phasing, and development control are key components of the new town success tied up with shareholders inclusion at the different stages of the process.

Urban land development history in South East Asia, in the recent period, has demonstrated key points that are highlighted in the case studies analysis, on the right side.

The key takeaways, here aside, have been summarized and consistently integrated in the following recommendations to be found and detailed in the Spatial Plan chapter (chapter 4).

The key takeaways focus on key strategic actions to be taken and followed up by NYDC up front the implementation stage, and during the implementation phase itself.

KEY TAKEAWAYS



One-stop business process through a dedicated management body



Private sectors involvement in development governance



Public – private collaboration as most prominent development strategy



Bold design and district making statement to enhance legibility for investors



Incentives + preferential grants towards preferential industrial sectors



KEY FIGURES & POSTIONING

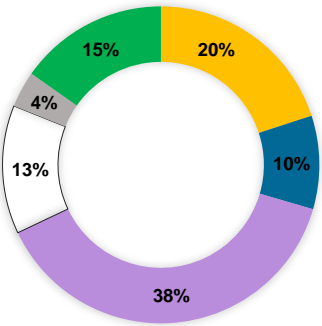
project name	Sino-Singapore Suzhou Industrial Park
location	Suzhou, CN
population	700,000
land area	80sq km (projected)
land owners	Suzhou-Singapore Township Development (SSTD)
master developers	SSTD
positioning	<i>“Develop into an innovation eco-township of internationalized, modernized, information-based happy district of Suzhou.”</i>
primary use + amenities	Residential recreational open space public amenities commercial educational (vocational international schools) industrial parks
IMPLEMENTATION STRATEGY	
phasing strategy	<ul style="list-style-type: none">Phase 1: 10 sq. km: hi-tech ready-built estatePhase 2: 10 sq. km. focus on logistics
implementation tools	SEZ, primary investors host and identified through one-stop business process
broad cost	1.25bnUS\$ investment debt for infrastructures
partnership / JV	<ul style="list-style-type: none">Government-to-GovernmentJoint Venture between SSTD and SUDC (China owned)
Planning strategy	<ul style="list-style-type: none">One body two wings structure that defines the phasing main directionSelf sufficient planned units according to Singapore estate planning experienceCatalyst projects (Park, CBD, Convention Center, University.



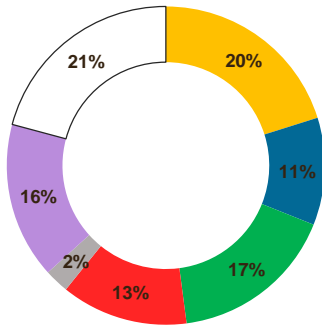
Tianfu New Science City	Pudong New Area District	Phu My Hung South-Saigon
Chengdu, CN	Shanghai, CN	Ho Chi Minh City, VN
300,000 (working population)	1.8M	1M
73sq km	500sq km	31sq km
Chengdu Municipal Government	PNDA Management Office (PNDA)	CT&D; PMHDC; TTC; HIPC
Beijing Vantone Citylogic Invest. Corp.	PNDA	Phu My Hung Development Corporation
<i>“To become a national center city concentrating on pro-innovation factors by 2020, and have international influence in the field of innovation.”</i>	<i>“Home to the Shanghai free trade zone and a host of world-class business parks, Pudong has the most supportive business environment in China.”</i>	<i>“Re-establish HCMC position in the global economy while creating a modern well-planned city that can become the most desirable international business location in SEA.”</i>
Residential, lifestyle facilities, medical care, education, sports and culture: accessible by expressway, subway and tramway.	Commercial uses (landmarks trophy skyscrapers), residential, public facilities, international schools, and institutions.	Mixed use residential, civic institutions and public facilities, commercial, open space, industrial: process export industrial functions.
Sub-division 8 zones: innovation incubators, information security, big-data internet, industrial R&D, design, emerging finance, science and technology R&D, and school innovation.	1990-1995 : infrastructure and utilities development on Hangpu River + hospitals and educational and entertainment facilities 1995-2000: international airport, deep sea water harbour	1996 - 2006: Nguyen Van Linh development from the District 7 2014: Completion of the Phu My Hung New City Center
Special Economic Zones (SEZ)	SEZ, grants and allowances for foreign investments (1990's: regulation framework reform)	Management Authority for Southern Area Development: “one-stop application procedure”
169bn RMB investment debt for public infrastructures	3.3bn US\$ investment debt for infrastructures and 25bn RMB for public investment	<i>n/a</i>
<ul style="list-style-type: none"> China Railway Engineering Corp’s railway R&D center, Sichuan-France ecology technology Center, Nokia’s global R&D, Chinese Academy of Sciences 	<ul style="list-style-type: none"> Land developers incorporated into JV to develop expropriated land; Creation of SLDC as a public company, privately owned by shareholders: PPP model 	<ul style="list-style-type: none"> Partnerships between private capitals (landowners)
<ul style="list-style-type: none"> one belt two wings + six specialization areas organization around the Xinglong lake 	<ul style="list-style-type: none"> Radial development (garden city principle) principle: Central green cores and corridor (Century Avenue) Traditional chessboard design 	<ul style="list-style-type: none"> Corridor oriented development Grid system as urban structure From 17 to 48m ROW to enable urbanity

LAND USE

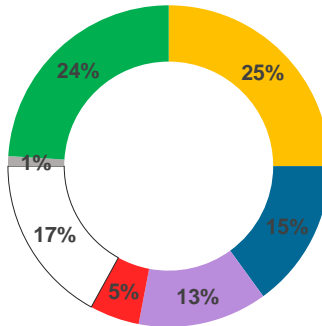
Sino-Singapore Suzhou Industrial Park



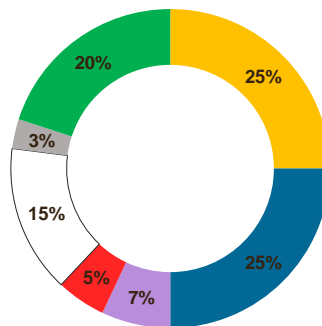
Tianfu New Science City



Pudong New Area District

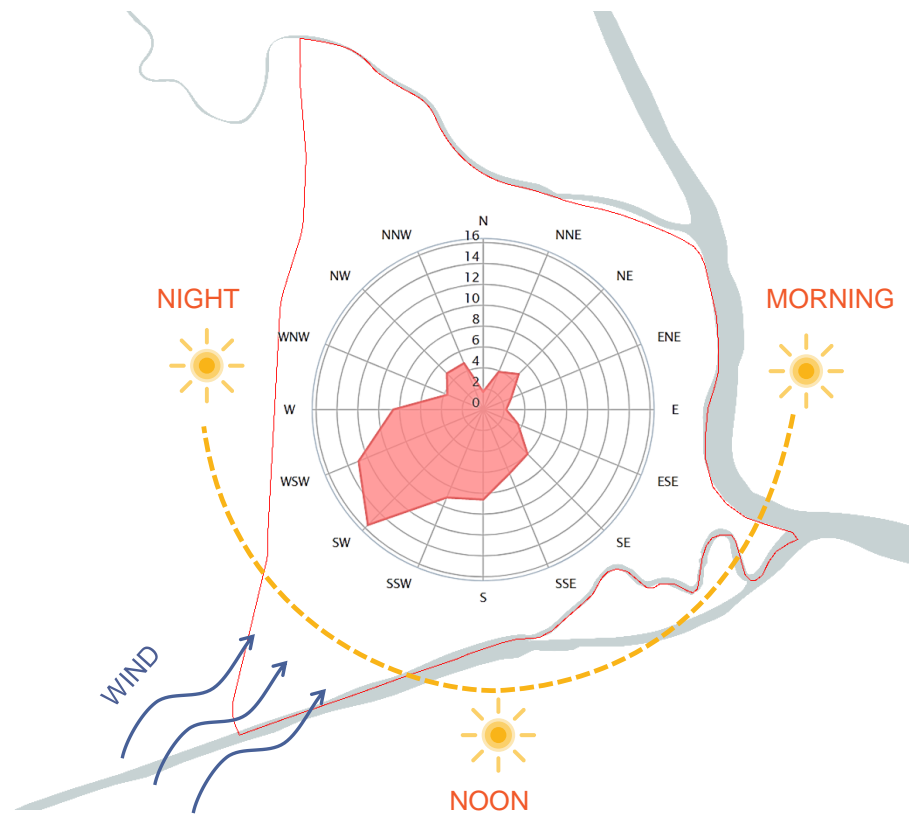


Phu My Hung South-Saigon



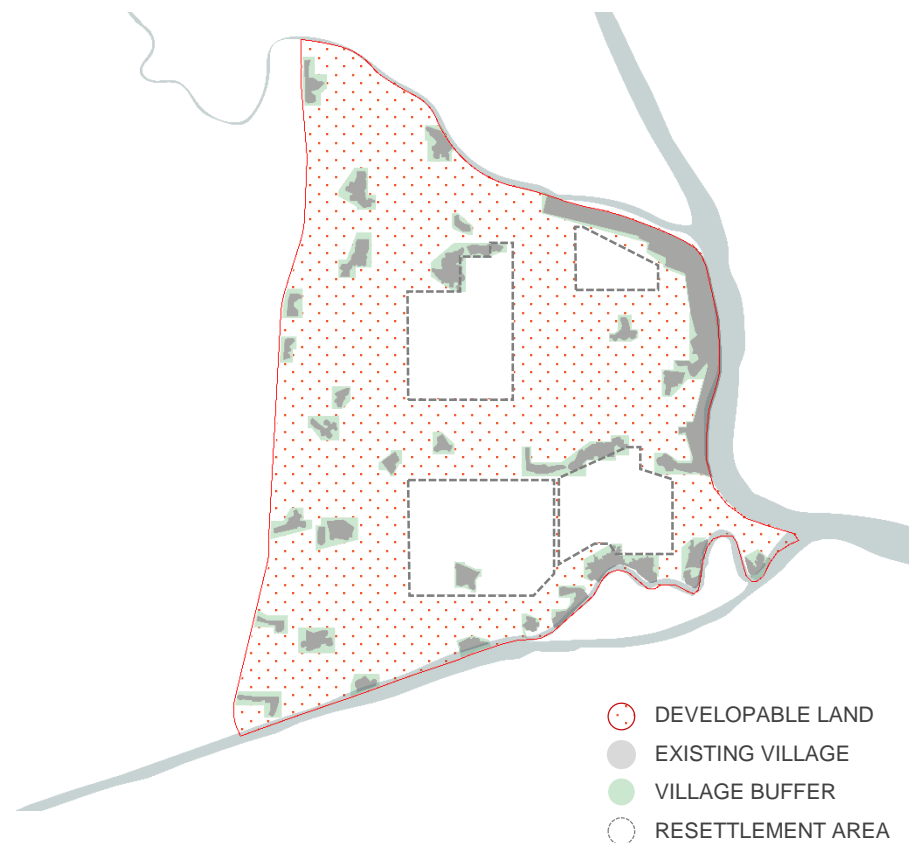
2.6 Site Analysis

Challenges & Opportunities



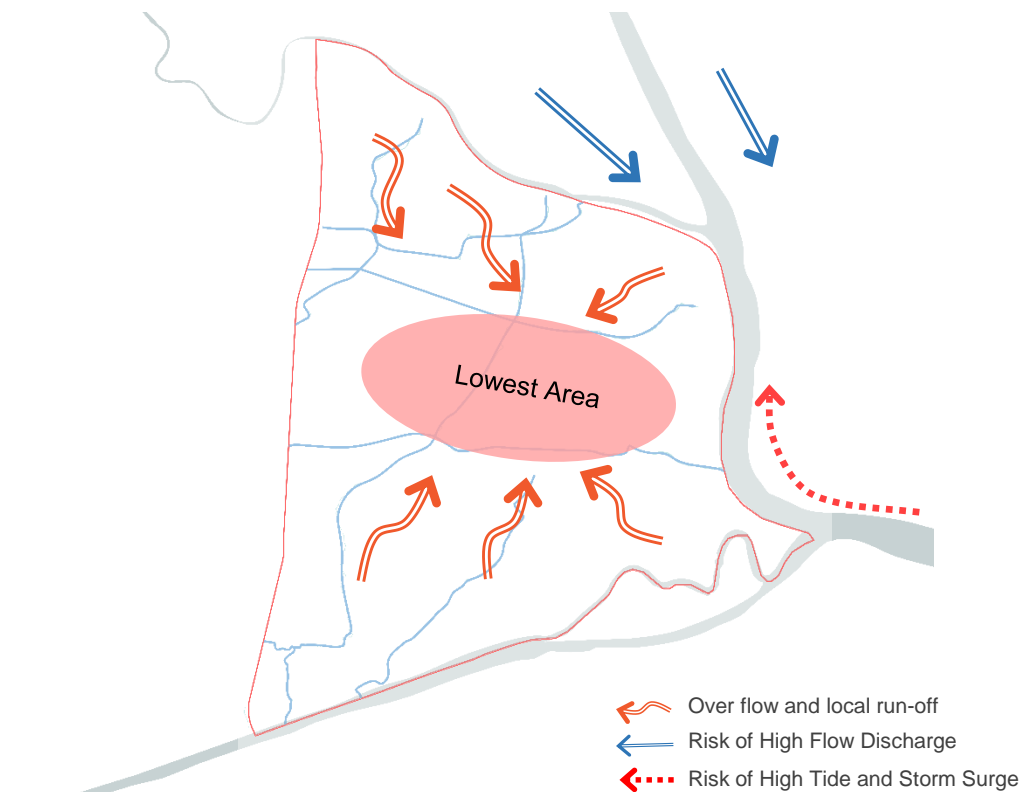
Wind Flow and Sun Path

With a tropical monsoon climate, New Yangon City will experience heavy rains, high temperature, and high humidity. Thermal comfort needs to be achieved through shading and by capturing prevailing winds. Passive and active cooling techniques can be employed for individual structures that can reduce solar insolation and allow natural ventilation.



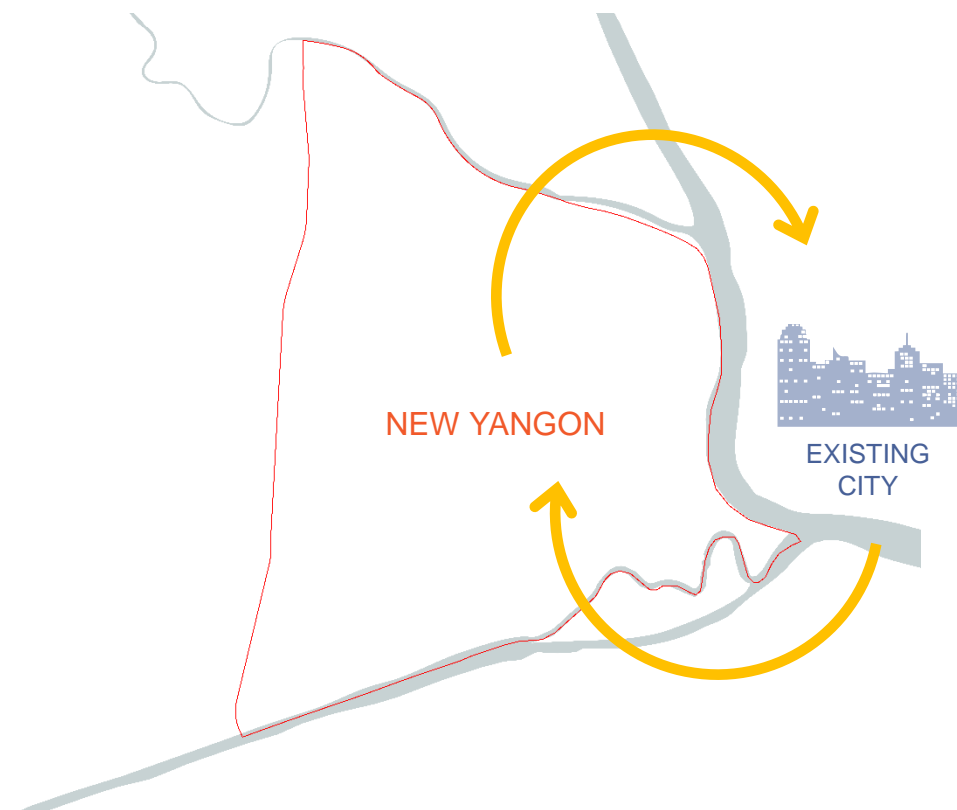
Land Availability

Existing settlements and provision of resettlement land reduce the amount of developable land available for the city to monetize. With approximately 7.0 sqkm of land under existing settlements and around 19.0 sqkm of land for resettlements, the city will have limited land availability after provision of green areas, roads, and public amenities. The programming of available land needs to be carefully programmed to safeguard future development of the city.



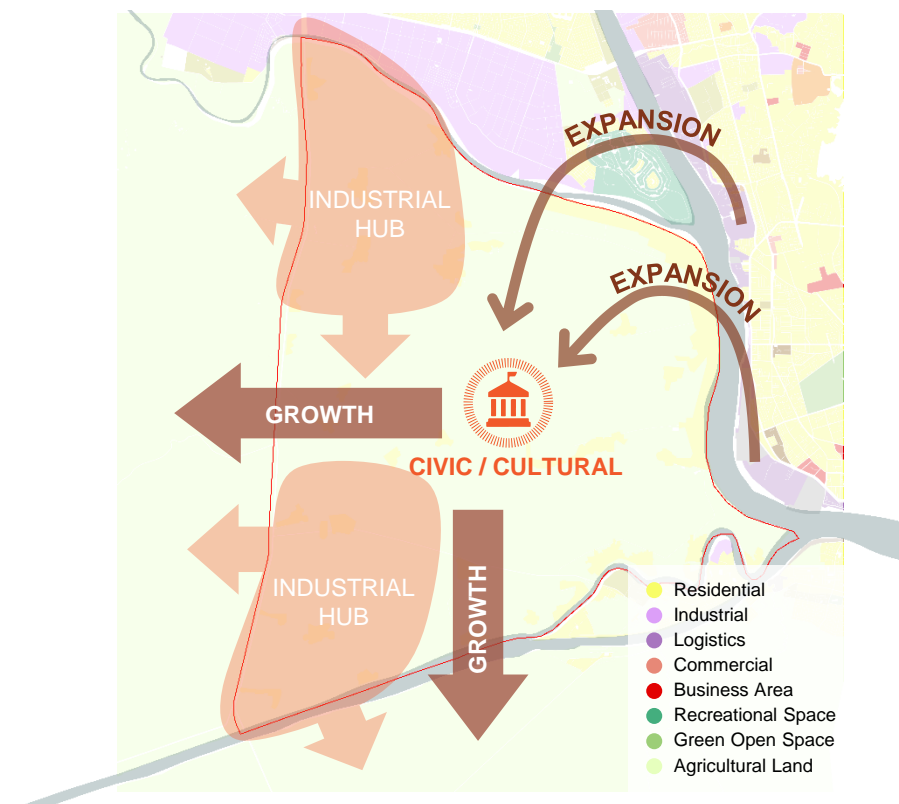
Flood Analysis

The site has significant flood risks that require a robust flood management strategy. Creation of ring dykes and other means need to be employed. The existing drainage network needs to be leveraged and augmented for draining the site in usual as well as special conditions.



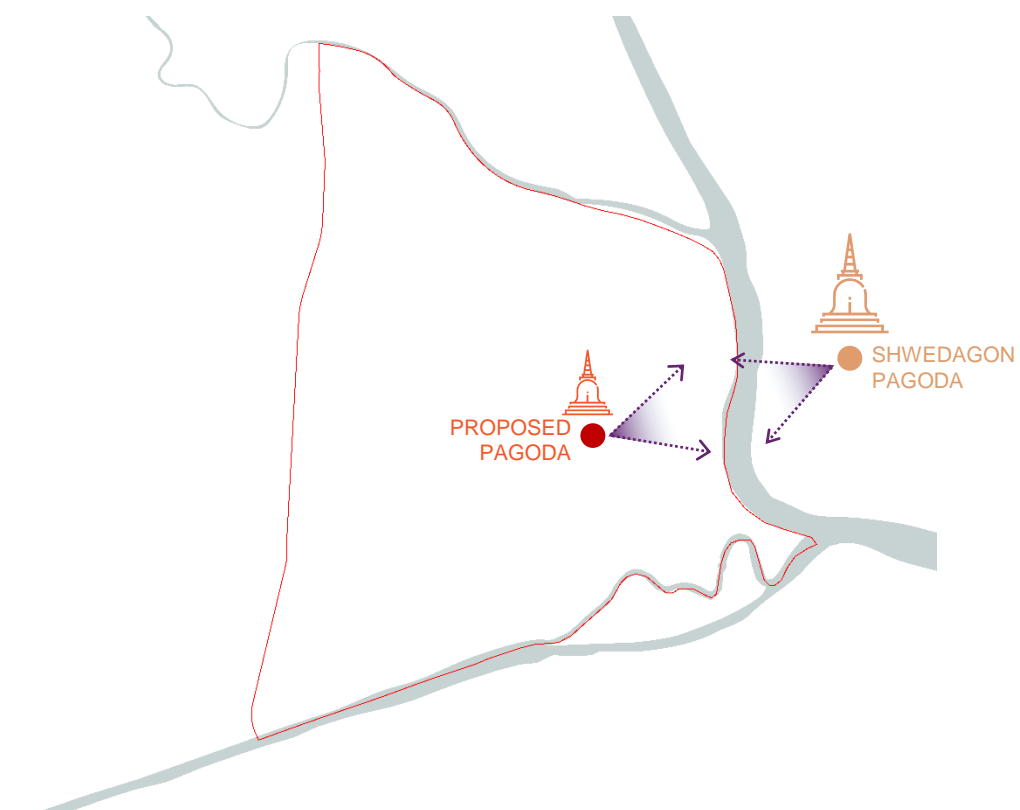
Requirement of Connectivity

Being surrounded by water on three sides, and with the aim of creating jobs for the entire city, there is a significant effort required to stitch New Yangon City with the existing fabric. Future proposals for mass transit also need to be extended to NYC for promoting use of public transportation and reducing the burden on roads.



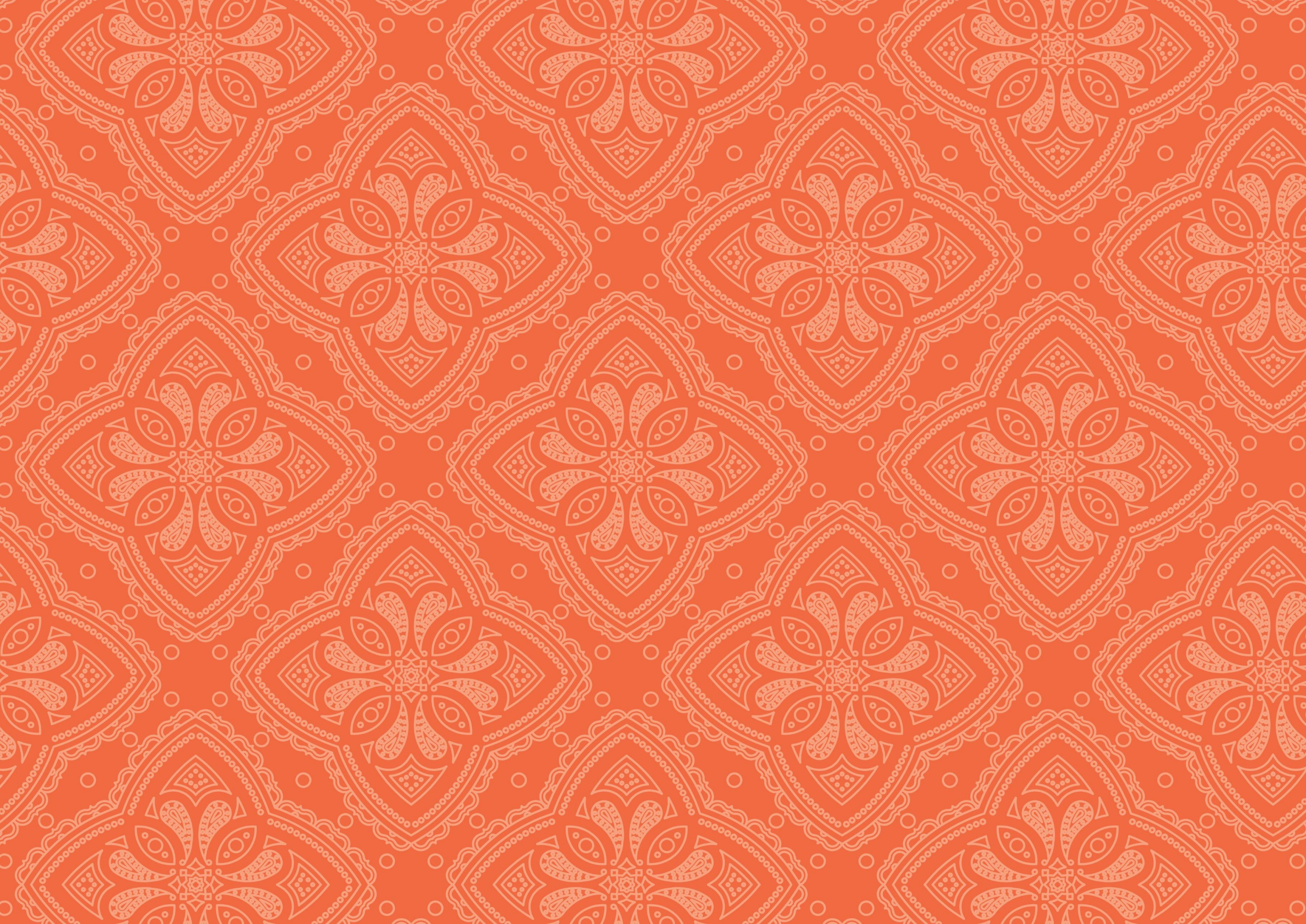
Adjacent Land use

Adjacent land uses and anticipated growth patterns will influence the plan for NYC. With growing needs of the economy and the existing city, NYC will experience pressures of urbanization once it is directly connected with the existing city. It is important to zone uses in the new city in light of adjacent land uses for compatibility and enhanced livability.



View Corridor

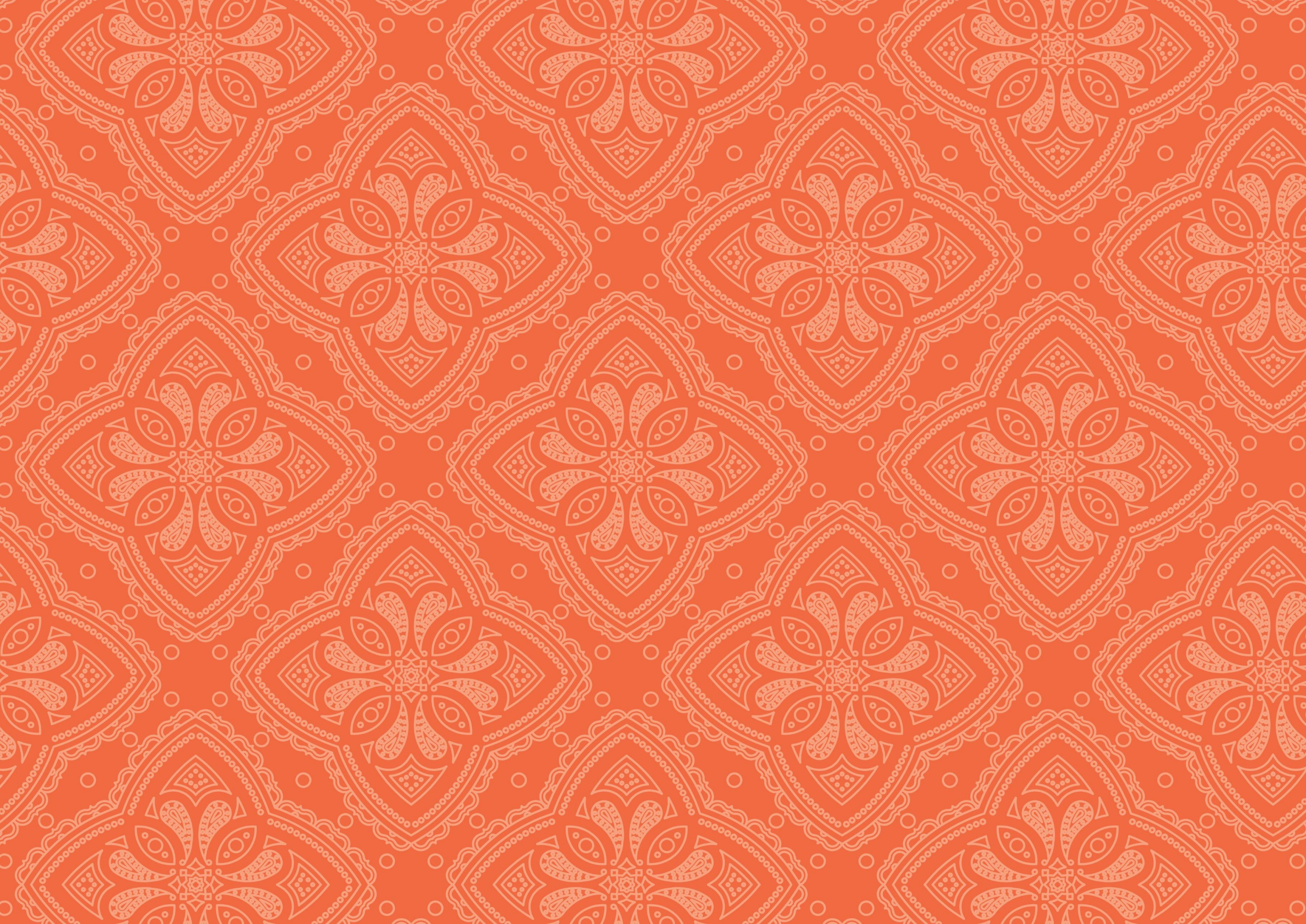
Shwedagon Pagoda is one of the most sacred Buddhist pagoda in Myanmar. The proposed pagoda within the central area of project site provides an opportunity to create a view corridor with the existing Shwedagon pagoda. Additional controls within NYC can be adopted to suggest importance of these areas within the socio-cultural fabric of the site.



3

Population, Employment & Land Development

The main focus of any city planning exercise is people. Harnessing the human agency is key for making cities successful, whether it is in terms of making the city liveable for the residents or in terms of creating jobs and fostering innovation. City planning also needs to incorporate flexibility to ensure that people are able to reimagine and reshape their surroundings to suit changing needs. This chapter focuses on population, employment, and demand for land in New Yangon, such that the plan can respond to future dynamics. The analysis builds on the work and recommendations of the Socio-Economic Master Plan prepared for NYDC earlier, and analyses the population and employment dynamics over time, thereby anticipating demand for land. The projections and estimates have assisted in spatial distribution of various uses across NYC synergizing creating of jobs and infrastructure over the period of development. It is recommended that surveys be carried out periodically to ascertain most current development within the city that should feed into revision of planning for NYC in the future. Demand for land in New Yangon will arise from various factors, primary amongst those is need for new residential and commercial infrastructure. The other main factor is the aim of the city to create 600,000 jobs by 2025 and 900,000 jobs by 2050. This will require concerted efforts by all stakeholders to attract businesses and create supporting infrastructure at a rapid pace including housing within NYC as well as in surrounding areas. At the same time, the city will compete with other upcoming developments within Greater Yangon area. Such demand will put pressure on infrastructure and the city needs to be prepared to respond. One of the critical findings of the analysis indicates that the number of jobs in NYC will lead to high travel demand from the hinterland. Hence there is a special emphasis on public transportation from the hinterland. NYC aims to grow and develop at a pace that has never been seen elsewhere in the world. The city and the private sector will need to mobilize all resources at hand to help achieve these goals.



3.1 Population, Employment and Land Development Summary



Population

About **1.2 million** people will live in New Yangon City by **2050**

Gradual increase with about **180,000** residents by **2025** and **290,000** by **2030**

Aspirational target of **750,000** people by **2025** will require large construction and planning efforts, including the construction of about **163,000 homes**



Employment

NYC will accommodate about **900,000 jobs** by **2050**, depending on the scenario

There will be a gap between the resident workforce and number of jobs, reaching a peak of more than **400,000** around **2032**

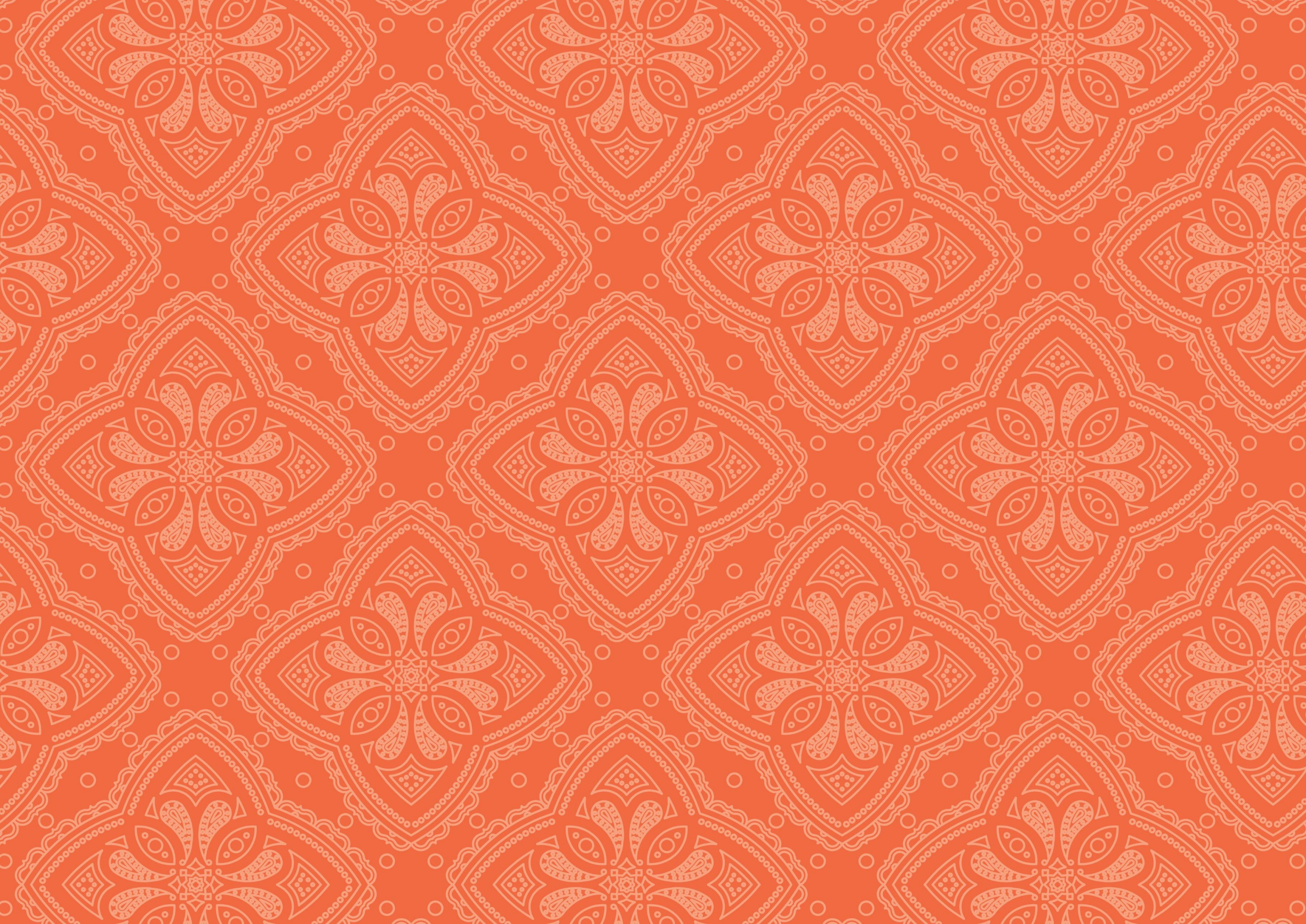
This will result in a large number of commuters, requiring significant investments in **transport infrastructure**



Land Development

The economic model projects a gradual increase in land use from about **24 km2** in **2025** to **44 km2** in **2030** and **90 km2** in **2050**

In **2050** about **25%** of the area is for **industrial** land use, 9% for **services**, **31%** for **housing** and the remainder for other uses



4

The Master Plan

The spatial planning for NYC builds on analysis and proposals for connecting the city with the existing fabric. Population and employment targets for New Yangon indicate the need for connectivity with the rest of Greater Yangon. With the main aim of creating jobs, New Yangon is targeted to have a large industrial area that also caters to smooth flow of logistics. Existing natural ecosystem allows creation of an open space network that integrates the natural flow of water in the site. The master plan aims to create a vibrant public realm that can foster a unique culture within the city. The site is susceptible to flooding especially during cyclones and other storm events. This requires special measures to be adopted in the plan for flood mitigation. A number of character districts have been identified in the city that have a unique identity through clustering of allied activities, and together will contribute to the overall image of the city. The city structure also takes into account future growth towards the west and south by recognizing growth corridors stretching out along transportation corridors. The city is proposed to have a strong relationship between land use and transportation especially through the use of Transit Oriented Development (TOD) concept. Such TOD nodes can also become focal points for creating a 'smart' city, integrating technology with transit and public functions. The master plan aims to create a framework for sustainable communities that can ensure distribution of facilities and amenities as the city grows. This 'Planned Unit Development' framework is proposed to be adopted for planning of resettlement areas, other residential areas, as well as the entire city. While retaining all existing villages, the plan proposes to provide a buffer that can be used for mitigating level differences between new and existing, and for providing required amenities. The master plan was developed after studying many options and employing a Sustainable Systems Integration Model (SSIM™) that allowed testing each option against sustainability performance indicators. The adopted plan was iterated to optimize performance against such indicators that include connectivity, access to green spaces, and jobs to housing balance.

This will be delivered through:

- 4.1 Four Pillars of NYC
- 4.2 Master Plan Alternatives
- 4.3 Master Plan
- 4.4 Future Development
- 4.5 Green-Blue Network
- 4.6 Great Places
- 4.7 Industrial Ecosystem
- 4.8 Planned Units

4.1 The Vision

The Four Pillars of NYC

Based on extensive background research, data analysis, and multiple stakeholder engagements, four main pillars for the New Yangon City have been selected and emphasized as principal enablers for New Yangon City to be able to become a desired living community and a business destination where industries and services can provide jobs while promoting a sustainable development.

1. Social, Economic, and Environmental resilience is key for New Yangon City due to various challenges including flooding, infrastructure provision, job creation, and sustained skill development;
2. The vision for New Yangon City is to be an 'Intelligent City' at the cutting edge of the urban and industrial innovation while providing sustainable tools for people to enjoy services accessibility and increase their living quality;
3. Integration of nature in the New Yangon City is at the heart of the future lifestyle proposed by the Master Plan proposal. Enhancement of the existing ecology system is key to nest communities into the site's original ecosystem.
4. The most fundamental pillar shaping New Yangon City are people. NYC is envisioned to celebrate its people by engaging them in vibrant urban precincts and cultural amenities embodying the Myanmar culture and Myanmar's endeavour for vibrant city development.

The vision is further developed into key principles that are translated into big physical moves allowing formulation of the spatial plan. Embodying the philosophy of the pillars, the big moves provide a backbone for spatial and physical distribution of land use and activities.

1. RESILIENT CITY



“A city of robust eco-system that creates a vibrant and sustainable development.”

2. INTELLIGENT CITY



“To ensure the future growth and sustainability of population by introducing smart elements”

3. GREEN CITY



“To create lifestyle, business, community and industry nested in Nature”

4. PEOPLE'S CITY



“An inviting city that celebrates its rich contents and depth that bring citizen pride.”

KEY PRINCIPLES

Make New Yangon City the future eco-friendly lifestyle destination nestled into a natural and sustainable environment

Celebrate and enhance the culture of Myanmar and Yangon through linking the old with new

Design unique places that define the identity of New Yangon City and give an address for the future investors and communities

Enable a tech-friendly environment to optimize businesses' performances and to maximize people's opportunities and access to services

Enable a future-ready ecosystem of industries, processing and logistics activities to grow and diversify

Connect employment Centers to homes within a transit oriented development framework for people to live, learn, work and play.

Foster citizen participation and private sector involvement into decision-making of the growing New Yangon City

Attract a diversity of businesses in a flexible environment absorbing potential changes

BIG MOVES

NATURE

CULTURE

GREAT PLACES

SMART CITY

INDUSTRIAL ECOSYSTEM

CONNECTED PUBLIC REALM

NEW DEVELOPMENT MODEL

CATALYST OF GROWTH

The relationships between the four pillars of NYC and physical moves have multiple dimensions. Some of those have been explored here to be translated into spatial expressions at the master plan level, while others will need to be explored further in development of the plan. The guiding principles expressed here are encapsulated in the plan through a set of physical spaces and relationships that are found to be of fundamental importance for translating the vision of NYC into reality.



RESILIENT CITY

“A city of robust eco-system that creates a vibrant and sustainable development.”

Enhance flood protection and disaster management

Foster expressions of local culture in space and architecture

Create an identity for districts without compromising on flexibility

INTELLIGENT CITY

“To ensure the future growth and sustainability of population by introducing smart elements”

Tech based management of resources to enhance sustainability

Program spaces to showcase cultural vibrancy

Practice land-banking for unlocking future value

GREEN CITY

“To create lifestyle, business, community and industry nested in Nature”

Provide ample and accessible green spaces for residents

Integrate culture with the public realm and daily activities

Enhance quality of spaces with an active public realm

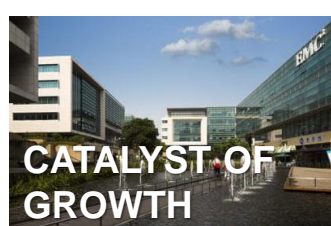
PEOPLE’S CITY

“An inviting city that celebrates its rich contents and depth that bring citizen pride.”

Enhance liveability with active green spaces

Allow flexibility in spaces for multiple expressions and interpretations

Promote diversity and inclusion in design of public spaces



Enable timely responses through data collection and monitoring

Enable diversity and incremental growth towards higher-order industries

Cluster around and densify transit corridors to increase usage

Enhance attractiveness through private sector participation

Safeguard future expansion potential to absorb changes

Create backbone infrastructure for command, control, and monitoring

Engage urban tech to increase efficiency and attract businesses

Allow for strong links between land use and transportation with Transit Oriented Developments

Foster complementary relationships between different sectors of economy

Promote synergetic and planned growth of the city through analysis and monitoring

Allow integration of smart enablers with the public realm for maximum outreach

Enforce protection of environment at all costs

Promote public transit, discourage private modes through usage fees

Incentivise development of public infrastructure and sustainability measures

Nurture and protect the natural environment for future generations

Foster a culture of feedback loops to build confidence in systems

Focus on continued skill development

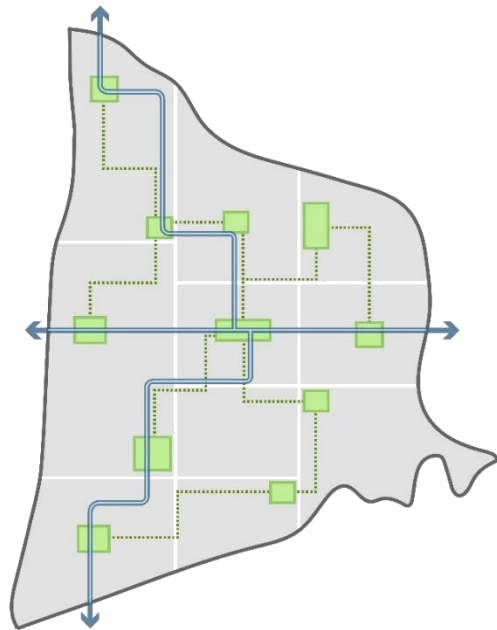
Aim for user convenience through multiple options

Foster citizen participation and good governance

Allow decision-making through participation for greater ownership and pride in the city

BIG MOVES

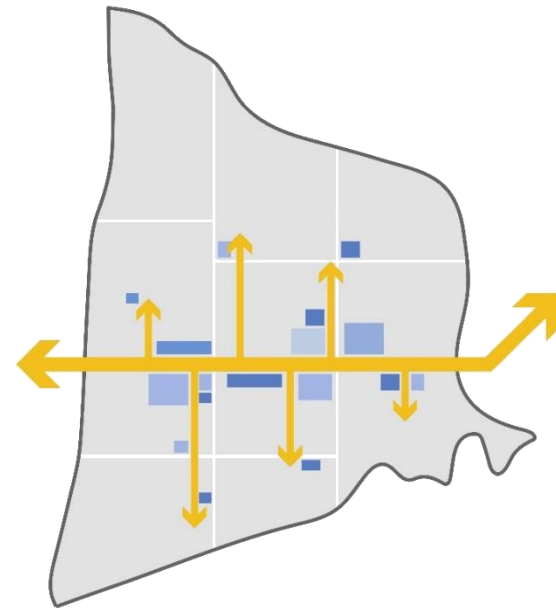
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NATURE

Leveraging existing green networks, enhance liveability and resilience by creating hierarchies and new connections

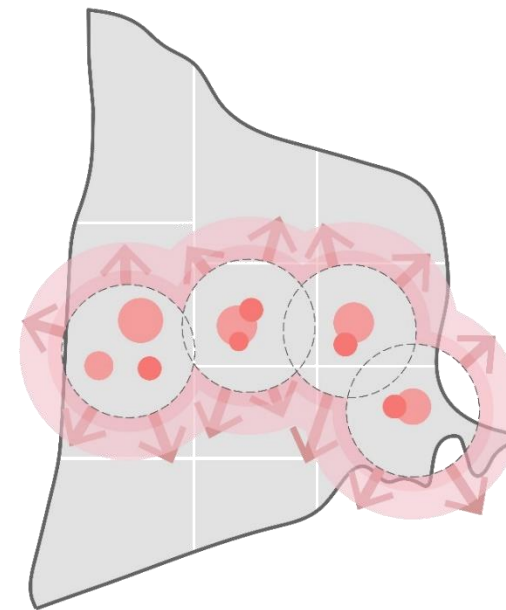
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CULTURE

Create a cultural spine as a means of expression as well as a connection between various programs within the main public realm of the city

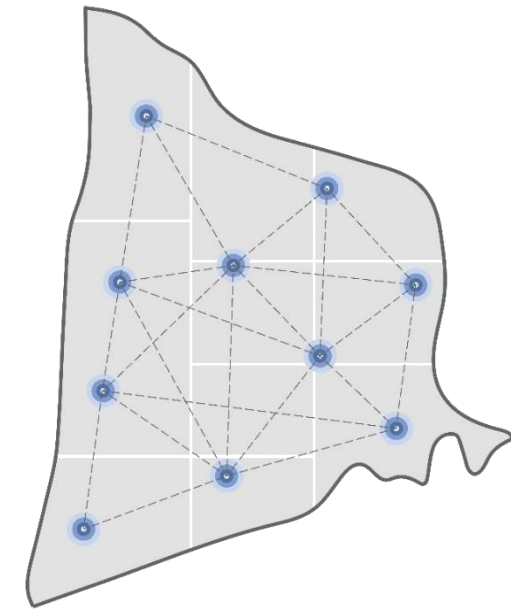
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GREAT PLACES

Create nodes and districts catering to different key activities of the city lending an identity to each

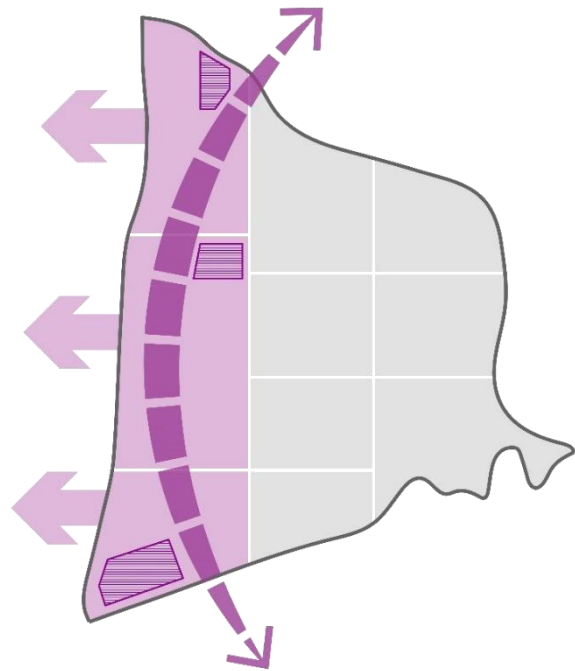
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SMART CITY

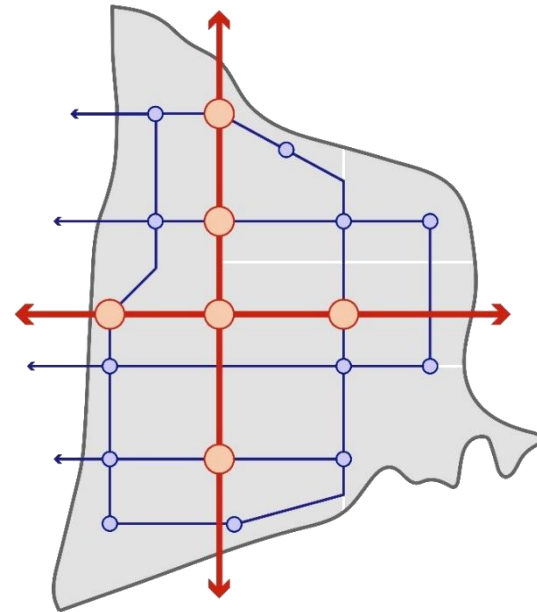
Enable integration of urban tech in the public realm, transportation, and infrastructure for maximum outreach and social benefit

5



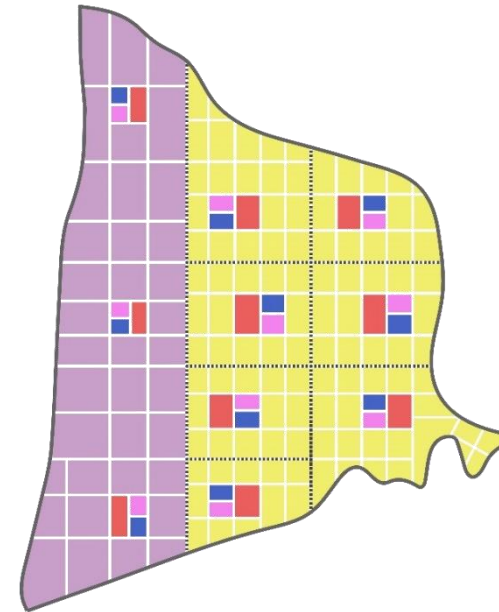
Identify an industrial zone leveraging on existing and future connectivity to create an ecosystem allowing clustering as well as incremental growth

6



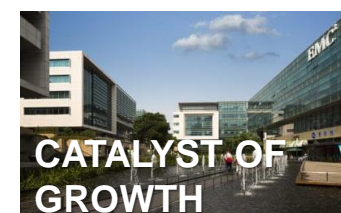
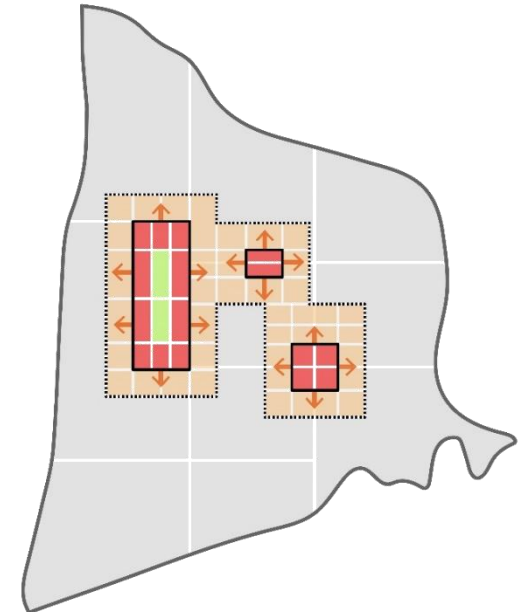
Create a multi-layered public transit system with Transit Oriented Development that connects internally, as well as with the region's network

7



Allow for 'estate' based planned development with norms and standards for a sustainable and cohesive city complete with required facilities and amenities

8



Identify initial catalysts that lend an identity while creating phases of development and land banking to absorb changes and capture future value

4.2 Master Plan Alternatives

Key Considerations

The overall vision and physical framework of big moves can be put together in multiple ways with other practical considerations. Three options were developed to study and analyse such combinations. The main considerations for the alternatives included:

- Relationship with the existing city: Phase I of NYC will have a close relationship with the existing city allowing activities to spill over the river. Almost a natural expansion, NYC needs to respond to this relationship intuitively.
- Future Direction of development: New Yangon City will be part of a larger agglomeration within Greater Yangon, with potential expansion towards the west and south. The new city will need to be positioned to respond to such future stimuli.
- Location of city center/ major commercial node: Commercial activities usually cluster together that also provides a unique identity to a district guiding provision of transportation and other infrastructure. Location of such a node is crucial for developing future relationship with surrounding areas.
- Location of industrial area: The industrial area will be main employment center, requiring logistics and connectivity for movement of daily people and goods, and most importantly, will need to have an early start-up stage with seamless connection with future stages of NYC. The most suitable location is therefore adjacent to the adjacent highway which is proposed to be upgraded into an Outer Ring Road.
- ‘Heart’ of the city: A city may have one or many vibrant districts or precincts depending on the size and population. The ‘heart’ can be defined as one of the most easily recognizable areas that primarily has commercial and public functions, and which is frequented by most of the residents. Locating a ‘heart’ is important for enhancing livability and increasing legibility in a city.

The three alternatives have a specific response to each consideration. Along with these considerations, a set of Key Performance Indicators were developed to test the alternatives against globally adopted benchmarks.

ASPECT	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Relationship with existing city	Strong relationship with existing city with commercial node a short ride from proposed bridge to pull businesses and provide an alternative and absorb overflow of uses	Relationship is primarily in the form of extended residential fabric which will be visible from existing city	Fabric planned as an organic extension of the existing city with mixed use commercial and mixed use residential parcels along major roads; extension of CBD planned in south-eastern portion of site visible from existing CBD across the river
Future direction of development	Weaker relationship with future developments in the west and south, envisaged to be primarily responding to transit corridors	Positioned to act as a catalyst for development towards the west and connect with future growth in the south through the commercial node and a commercial corridor	Organic connections planned towards future growth in west and south
Location of commercial node	Strategically located close to proposed Bridge in phase I from existing city to immediately start absorbing activities and overflow	Located adjacent to highway and between the industrial areas to provide support to those uses and possibly for future growth in the west	Smaller commercial node as an extension of existing CBD with smaller dispersed nodes along major corridors
Location of industrial area	In the west adjacent to highway	In the west adjacent to highway	In the west adjacent to highway
‘Heart’ of the city	Strong relationship between civic area around the proposed Pagoda and commercial node	A city of two ‘hearts’, the civic area around the Pagoda and the commercial node adjacent to the highway	While extension of existing CBD acts as a node, primary ‘heart’ planned around the proposed Pagoda with civic and flexible commercial uses



OPTION 1: East CBD



OPTION 2: West CBD



OPTION 3: Central Commercial Axis

4.2 Master Plan Alternatives

SSIM™ Approach

The framework for analysis of the three alternatives was based on the Sustainable Systems Integration Model (SSIM) prepared by AECOM. The primary objective of SSIM was to measure and optimize planning outcomes by measuring the efficiency and effectiveness of the spatial arrangement of uses and densities in a plan. In essence, this processes helped answers questions such as:

- Which Plan is a 'better' plan that satisfies major goals of the City?
- Which plan option is inherently more sustainable?
- Which Plan will likely create a better living and working environment for residents and workers?
- Where are the planning gaps and how/ where do we improve the plan?
- How do we measure & quantify performance and sustainability?



In the case of Yangon, a range of planning and urban design strategies were tested through the SSIM model to assess for a variety of metrics.

KPI Framework for New Yangon City

Using the SSIM framework, the Master Plan options were assessed under four categories:

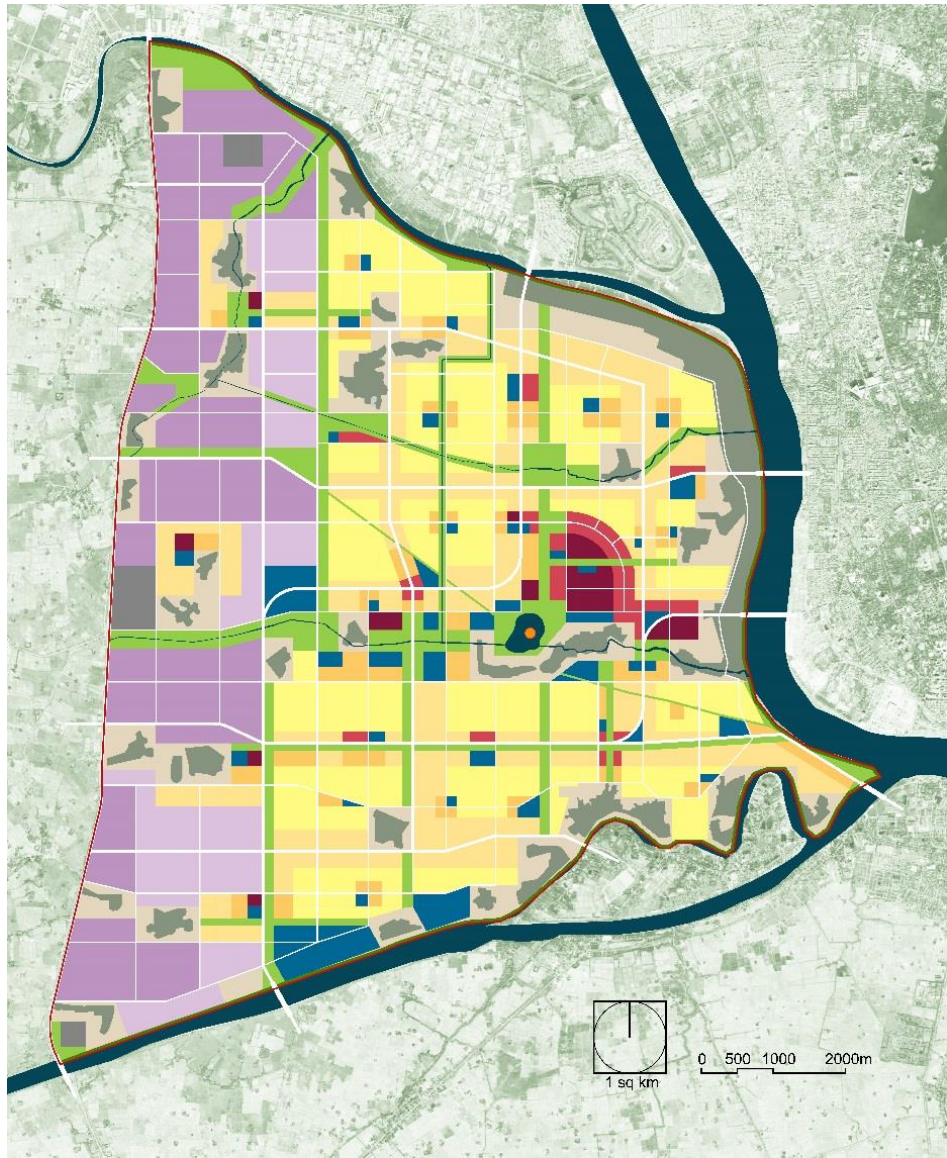
- Connected Neighbourhoods
- Workforce Environment
- Sustainable Urban Infrastructure
- Green Infrastructure

The final score card represents three levels of information about the master plan performance and is represented by a performance disc or a circle. At individual indicator level (L1,L2, L3, etc.) each indicator has a score between 0-100 and is represented by a coloured wedge with the length representing the score. The gap in each wedge represents the potential for improvement in performance for that particular indicator.

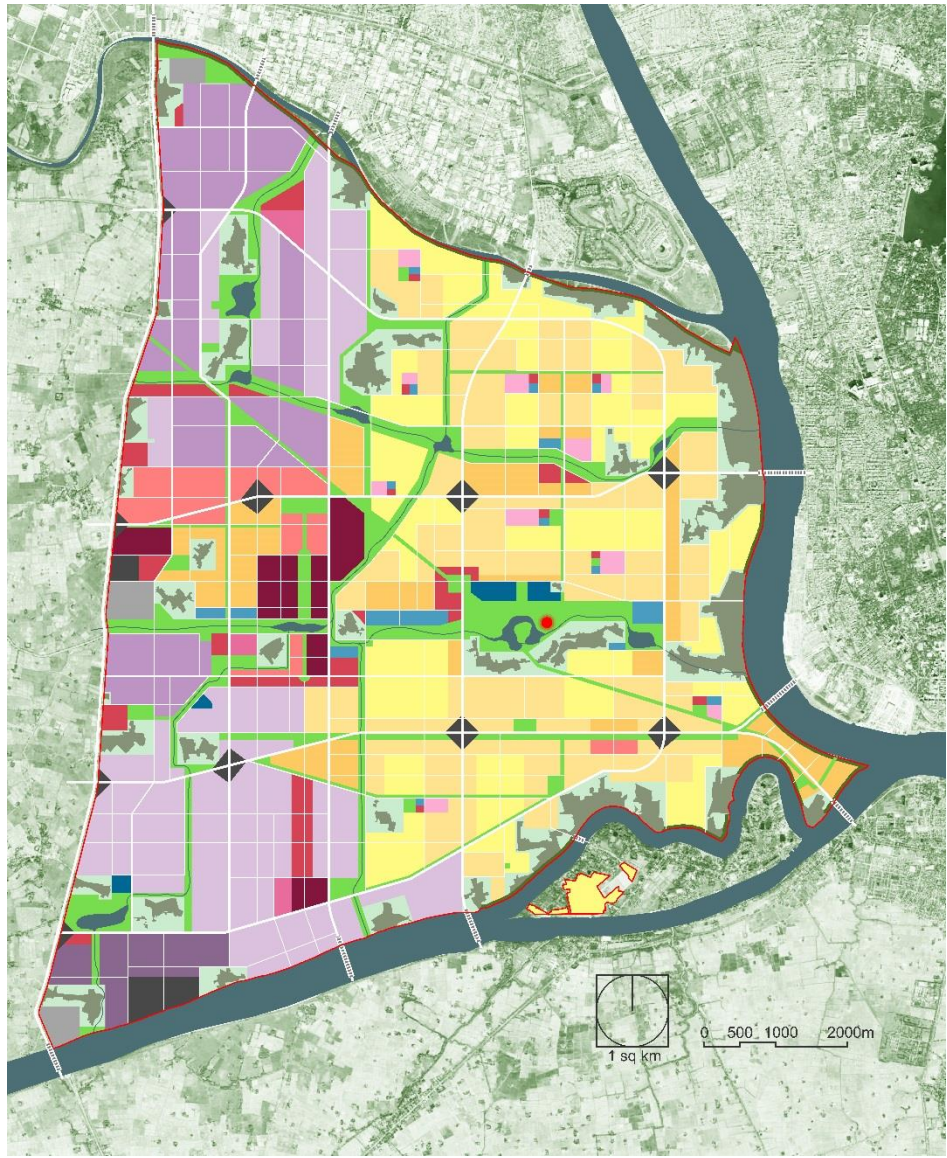
INDICATORS		SCORING CRITERION	BENCHMARK
 CONNECTED NEIGHBORHOODS <i>Creating a New Yangon that enhances human and environmental health by connecting people with nature, neighbourhoods, thriving business hubs and people.</i>			
L1	Access to Transit	Scores 100 if at least 50% residents live within 800m from a MRT or BRT station	Have at least 50% within 800m (LEED ND)
L2	Access to Bicycle Network	Scores 100 if ALL residents live within 250m from a bicycle network	Have ALL residents live close to a bicycle network (Aspirational)
L3	Access to Parks & Open Space	Scores 100 if at least 90% residents live within 800m from a city park	Have at least 90% within 400m (LEED ND)
L4	Access to Waterfront	Scores 100 if at least half of residents live within 800m from an accessible waterfront	Have half people live close to an accessible waterfront (Aspirational)
 WORKFORCE ENVIRONMENT <i>Providing economic opportunities that are accessible to the residents creates neighbourhoods that are inherently more sustainable.</i>			
E1	Jobs Near Transit	Scores 100 if at least 50% employees work within 800m from a MRT or BRT station	Have at least 50% within 800m (LEED ND)
E2	Jobs Closeness	Scores 100 if average job closeness is as low as 5.0 km	Have average commute distance less than 5.0km (Aspirational)
E3	Job Housing Balance	Scores 100 if job-housing ratio is between 1.3 to 1.7	1.3 – 1.7 (APA)
 SUSTAINABLE URBAN STRUCTURE <i>Defined streets and blocks, which are fundamental elements of an urban form, can define density, connectivity, and liveability of neighbourhoods in a comprehensive manner.</i>			
U1	Roadway Capacity Per Capita	Scores 100 if major roadway capacity per population reaches 15.0	Have adequate roadway capacity for NYC (Aspirational)
U2	TOD Land Use Diversity	Scores 100 if average land use diversity index reaches 0.90 in TODs	Promote mixed use development around TODs (Aspirational)
 GREEN INFRASTRUCTURE <i>A green infrastructure approach involves maximisation of physical and functional connectivity while optimising the ecological landscape to create a sustainable community.</i>			
G1	Ecosystem Connectivity	Scores 100 if ecosystem connectivity index reaches 100%	Have a fully connected ecosystem for NYC (Aspirational)
G2	Park Space Per Capita	Scores 100 if park space per thousand population reaches 1.0 hectare	Provide sufficient park space for residents (Aspirational)
G3	Natural Drainage	Scores 100 if natural drainage of canal system reaches 25 miles	Have at least 75% of existing canal system of NYC area (Aspirational)

Alternatives

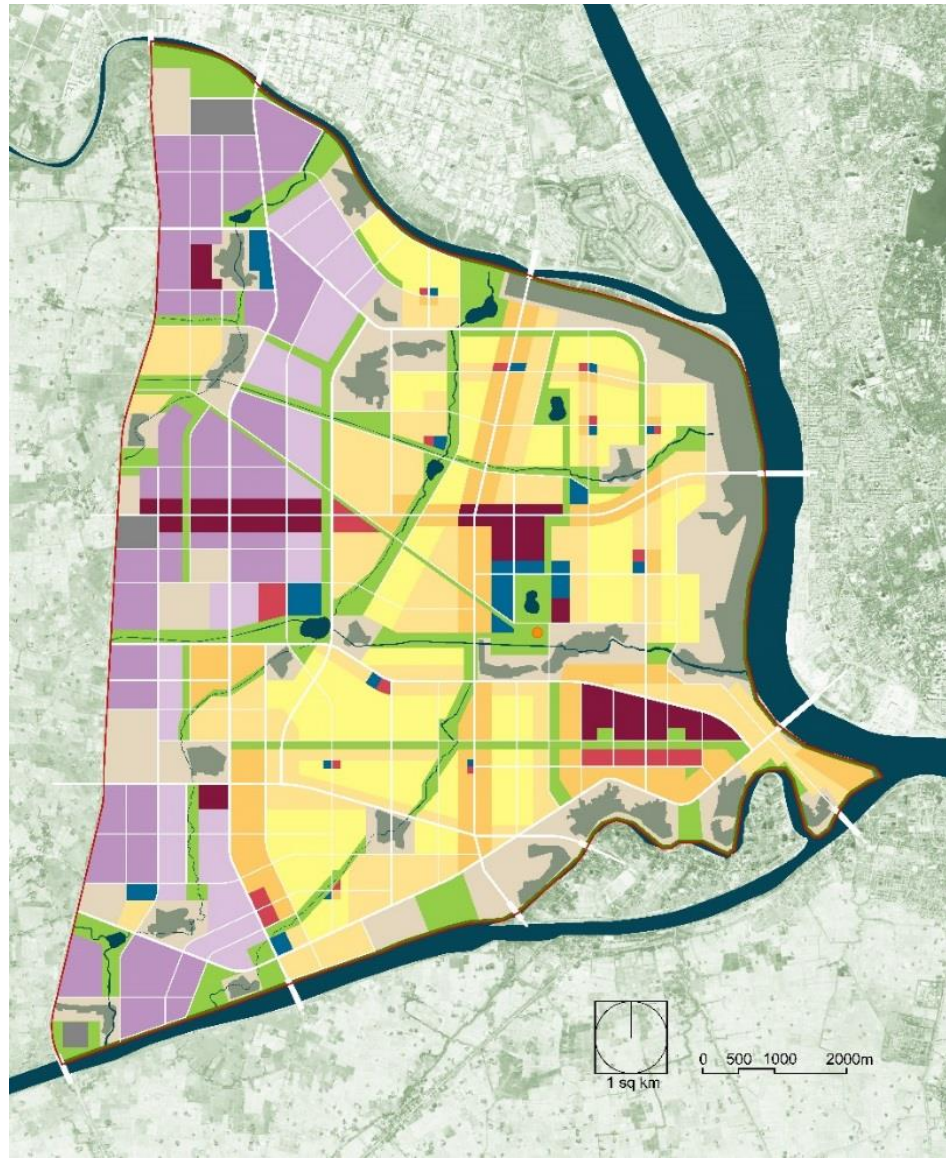
Alternative 1



Alternative 2



Alternative 3



Legend

- | | | | | |
|------------------------|----------------------|----------------------|------------------------------|----------------------|
| Low Dense Residential | Office Commercial | Light Industrial | Administrative Use | Open Space |
| High Dense Residential | Retail Commercial | Heavy Industrial | Cultural & Public Facilities | Existing Settlements |
| Mixed Use Residential | Mixed Use Commercial | Logistics Industrial | School | Village Buffer |
| Transport & Logistics | Utilities | River Buffer | Vocational training | |

4.2 Master Plan Alternatives

Evaluation & Analysis

The SSIM analysis of the master plan alternatives demonstrates that Option 2 scores higher on a range of metrics leading to a higher overall score.

Alternative 1 Overview: The geographic clustering of land uses, lower proportion of mixed use areas and a higher proximity to job hubs, along with persevering fewer existing natural drainage, led to a comparative poor performance of the plan.

Alternative 2 Overview: While the plan scores high on a range of metrics, certain KPIs such as E2 and E3 provide a window of opportunity for future planning efforts within the greater Yangon region. For example, the jobs provided within the study area can be made more accessible to the existing population to the east of the river that would lead to a better plan performance.

Alternative 3 Overview: The plan fairs well on a variety of metrics, however owing to comparative poor performance on park space provision, Option 3 has lower score when compared to Option 2.

It should be noted that, with the exception of a few indicators, a majority of the KPI values in all the three plans do not met their specific goals. The primary objective of SSIM analysis, therefore, is to understand the trade offs between the master plans. While Alternative 2 and Alternative 3 are both arguably better performing plans, the spatial allocation of density and uses of Alternative 2 resonates more closely with the core growth objective for New Yangon, viz. jobs richness, mixed use neighborhoods, preservation of existing natural drainage.



CONNECTED NEIGHBORHOOD

- L1** Access to Transit
- L2** Access to Bicycle Network
- L3** Access to Parks & Open Space
- L4** Access to Waterfront



SUSTAINABLE URBAN STRUCTURE

- U1** Road Capacity / Capita
- U2** TOD Land Use Diversity



WORKFORCE ENVIRONMENT

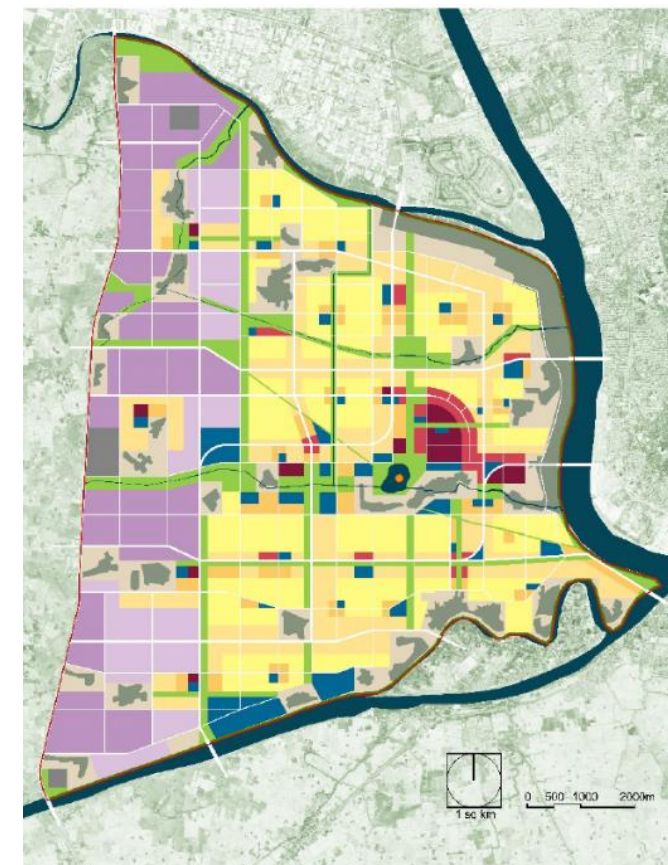
- E1** Jobs Near Transit
- E2** Jobs Closeness
- E3** Job Housing Balance



GREEN INFRASTRUCTURE

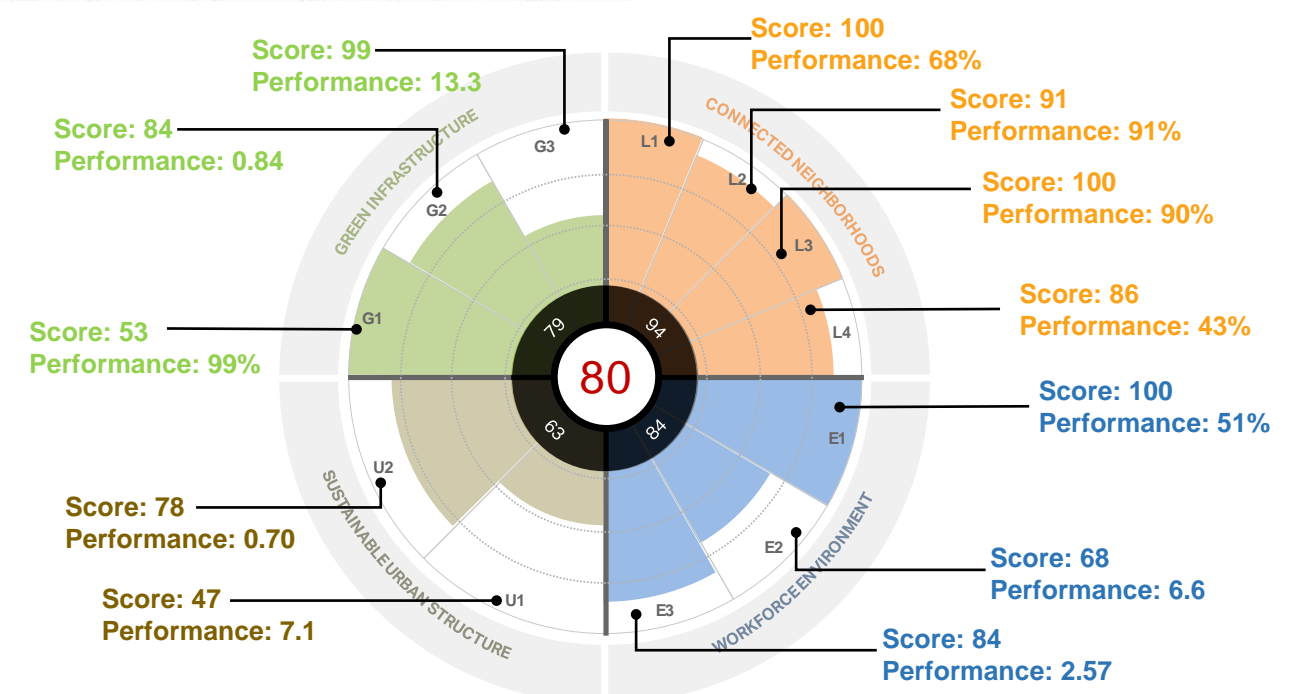
- G1** Ecosystem Connectivity
- G2** Park Space / Capita
- G3** Natural Drainage

Alternative 1

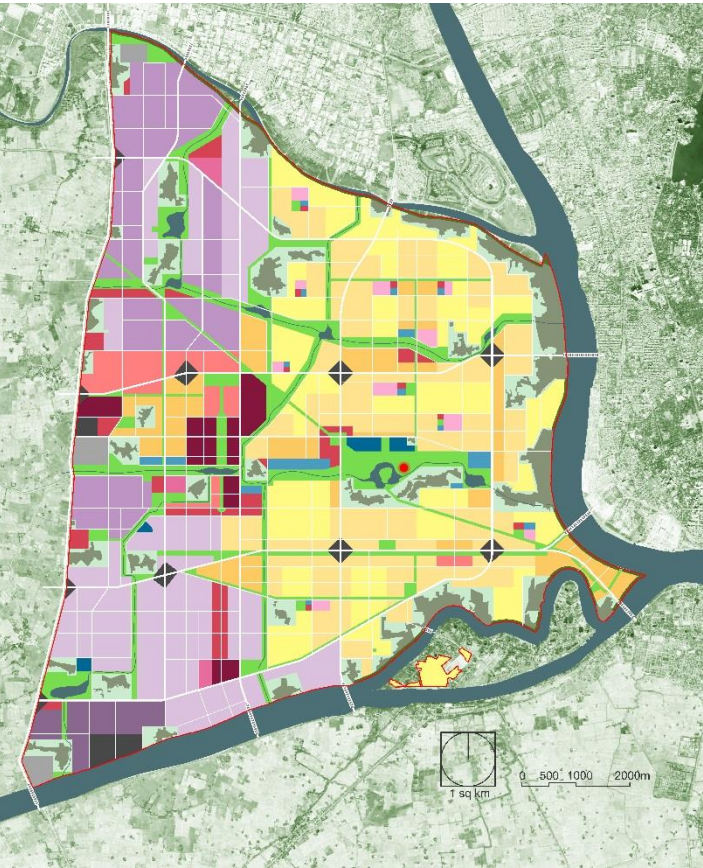


	Total Population	1,218,000
	Total Employment	784,000
	Residential Land Area (km ²)	33.12
	Commercial Land Area (km ²)	2.65
	Industrial Land Area (km ²)	20.14
	Open Space Land Area (km ²)	11.17

- ✓ Location of phase I areas closest to as envisaged
- ✓ Provides a twin-node leveraging Bridge 2 and location of Pagoda creating a vibrant heart
- ✓ Clear delineation of 'planned units' for sustainable growth
- ✗ Static structure with weaker relationship with future growth in west and south
- ✗ Potentially higher dependence on road-side drainage vs natural drainage

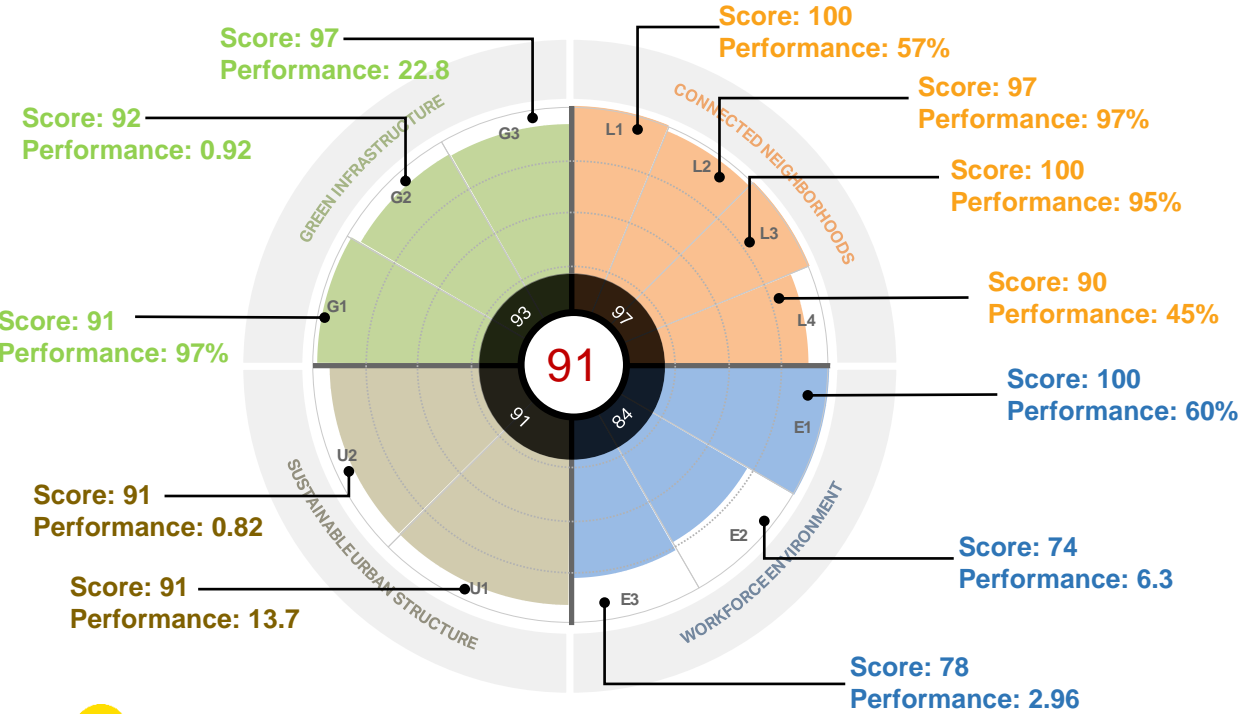


Alternative 2



	Total Population	1,212,122
	Total Employment	901,791
	Residential Land Area (km ²)	30.93
	Commercial Land Area (km ²)	6.41
	Industrial Land Area (km ²)	22.37
	Open Space Land Area (km ²)	9.14

- ✓ Provides for a future growth node leveraging the (future) ring road
- ✓ Distinct relationship with future expansion through growth corridors
- ✓ Clear delineation of ‘planned units’ for sustainable growth
- ✗ Risk of dependence on future growth and expansion
- ✗ Separate commercial node and civic areas creating two separate hearts of the city
- ✗ Weaker relationship of residential areas in industrial hubs with rest of the city

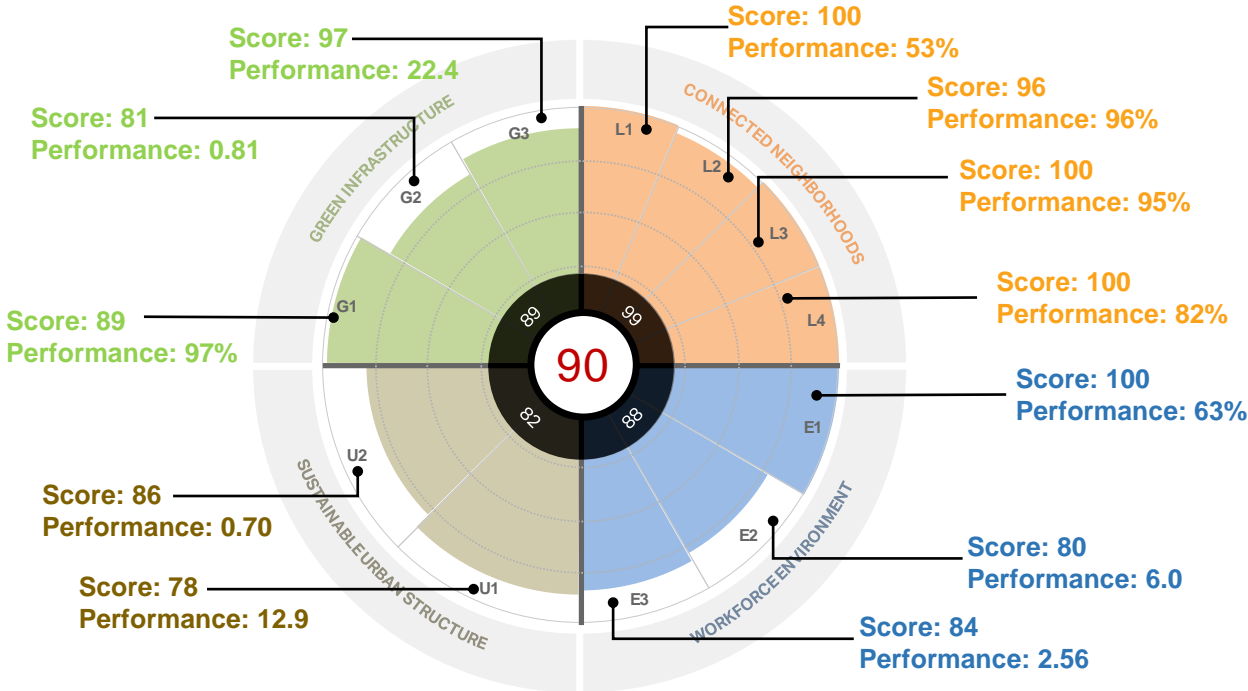


Alternative 3



	Total Population	1,269,000
	Total Employment	812,000
	Residential Land Area (km ²)	32.84
	Commercial Land Area (km ²)	4.47
	Industrial Land Area (km ²)	17.69
	Open Space Land Area (km ²)	12.73

- ✓ Organic structure promoting retention of all natural drainage reducing dependence/ cost of road-side drainage
- ✓ Caters of visual and physical relationship with existing CBD
- ✓ Combined civic and low-intensity commercial ‘heart’
- ✓ Less defined ‘planned units’ and organic fabric will be difficult to phase
- ✓ Improvement works for existing drainage channels required, may balance out savings on deeper road-side drains

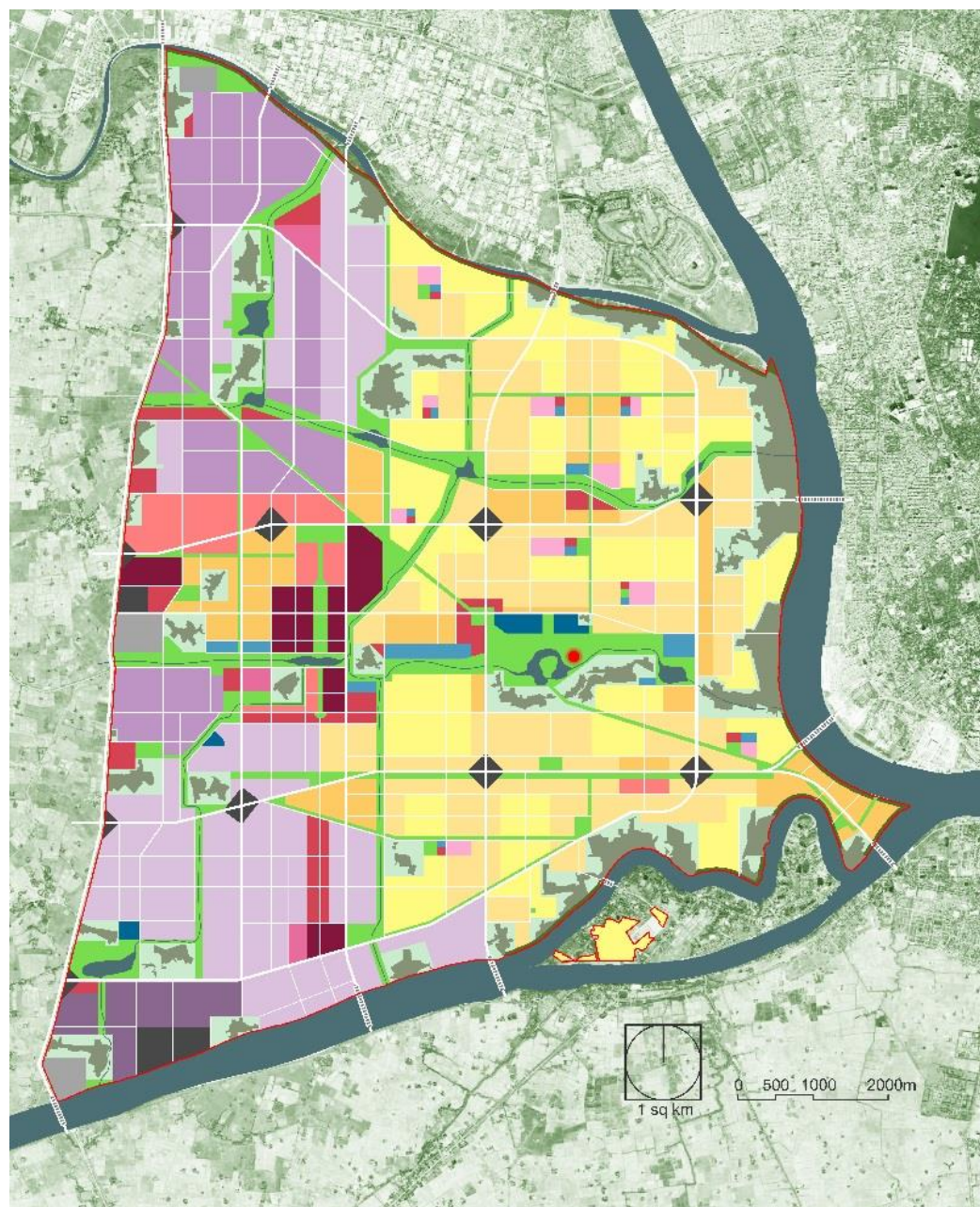


4.2 Master Plan Alternatives

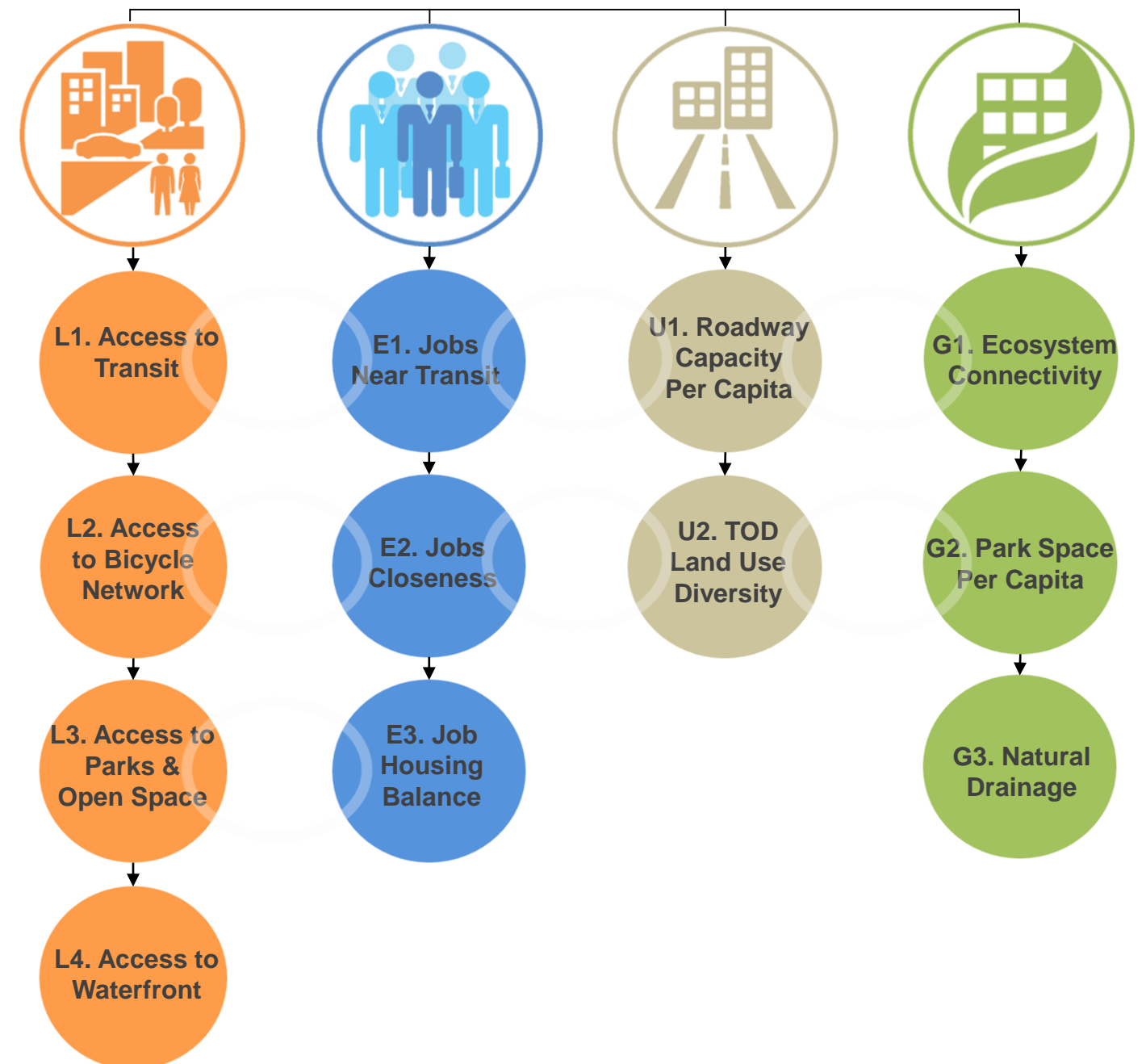
Preferred Option

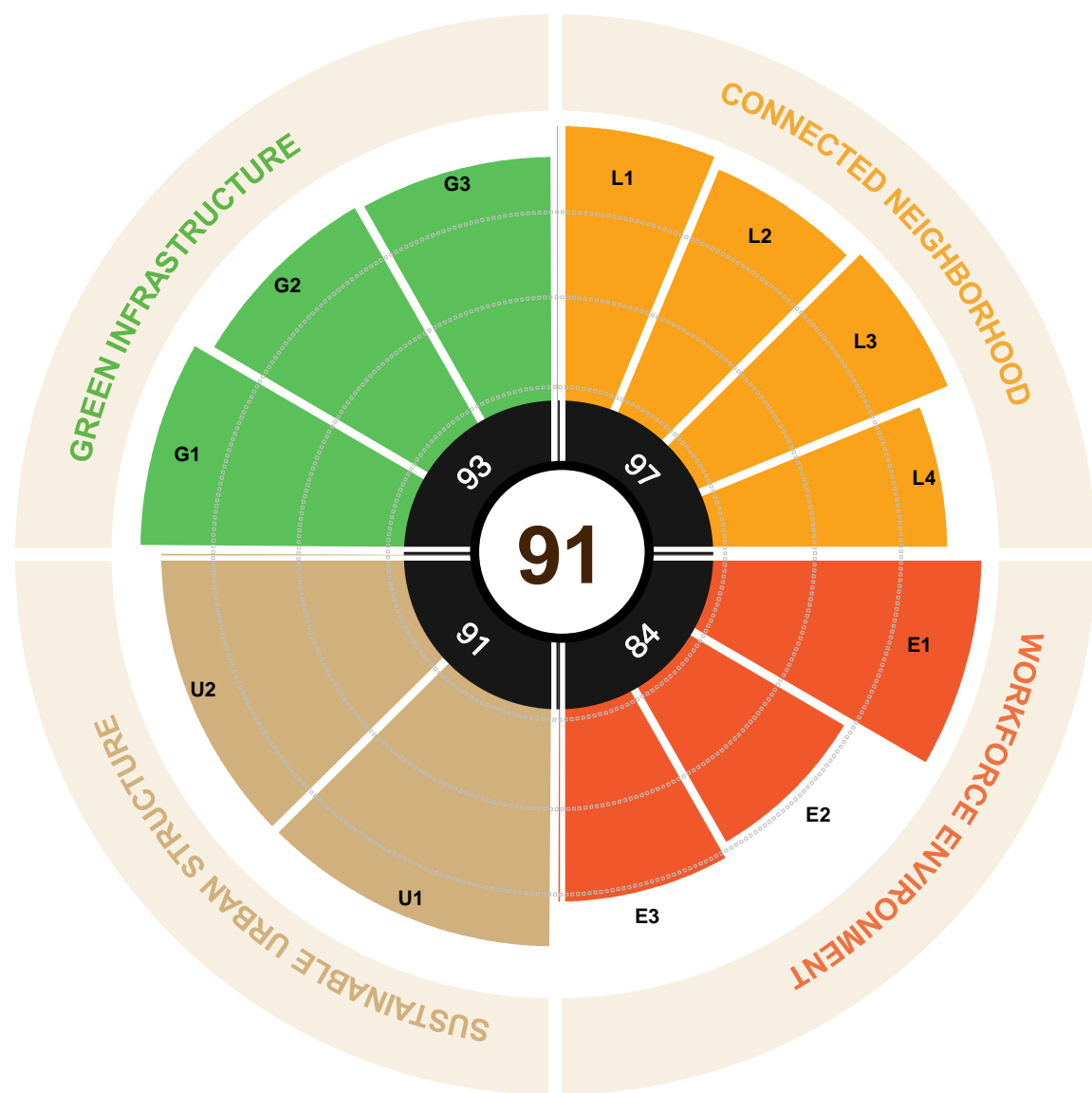
Performance Overview

Based on the performance analysis and amongst the set of 3 Master Plan options proposed by the AECOM team, the option 2 is the best performing among the alternatives that were developed for the study area. In addition to providing enhanced economic opportunities for its residents, the plan also promoted healthy living and provided a more sustainable living environment. In the long term, the urban form of Option 2 is most well suited to achieve the objectives set out for the New Yangon.

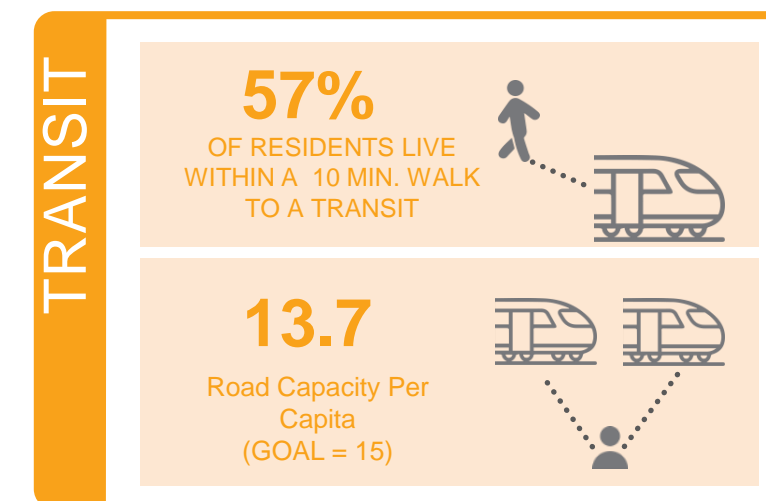
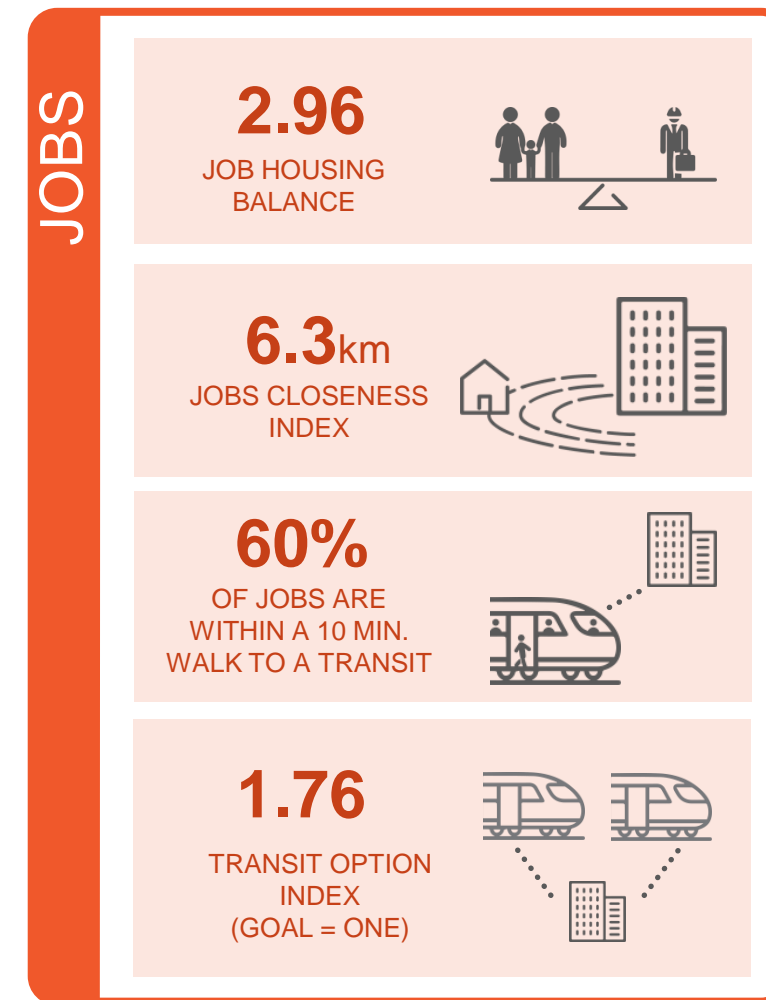
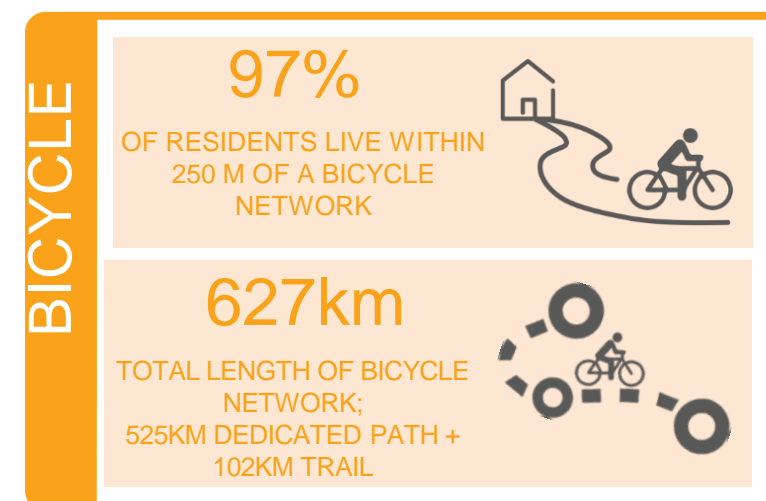
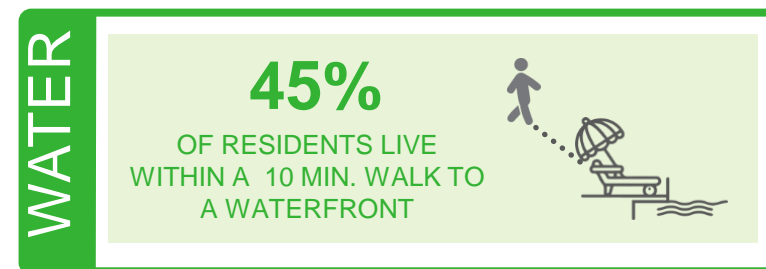
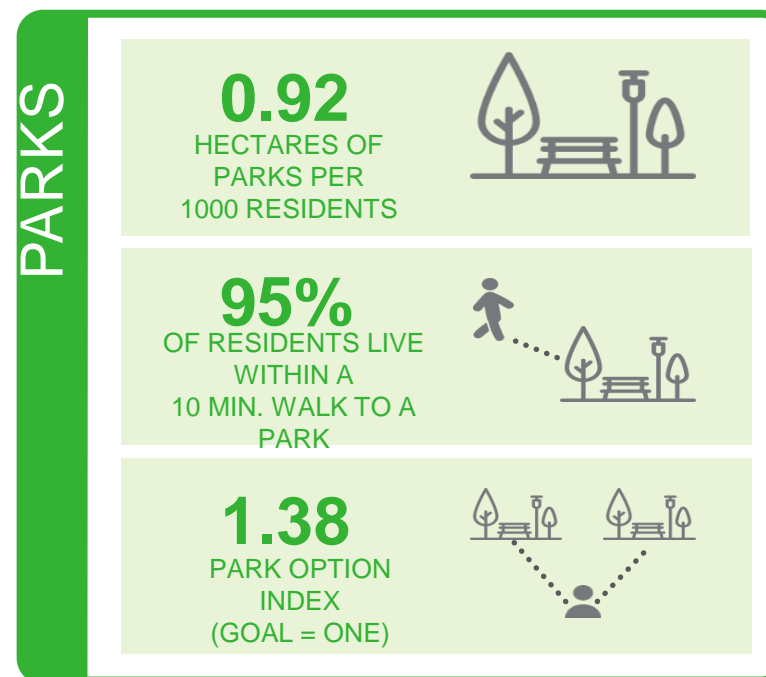


Key Performance Indicators (KPIs)





Key Performance Indicator Wheel



4.3 Master Plan

Land use Plan

The main goal of New Yangon is to generate jobs in the Greater Yangon area through selected industrial sectors (in early stages) that leverage on existing skills and available resources. Therefore around 25% of the site is dedicated to industrial uses. The industrial area is proposed to have a mix of heavy, light, and logistics related uses.

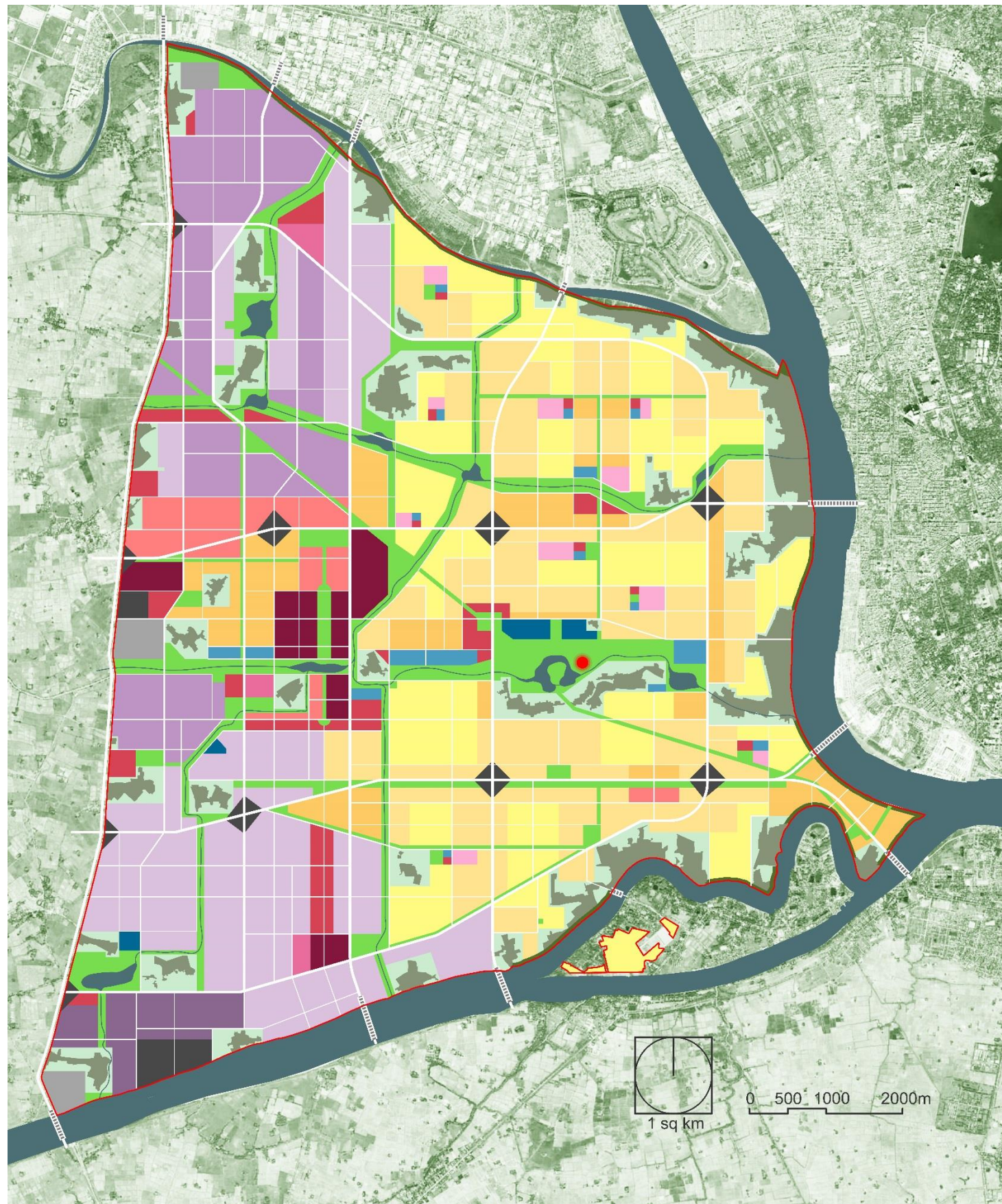
The city center is planned to be strategically located in the west of the city to become a catalyst for the future and serve the industrial areas. Around 35% of the site is planned to have residential uses with varying proportions of density and mix of uses. This residential area will also cater to the resettlement land requirement. Around 14% of area has been allocated for the green-blue network catering to flood resilience and drainage requirements of the city. Further allocations for green area at the local level will need to be made upon detailed planning for each zone/ area.

Civic uses at the city level have been identified, and those at the local level are envisaged to be allocated from within major land use zones.

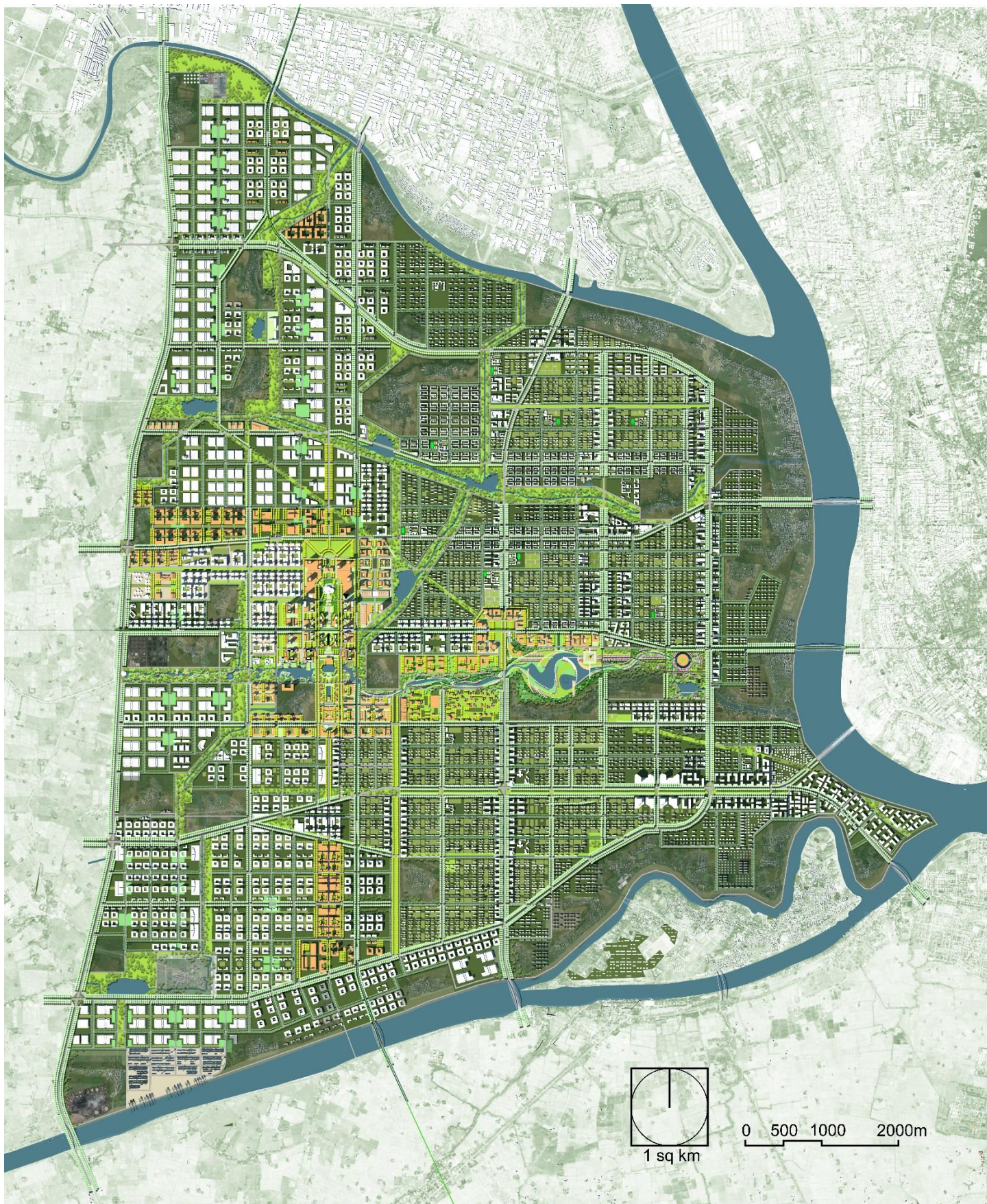
Existing villages and village buffer occupies almost 14% of land. The village buffer has been identified to act as a mitigation zone between existing and new development. A proportion of the village buffer can be used to provide facilities and amenities for the community.

The land use areas include all roads, net available area will need to be calculated through detailed planning of individual zones. Due to rounding, the numbers presented may not add up precisely to the totals indicated.

LAND USE	LAND AREA (in sq km)	%
Residential GFA	30.93	35%
Residential I (Low Density)	12.75	14.4%
Residential II (High Density)	12.56	14.2%
Residential III (Mixed Use)	5.63	6.4%
Commercial GFA	6.41	7.3%
Commercial I	1.91	2.2%
Commercial II	2.25	2.5%
Commercial III (Mixed Use)	2.25	2.5%
Industrial	22.37	25.3%
Industrial I (Light Industry)	12.82	14.5%
Industrial II (Heavy Industry)	7.96	9%
Industrial III (Logistics)	1.59	1.8%
Transport & Logistics	1.51	1.7%
Green Spaces	12.01	13.6%
Open Space	9.14	10.35%
River Buffer	0.64	0.7%
Water Bodies	2.24	2.54%
Villages	11.97	13.6%
Existing Villages	5.68	6.4%
Village Buffer	6.29	7.1%
Civic Amenities	2.33	2.6%
Utilities (Physical Infrastructure)	0.77	0.9%
TOTAL	88.30	100.00%



Land use Master Plan



Illustrative Plan



New Yangon City

Productive City, Liveable City



4.4 Future Development

FAR & Density Distribution

The Floor Area Distribution (FAR) within the site has been mandated to strengthen the relationship between land use and transportation. Higher densities have been allocated near transit stations of both the MRT and Secondary Transit networks. Land use typologies have been synchronized to allow for appropriate density to take shape and draw maximum advantages from being allocated close to a station.

The Land use and FAR distribution also takes into account allocation of density for jobs and housing throughout the city. While maintaining primacy of a use, higher density allows for creation of mixed use districts that will help in reducing the need for long trips. Mixed uses will also help in distribution of amenities throughout the city and close to where they are required.

Together with minimum setbacks, maximum plot coverage or ground coverage, and other controls, the FAR controls are expected to allow for diversity and individual expression in urban design and architecture. This master plan does not mandate height restrictions except those near the central Pagoda. It is expected that FAR controls and cost efficiency constraints will have an overarching impact on heights of buildings, and allow for a vibrant skyline in New Yangon.

A high FAR has been allowed in the commercial node or city center such that it can have a pronounced presence in the skyline of New Yangon and even be visible from the existing city. This will help to create a landmark district in the city and assist in wayfinding.

The FAR map is expected to be a key development control enforced by the relevant authority along with rest of the development controls. Based on inputs received from developers and the market, FAR can be revised for various land uses and density can be reallocated across the city in future revisions of the master plan or from time-to-time

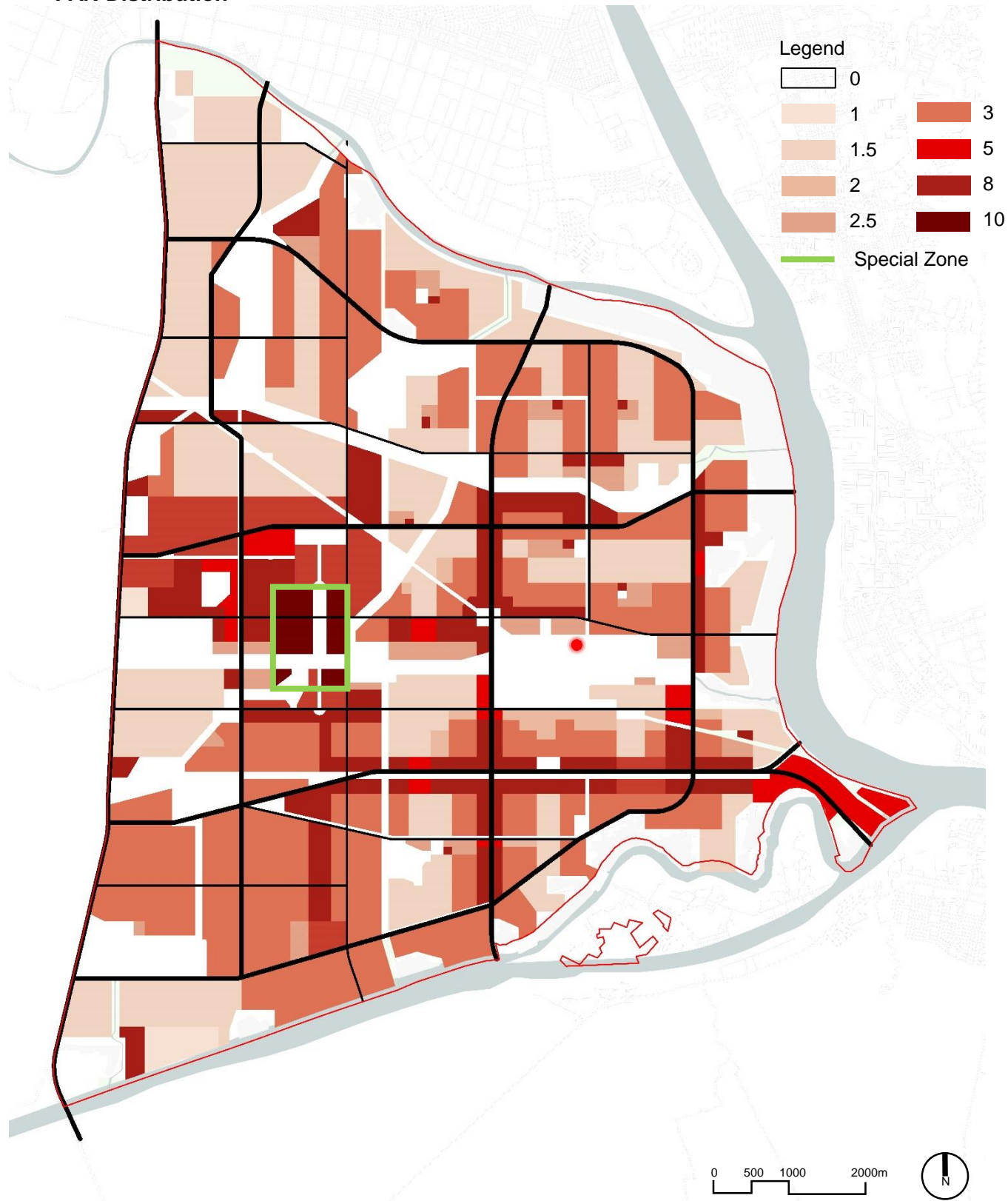
The BCR & FAR provided in the planning guidelines are maximums, to be used for development control purposes. The assumptions in the master plan for population, employment & infrastructure provision have been made based on reduced BCR/FAR averages, presented in the Appendix 11.3.

FAR Distribution Table*

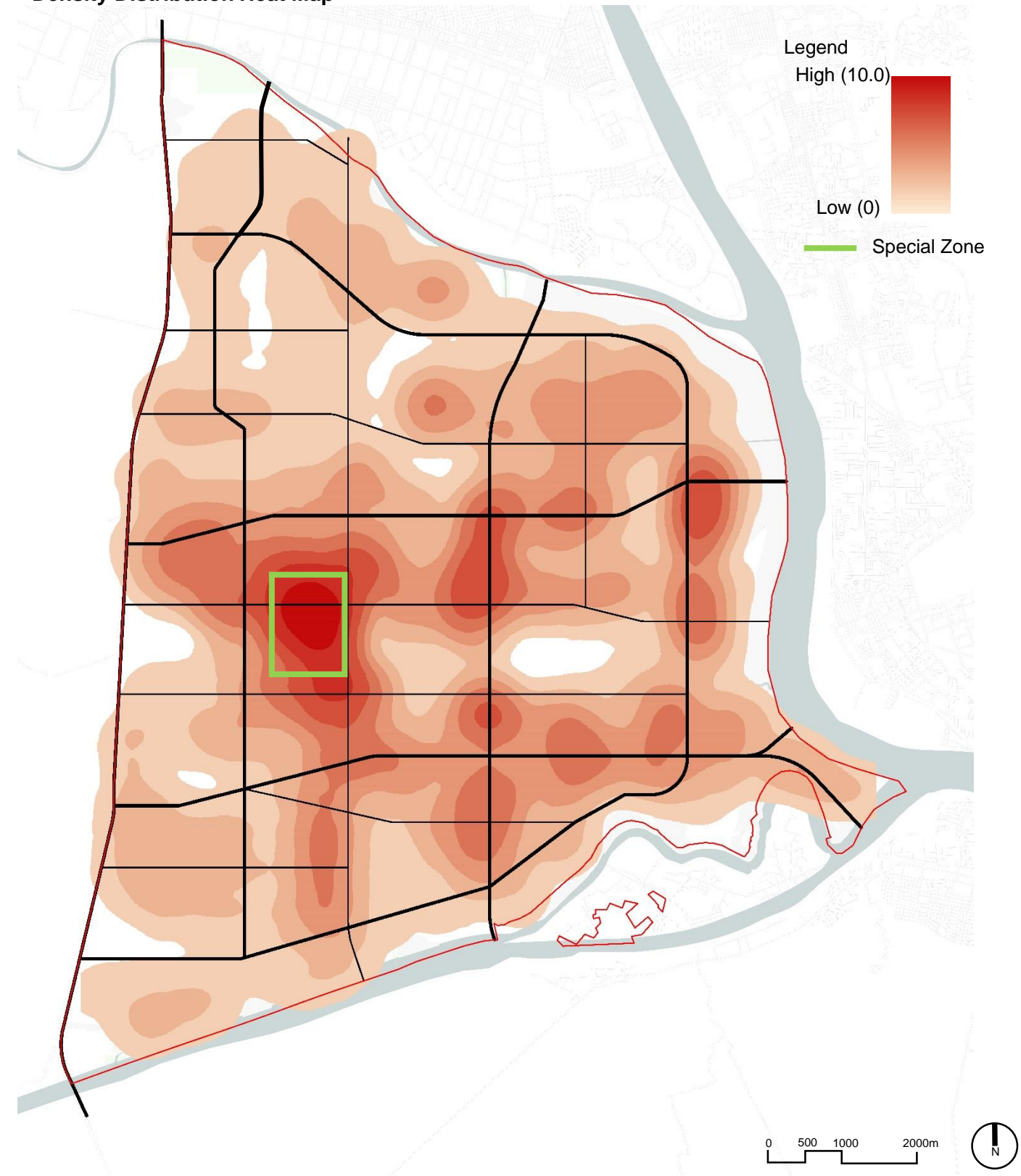
Category of Land Use Zones	Max: Floor Area Ratios (FAR)	Max: Building Coverage Ratios (BCR) (%)
Low Density Residential Area	1.5	60
Medium-High Rise Residential Area	3.0 (Inside TOD), 2.5 (Outside TOD)	50
Mixed Use Area (Residential)	5.0 (Inside TOD), 3.0 (Outside TOD)	80
Commercial Zone (Office & Retail)	8.0	80
Mixed Use Area (Commercial)	8.0	80
Light Industrial Zone	2.5	60
Heavy & Logistics Industrial Zone	2.0	60
Transport & Logistics	2.0	-
Civic Amenities	2.5	50
Utilities (Physical Infrastructure)	1.0	60
Special Zones: All land use zones within Main Commercial Node Buffer	10	80

*Any proposed variations to the maximum BCR & FAR permitted should be submitted to NYDC for approval

FAR Distribution



Density Distribution Heat Map



4.5 Green-Blue: Open Space Network

The Green-Blue Vision

Designing in harmony - a truly holistic approach to sustainable design recognizes the impacts of every design choice on natural and cultural resources. The most precious asset of any place is its local distinctiveness. This valuable quality is the main attraction for visitors who are looking for a rich and authentic experience.

Aside from being attractive and enjoyable for people, sustainable projects promote biological diversity, contribute to the quality of the air and water, and reduce the impacts of construction.

The results of our holistic approach to design and planning are livable, enduring places that are compatible with and considerate of natural ecosystems. We draw on the strengths of both the natural and the built environment, and create guidelines to ensure that the attributes that attracted people to a location in the first place will still be there years later. Creating a landscape fabric that becomes a backbone for New Yangon City.

The aim is to highlight the ecological richness, using green fabric and water as a main element to enhance the environmental benefits of the area, and to expand the public nature of the green spaces with the concept of “having a home in a park”.



HARMONY WITH NATURE

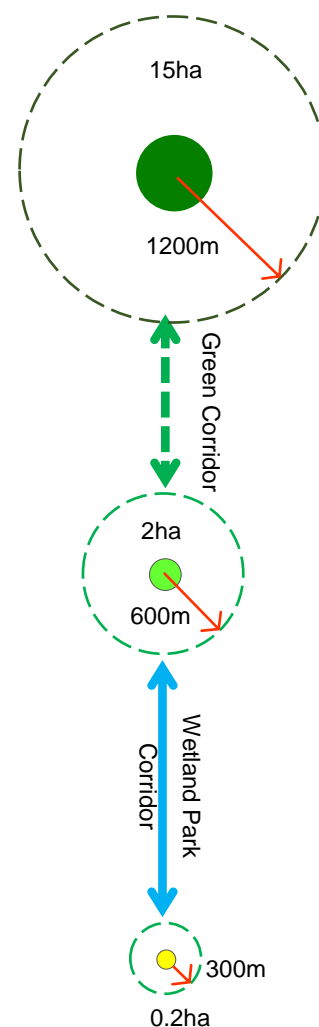
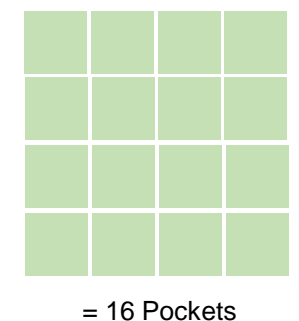
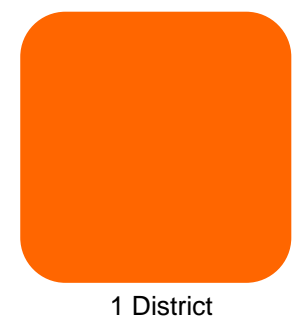
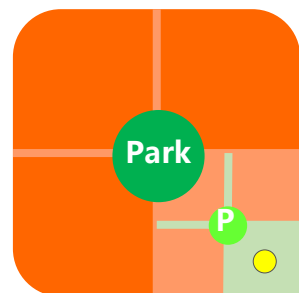
- Rich bio-diversity
- Connected to wider green network
- Capitalizing on natural assets

REJUVENATING AND INVIGORATING

- Fresh environment
- Places for body, mind and spirit
- Healthier community

DISCOVER EXPLORE AND CONNECT

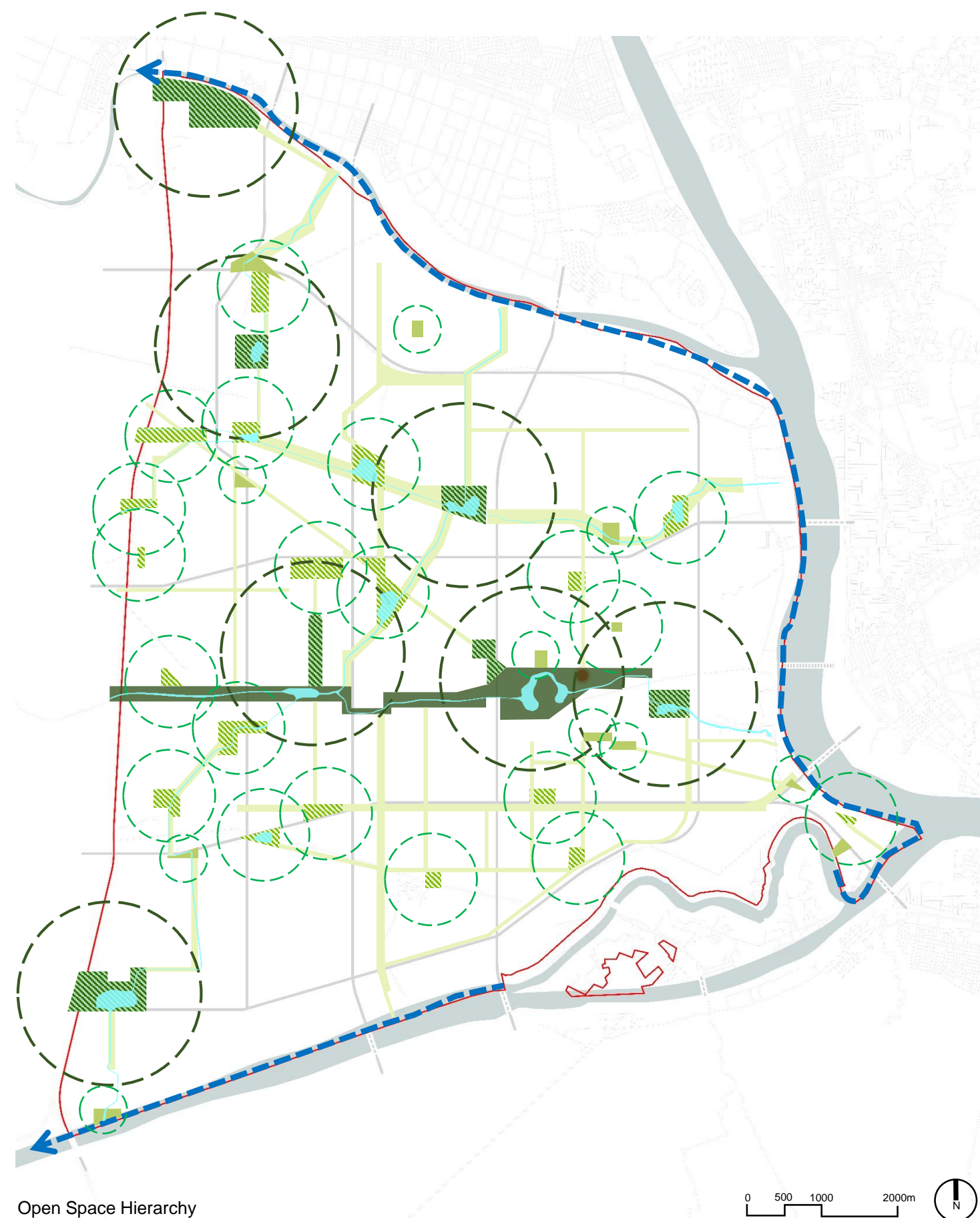
- Easy to navigate network of open spaces
- Active and vibrant
- Community integration



- Green Spine
- District Park
- Neighbourhood Park
- Pocket Park
- Green Connector
- Water Bodies
- River Buffer

The proposed open space network in New Yangon closely follows the blue ecosystem. These Green-Blue spines are proposed to leveraged for the public realm as well as for city wide pedestrian and bicycling networks. A hierarchy of city level to local green areas is proposed that can together provide around 12-14 sqm of green area per resident. While the master plan level green area provides around 10 sqm of green space per person, local green spaces are proposed to add additional 2-4 sqm per person through detailed zonal plans or detail area planning based on the norms outlined in the master plan.

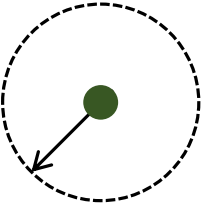
The main aim of the Green-Blue strategy is to create usable and active spaces that serve a purpose and are closely linked to day-to-day lives of the residents.



4.5 Green-Blue: Open Space Network

The Green-Blue Vision

Central Green Spine



R = 10 km

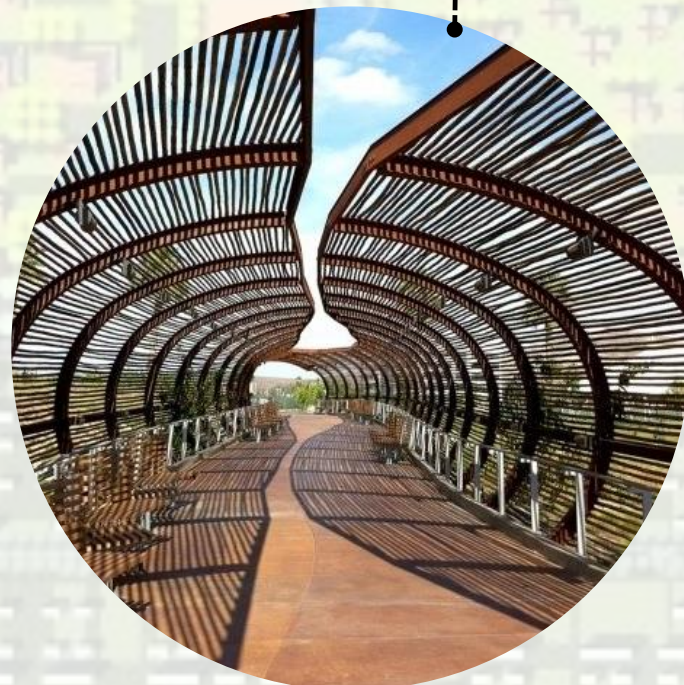


8 sqm

- Characteristics:
- City Gathering Space
 - Event Spaces
 - Thematic Open Spaces



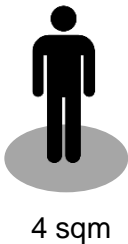
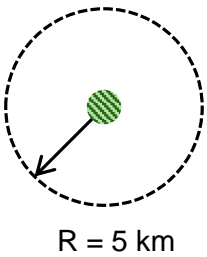
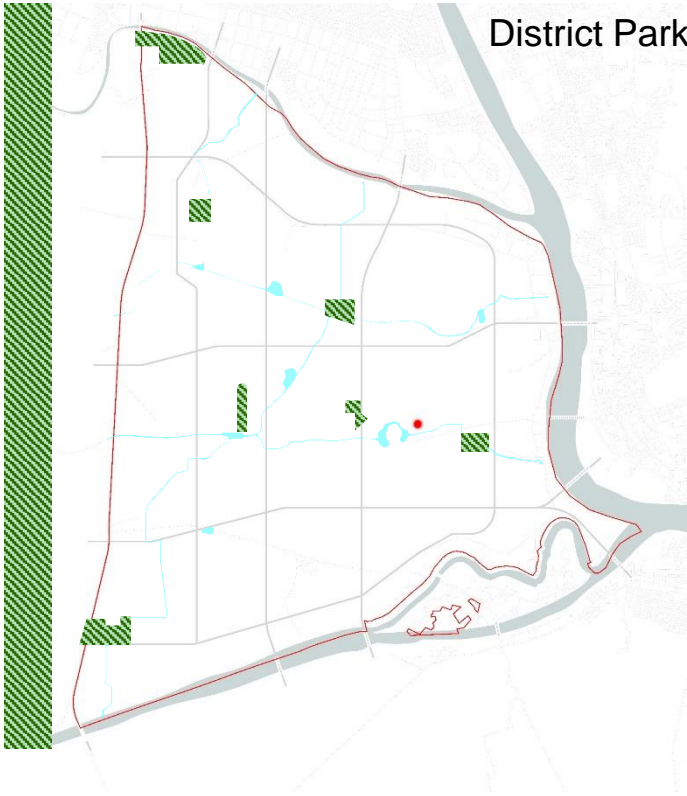
- 1 Walking/Jogging Path
- 2 Green Lawn
- 3 Wetland Boardwalk
- 4 Flower Garden
- 5 Pavilion
- 6 Natural Edge
- 7 Waterfront Amphitheatre
- 8 Viewing Tower
- 9 Pier



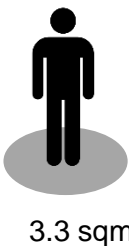
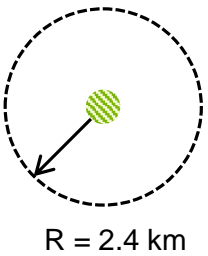
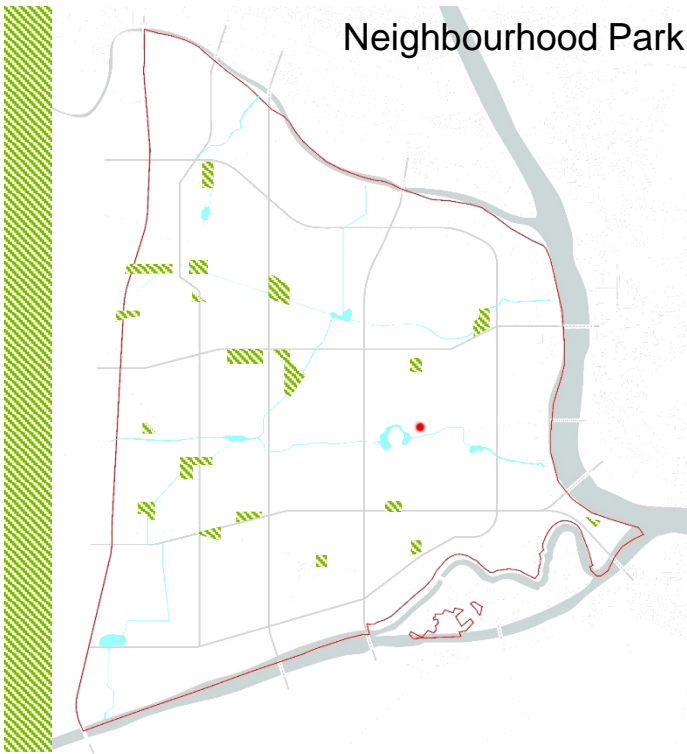
- 10 Soft Edge
- 11 Event Space
- 12 Lawn Room Flexible Activity
- 13 Feature Trail
- 14 Green Buffer
- 15 Steps
- 16 Fountain Feature
- 17 Berm
- 18 Waterfront Promenade
- 19 Pathway
- 20 Plaza
- 21 Pagoda Complex

4.5 Green-Blue: Open Space Network

Green Hierarchy

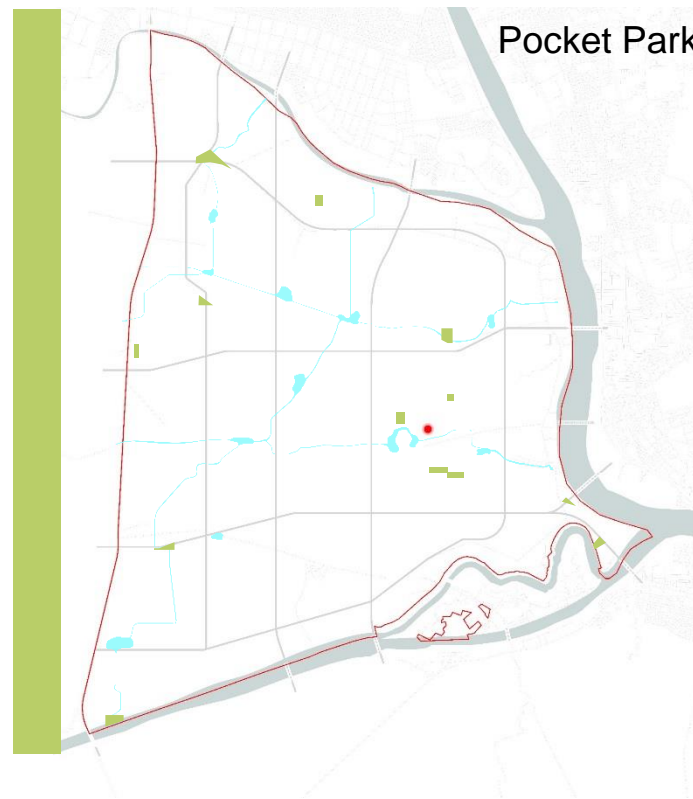


- Characteristics:
- Spaces for Exercises
 - Playground
 - Park facilities (Toilets/Shower)

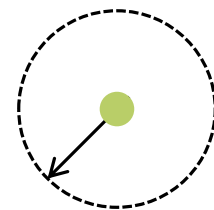


- Characteristics:
- Community Garden
 - Playground





Pocket Park



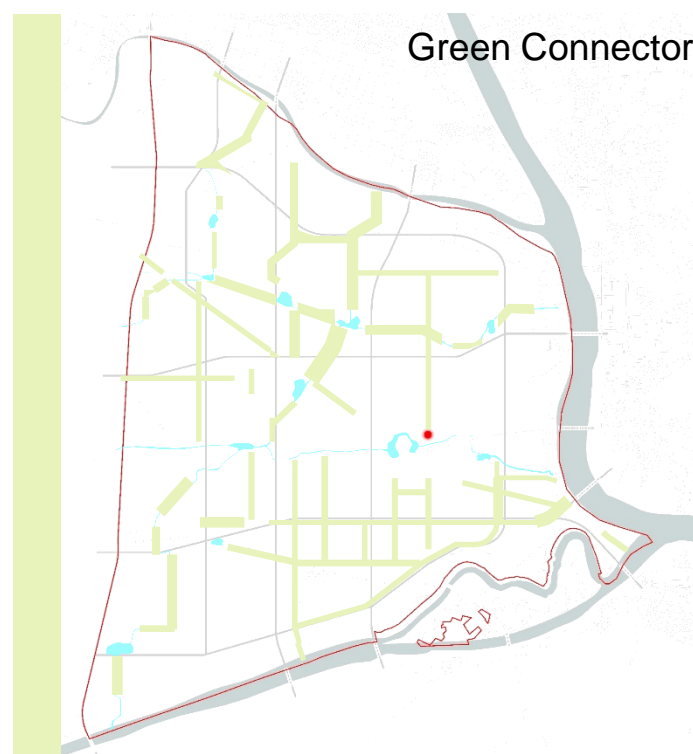
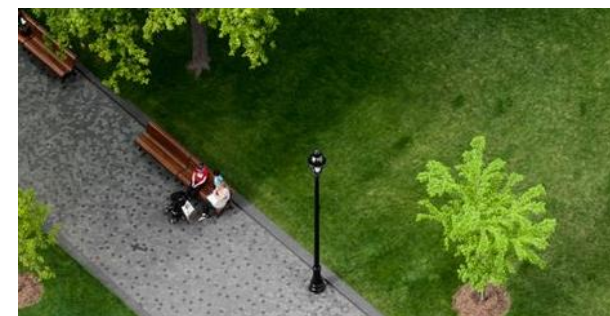
R = 1.6 km



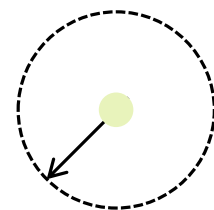
1.7 sqm

Characteristic:

- Seating Spaces



Green Connector



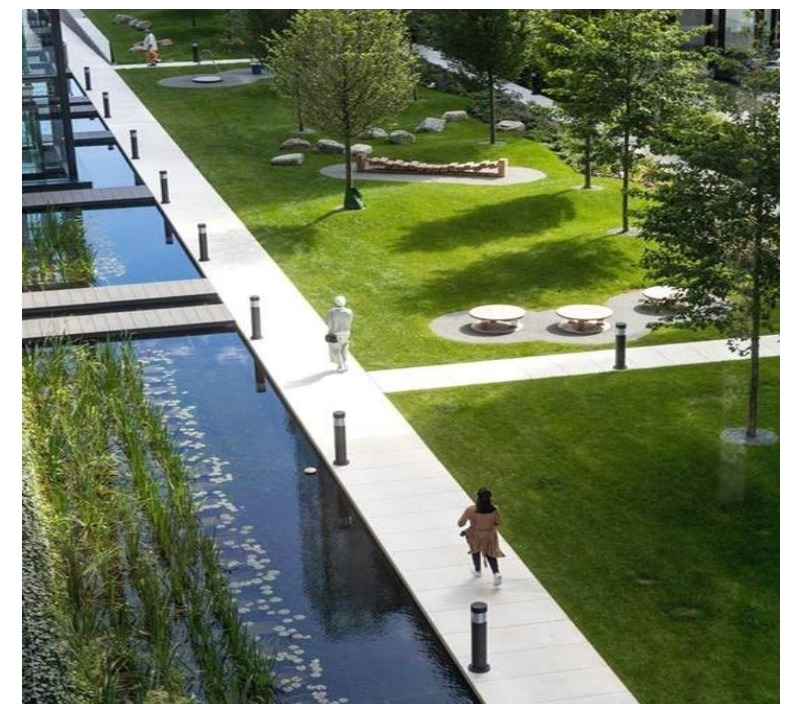
R = 2.4 km



3.3 sqm

Characteristics:

- Jogging/Cycling Path
- Seating Area
- Shaded Structures



4.5 Green-Blue: Open Space Network

Green Hierarchy

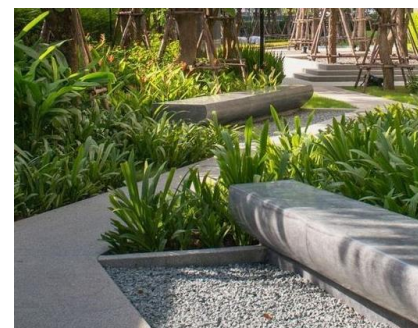
District Park



Community Park



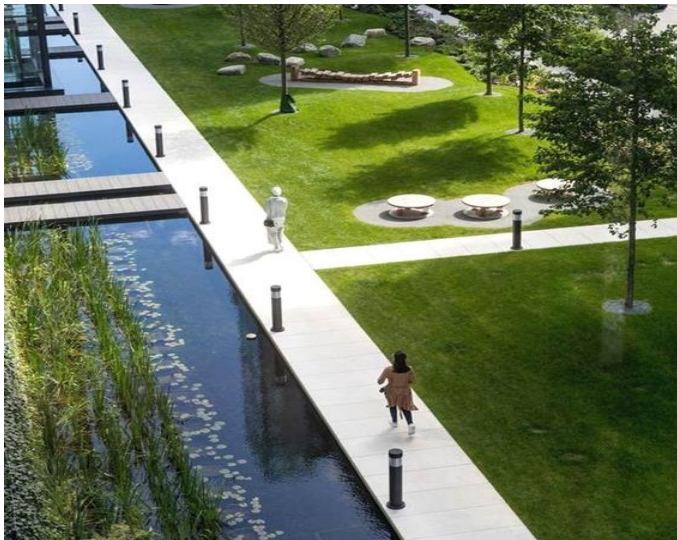
Pocket Park



Waterfront Promenade



Green Corridor



Wetland Park Corridor



Water Collection Area



4.5 Green-Blue: Open Space Network

Ecology Network



Using concept of 'Cross Ecological Axis', the design intention is to safeguard and enhance the existing natural assets, and extend them into the city interior, thus creating a lattice Green-Blue network in which nature can co-exist with people.

Different habitats, parks and open spaces within the master plan will be connected via nature corridors and green streets, creating immediate habitats and bringing nature closer to the residents.

Core Ecological Strategies include:

1. Encouraging planting of native species and remove invasive introduced species. Native plants provide food and shelter for native wild animals and have developed their own natural defenses against many pests and defenses thus requiring less pesticides.
2. Enhancing ecology and increasing biodiversity within the city with green corridors and green and blue streets that connect separated patches of habitat together. To encourage certain key animal species, their food sources should also be considered and planted.
3. Creating a diversity of planting palettes with seasonal delight for viewers. This is not just for people but also the variety can provide food sources for animals through the seasons.

Ecological Strategies

1 Ecological Habitat



2 Native Flora

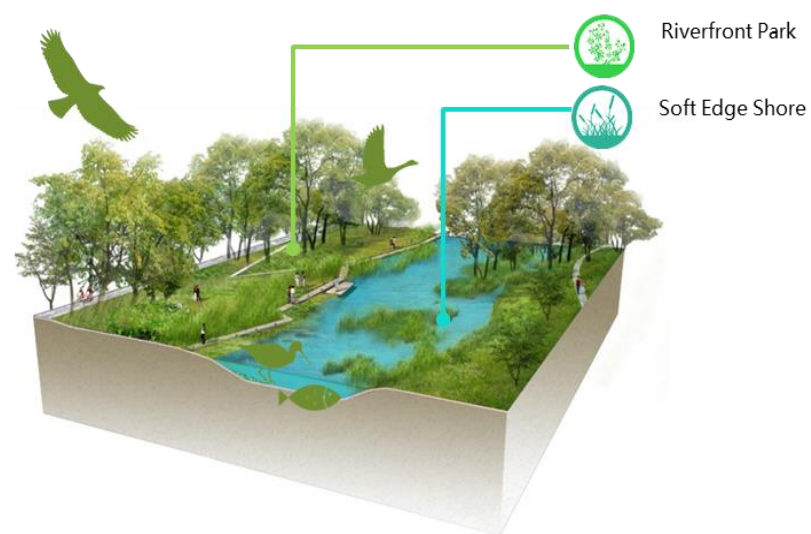


3 Seasonal Delight



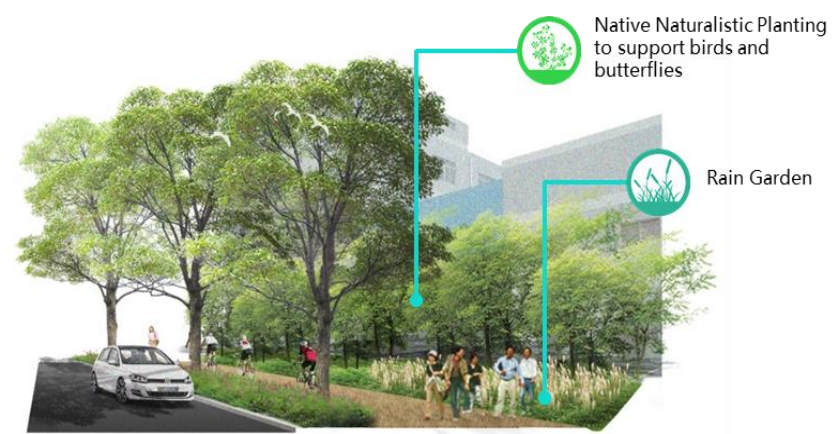
4 Ecology and Biodiversity





Enhancing Existing Ecology

Instead of removing the existing wetlands fringing the site which provides ecological services like storm water management, carbon sink and animal habitat, the design proposes to capitalize on this natural asset by creating wetland parks in which people can appreciate nature.



Weaving Nature into Urban Fabric

Streets with specific trees and shrubs to facilitate the movement of fauna between two green spaces is proposed. Besides enhancing the environment, these streets will help create a greater appreciation of nature and the rich biodiversity in New Yangon City and contribute to flood mitigation and shading effect.

- Waterway Habitat
- Urban Green Habitat
- Nature Habitat
- Green Streets
- Green Corridor
- Water Corridor Habitat
- Riverfront Habitat



4.5 Green-Blue: Open Space Network

Ecology Improvement

Green Buffers

Vegetation in buffers can affect local and regional air quality in three main ways: temperature reduction, removal of air pollutants, and energy effects on buildings. Plants remove air pollutants by uptake via leaves and by intercepting airborne particles. Pollutants captured by vegetation are often transferred to the soil. Also, tree buffers have the ability to mitigate highway noise by 6 to 15 decibels, and because they absorb more high frequency noise than low frequency, this makes them ideal for use as sound barriers.

Phyto-Remediation

Phytoremediation refers to the technologies that use living plants to clean up soil, air, and water contaminated with hazardous chemicals. Processes that would be applicable to the site would be:

1. Phyto-extraction – uptake and concentration of substances from the environment into the plant biomass.
2. Phyto-degradation - use of plants to uptake, store and degrade contaminants within its tissue.

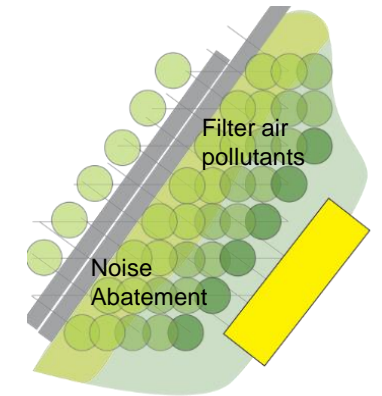
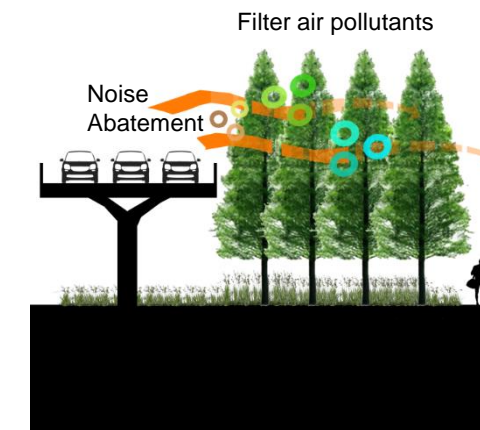
Sponge City – Biological Uptake of Nutrients

Water quality can be improved with Sponge City Design Elements as well as the retention of the existing wetland that is on site.

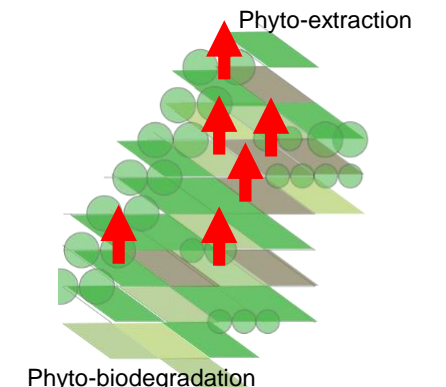
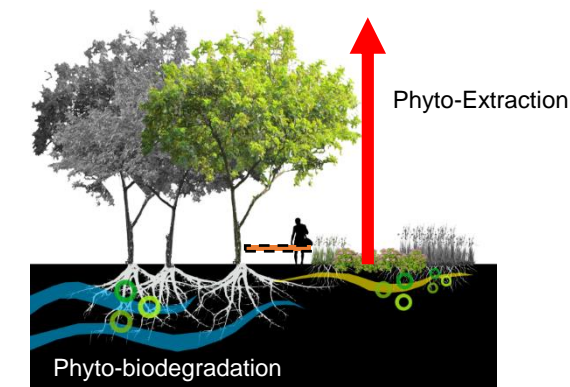
Pollutant removal is achieved by settling, vegetation uptake, adsorption, filtration and biological decomposition. Wetland vegetation enhances water quality by encouraging sedimentation, filtering of nutrients and other pollutants through roots, stems and leaves and promoting the growth of biofilms, which assimilate dissolved nutrients.

Methods of Improving Ecology

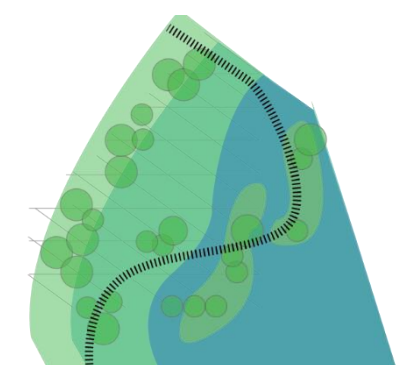
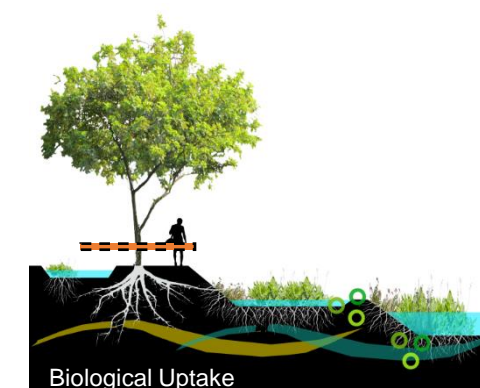
1 Green Buffer

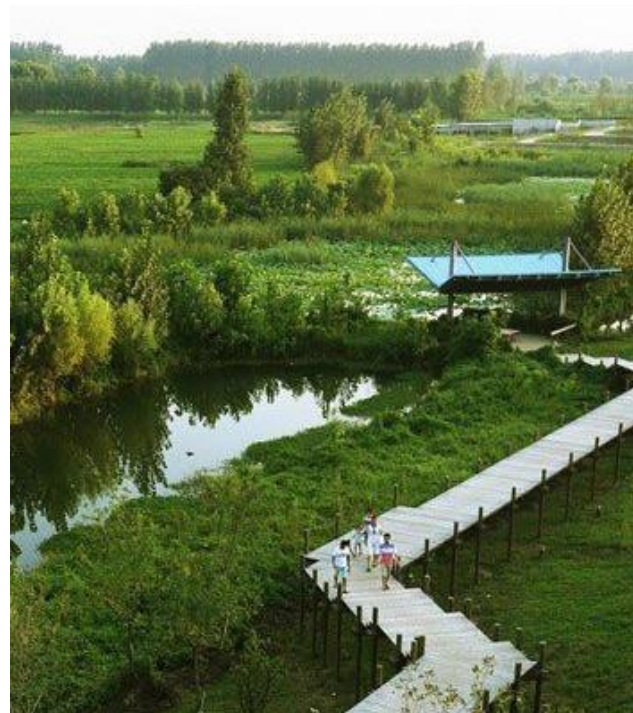


2 Phyto-Remediation

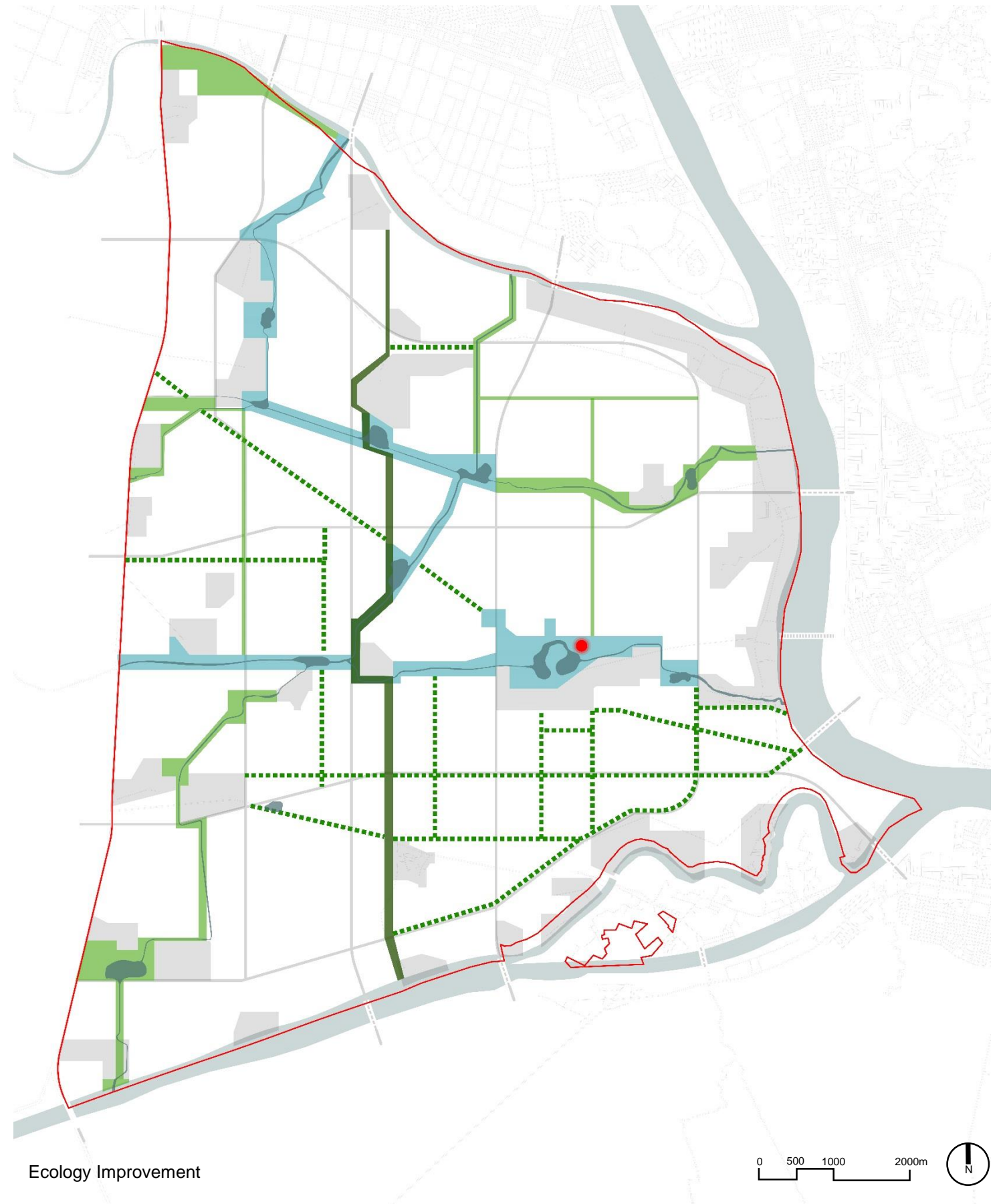


3 Sponge City - Biological uptake of Nutrients





- Treatment of Water using
Sponge City Design
Concepts and retention of
Natural Wetland
- Soil Remediation using
phyto-remediation in
parkland
- Mitigation of Traffic Noise
and Air Pollution from
Industrial Areas using
Green Buffer
- Mitigation of Traffic Noise
and Air Pollution from
Streets



4.6 Great Places: Nodes

Transit Oriented Development

The Transit Oriented Development (TOD) strategy focuses on the Land Use Diversity in the accessibility radius around MRT and Secondary Transit stations. This strategy aims to maximize land value and diversify services and functions within a walking radius. While higher densities have been proposed around all transit stations, specific TOD nodes have been identified for their primacy over others and their significance at the city level.

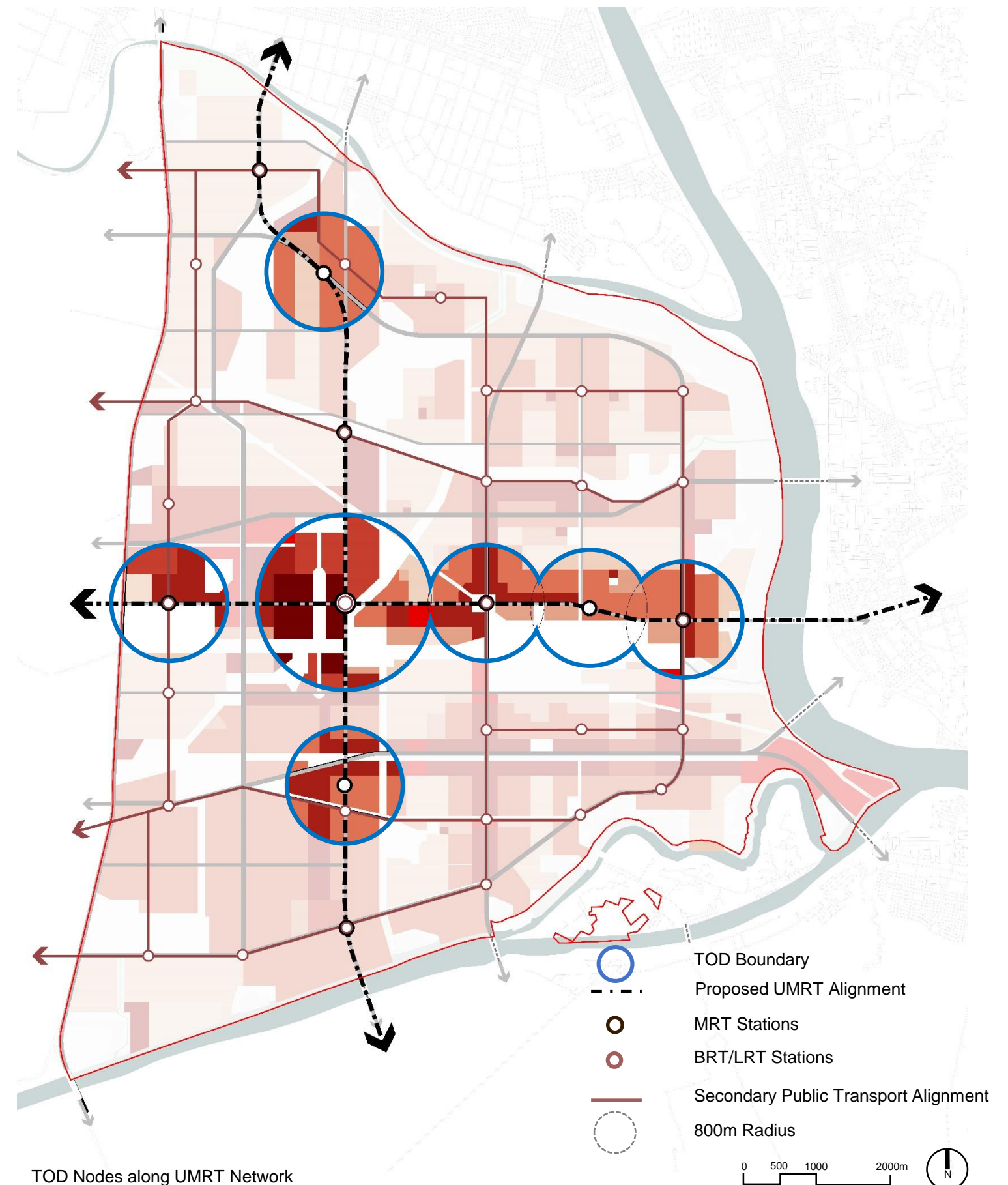
Typically TOD corridors are identified based on their importance within the city structure. The World Bank published the 3-Value approach (2017) for TOD. It talks about examining the importance of each station from the perspective of Node value, Place value, and Market value. This would also help guide potential use and activities close to each station. While such a detailed analysis is not required at this stage, it is recommended that detailed zonal planning in future should take such studies into account.

The following main TOD areas have been identified in the master plan*:

- **Commercial Node:** The intersection between the N-S and E-W MRT lines has been created to coincide with the city center or commercial node of New Yangon City. This will potentially be the most prime TOD node in the city.
- **Westside Gateway:** As an intersection between the E-W MRT and Secondary transit, this node is of importance from the perspective of carrying passengers from the west and distributing them in the employment centers within NYC.
- **Concorde Plaza:** This interchange between E-W MRT line and Secondary transit carries local importance. It is planned to have city level administrative functions and offices.
- **Skill Development Centers 1 and 2:** Both these nodes are on the N-S MRT line and are planned to have mixed functions that support the industrial area. These nodes will also help to distribute and collect employees from northern and southern industrial areas.
- **Stadium:** While this node is not designed as a conventional TOD, it carries event based volumes and hence has a high 'Place' value.

Various other transit stops help to carry and distribute volumes of passengers either to and from their residence or their place of employment. High density mixed environments are planned around those stops, however, are lower in primacy to qualify as a TOD node.

**Note: The MRT and Secondary Transit alignments are subject to change in future depending on the growth of city and external factors primarily arising out of implementation of Yangon wide MRT projects. Transit stations and nodes will need to change based on revised alignments and strategy for TOD will need to be revised.*

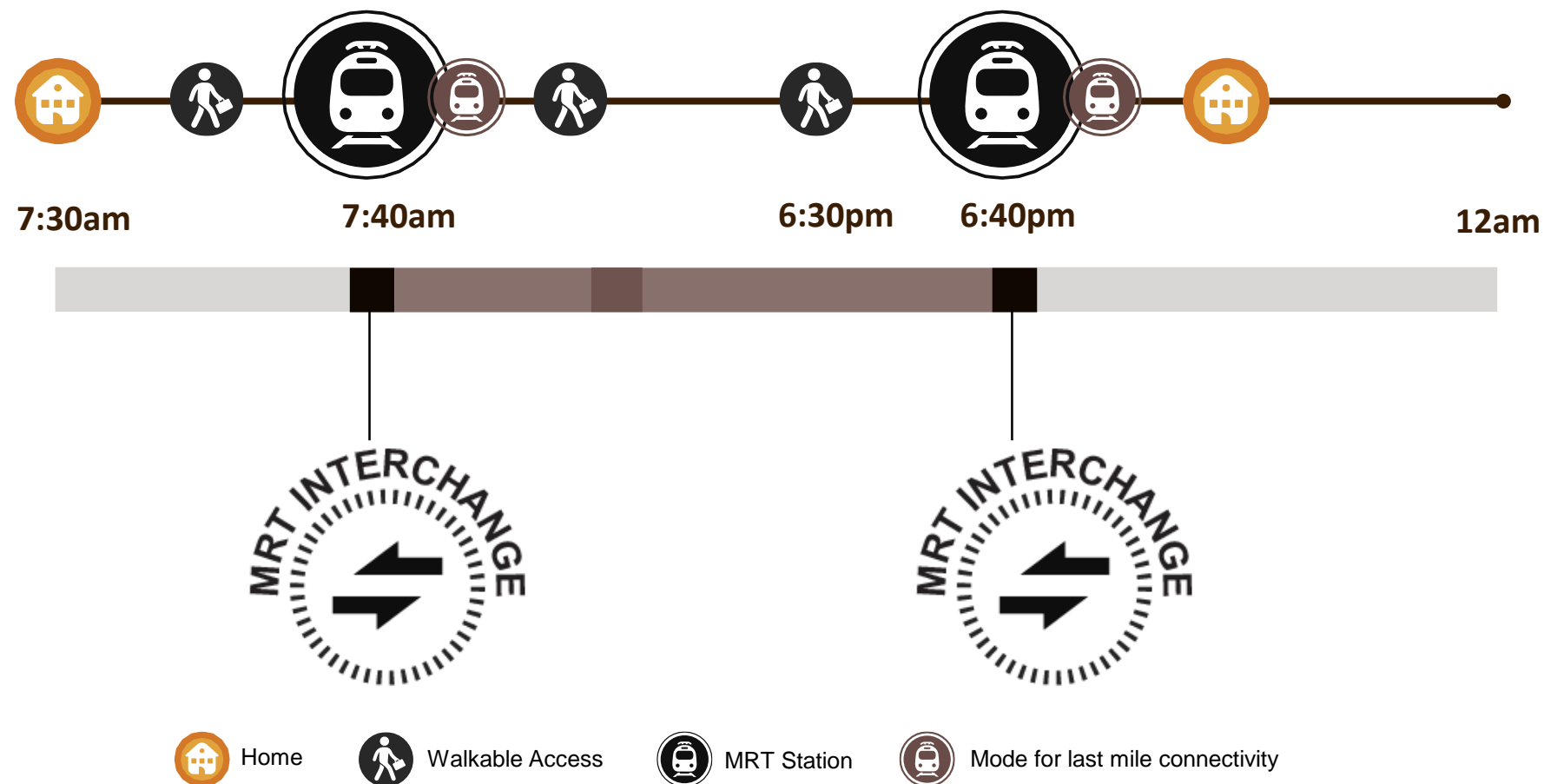




A MRT Network is essential to evolution of TOD in a city (Tukwila International Boulevard Station)

4.6 Great Places: Nodes

Transit Oriented Development



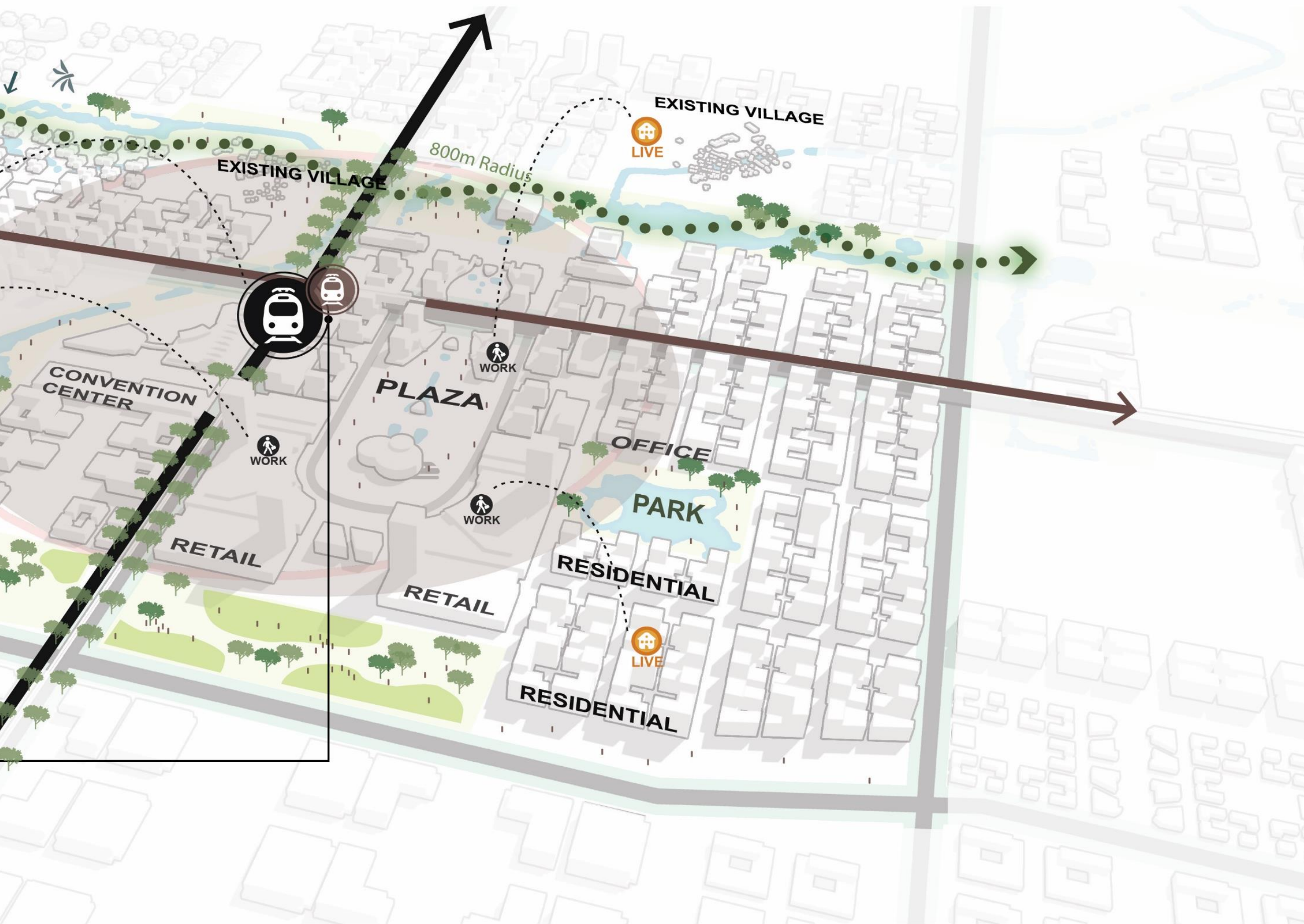
Transit-Oriented Development around Commercial Node

Establishing compact nodes of commercial uses located within a 10-minute walking distance of a planned MRT station with connected walkways will help distribute the peak-hour footfall. A transit oriented development pattern will maximize access to public transport, promote walking and bicycle use, and minimize daily vehicular trips to work. A mix of uses located in walking distance to transit can also generate transit trips throughout the day.

Retail is focused near the MRT stations, and sufficient office space is provided to attract world class companies to settle in the emerging district, while housing is integrated throughout the central area in close proximity to offices, shopping and community facilities.



A conceptual diagram of a typical TOD Node



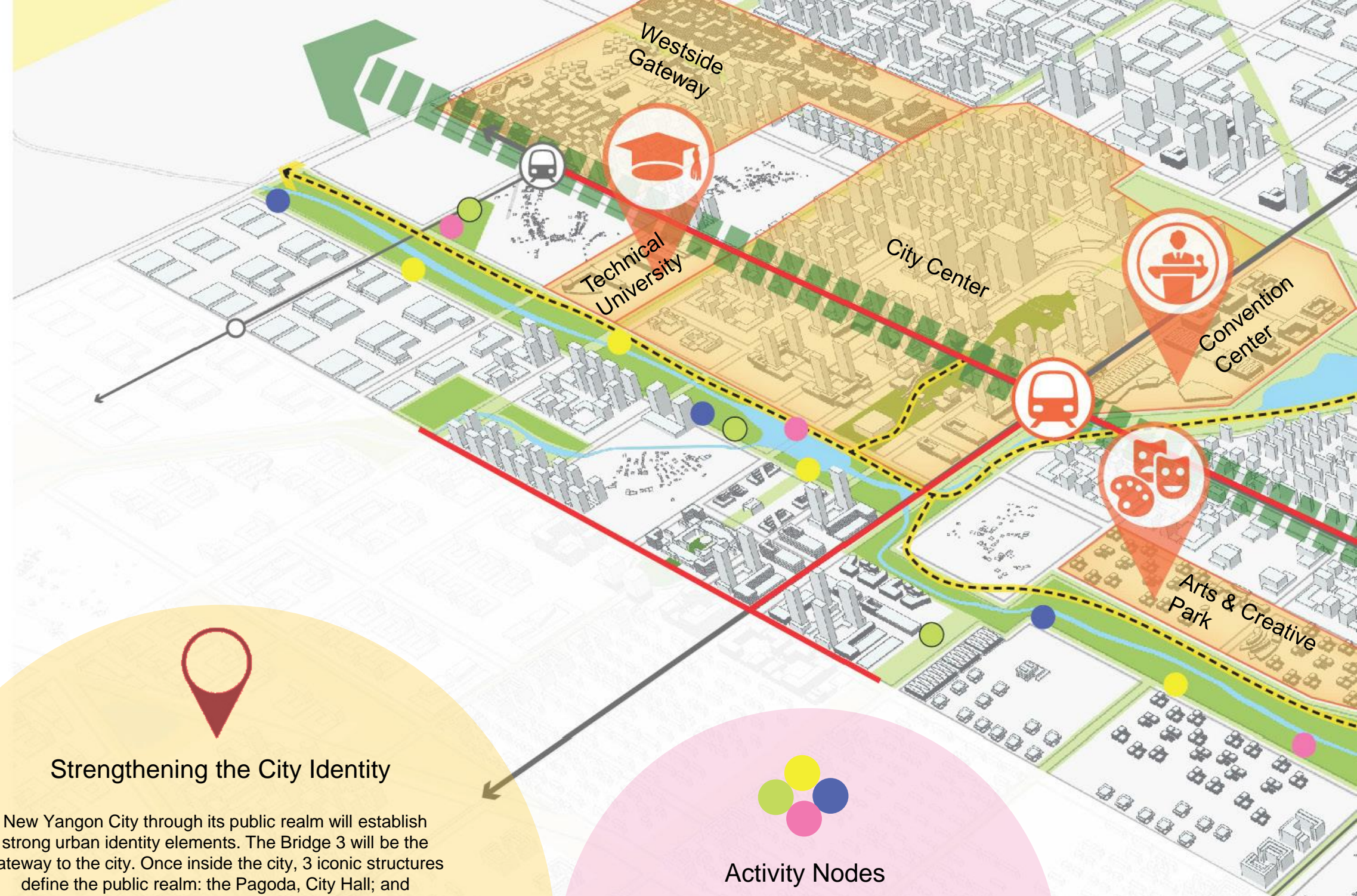
4.6 Great Places: Spine Cultural Corridor

The public realm provides a place for residents to interact and work, live, and play. City level spaces for leisure and entertainment act as catalysts for well being and significantly increase livability. Those spaces also become platforms for culture, public expression, and information dissemination.

The spatial structure of NYC plans for a Cultural Corridor along one of major waterways integrating various public activities for residents and visitors. Starting at the Stadium, the Cultural Corridor meanders through the Pagoda, the administrative center, arts and cultural center, the city center and onwards towards institutional uses.

The area around the Pagoda will also offer views towards the existing Shwedagon Pagoda and Yangon city. Various offshoots from this main corridor will together form the public realm complete with parks, cycling routes, pedestrian pathways, and activity centers.

KEYPLAN



Strengthening the City Identity

New Yangon City through its public realm will establish strong urban identity elements. The Bridge 3 will be the gateway to the city. Once inside the city, 3 iconic structures define the public realm: the Pagoda, City Hall; and Convention Center. The linear park creates a pedestrian network as well as a visual corridor that connects the key landmarks distributed from east to west.

Strategies:

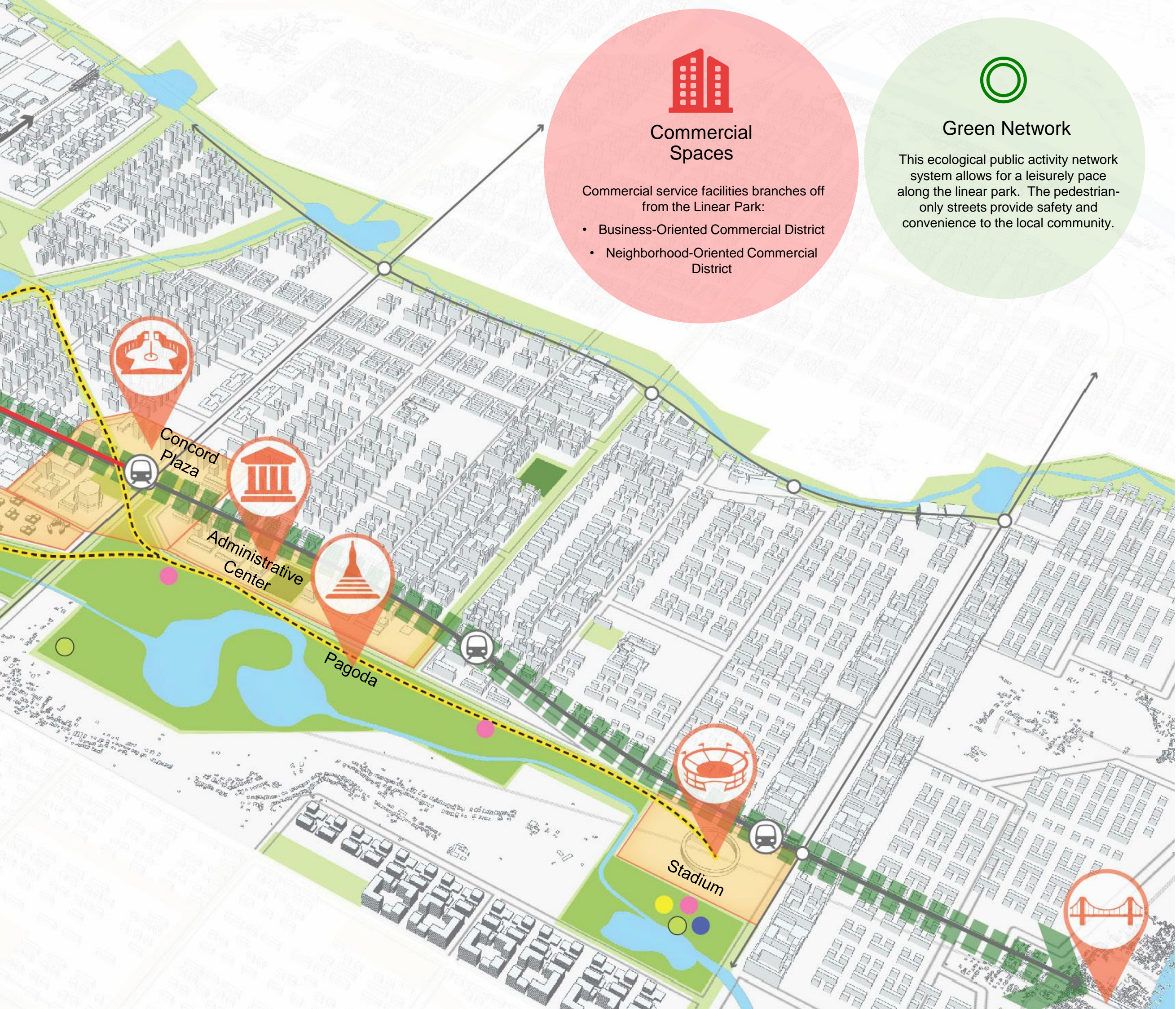
- Create urban landmarks
- Establish clear visual corridors and place the key landmarks within key areas of the visual corridor
- Establish a key landmarks walking trail with guides and indicator system
- Enhance the public activities of important nodes
- Strengthen control of urban streets and landscape interfaces

Activity Nodes





A walk through the Linear Park is a walk of discovery of Myanmar – the past, present; and the future.






Strategies:




- Establish a cultural activity spine where cultural facilities are intertwined with public service facilities and the local community.
- Establish a pedestrian route which goes across park blocks with differing characteristics, with activity nodes rooted in Myanmar culture






City Landmarks

-  Public Art Installations
-  Learning Node
-  Outdoor Activity Nodes
-  Police Outpost

-  Main & Transport Hub
-  MRT Network
-  MRT Station
-  Secondary Transit Network
-  Secondary Transit Station

-  Green Boulevard
-  Landmark Walking Trail
-  City Landmark Boulevard

-  Central Green Spine
-  Green Buffer
-  Water Bodies

4.6 Great Places: Spine Celebrating the Culture



Tagu (March/April)



Thingyan Festival

Generally celebrated in April, Thingyan is the water festival in Myanmar that honours the Myanmar New Year. This festival lasts 3-4 days where people throw water and colour on each other around waterbodies as they believe the water will wash away all bad luck of previous year.

Peasant Day, 2 March

Myanmar celebrates 2 March as National Peasant day to honour its peasant, that form 70% of its workforce. Generally leaders organize talks and events related to reforms in agriculture and peasantry.



Waso (June/July)



Waso Full Moon Festival

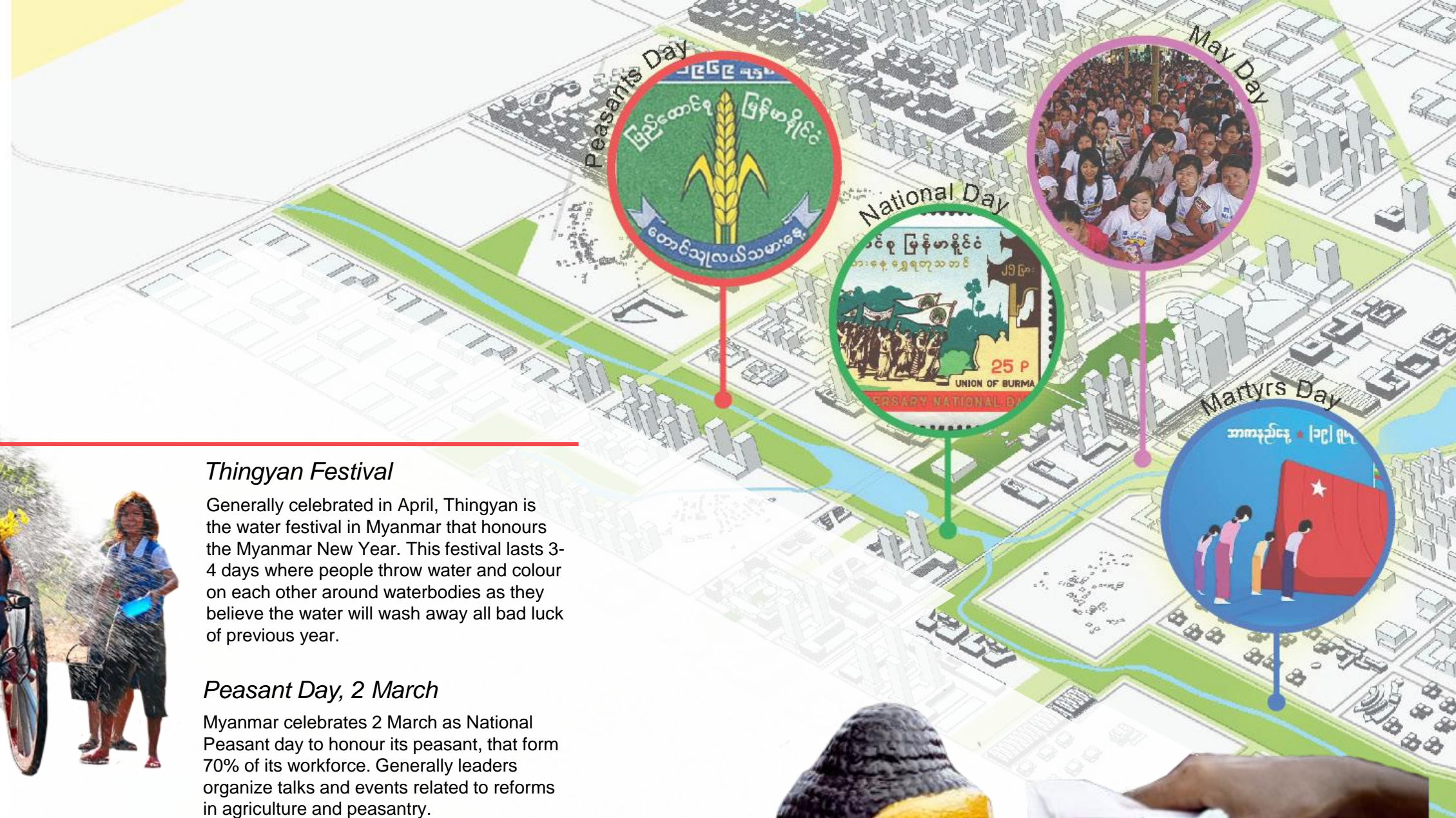
This festival occurs at the beginning of Buddhist Lent where ceremonies are held to offer robes and food to Buddhist monks and other temporal requirements. The younger people also gather to offer flowers to pagoda and celebrate through cultural performances



Kason (April/May)

Buddha Day Festival

Buddha Day festival, also called Kason Festival, is one of the most important festivals in Burmese Buddhism. On this day, Buddha attained enlightenment under a Bodhi tree. This festival involves religious rituals, processions and water pouring on Bodhi trees and statues.





Thadingyut (Sept/ Oct)

Thadingyut Festival

Also known as the Festival of Lights, Thadingyut festival is celebrated on the last day of Buddhist Lent, marking the return of Buddha from heaven. Being the most liveliest and popular festival in Myanmar, people light candles and lanterns in the evening. Traditional performances, market fairs and other interesting activities take place in this 3 day festival.



Tazaungmon (Oct/ Nov)

Tazaungdaing Festival

This festival is celebrated to mark the end of rainy season, during which monks are offered new robes and alms. The main feature of this festival is the robe-weaving competitions held for 2 consecutive nights.



Tabaung (Feb/March)

Union Day, 12 February

This day is celebrated to honour Panglong Agreement, that pronounce full independence in internal governance. The remembrance includes yearly participation in actions and movements of more than 7000 people representing different tribes in the country.

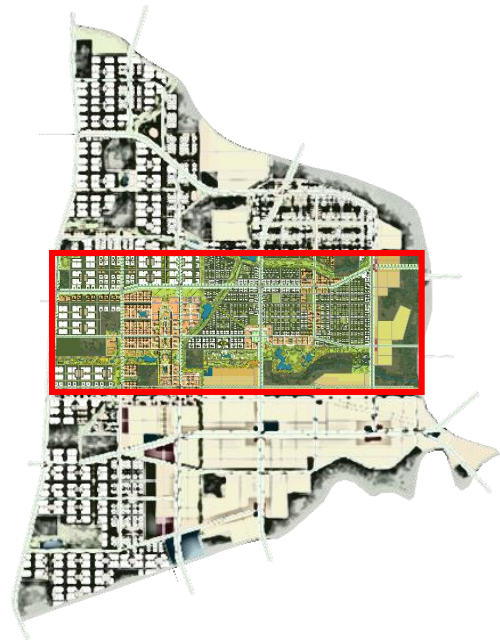
Tabaung Festival

This festival falls on the Full Moon Day of the month and marks the completion of Shwedagon Pagoda. This festival is celebrated with lanterns, veneration of Buddha, donations for monks and other cultural performances



4.6 Great Places: Character Districts

Eco-Link Corridor



A string of events along an eco-corridor forming a cultural spine for the city, providing commercial, institutional, public, sports, and administrative spaces.





- 1 Edutainment Linear Park
- 2 Technological University
- 3 Library
- 4 Ecology Research Center

- 5 Mixed Used
- 6 Exhibition Gallery
- 7 Performing Arts Pavilion
- 8 Lifestyle Pavilion

- 9 Open Lawn Performance
- 10 Cultural and Creative Park
- 11 Contemporary Art Gallery
- 12 Multimedia Exhibition Center

- 13 NYC City Gallery
- 14 City Hall
- 15 Iconic Pagoda
- 16 Biodiversity Park

- 17 Sports Stadium

4.6 Great Places: Character Districts

Westside Gateway

The Westside Gateway forms an important node on the proposed Outer Ring Road, acting both as an entrance as well as a connector to future expansion in the west. The node is planned to have commercial, mixed use, and residential uses. An intercity transport hub is also proposed to allow for interchange of modes.

- 1 Public transport transfer center
- 2 International Exchange Platform
- 3 headquarters office center
- 4 Smart Industrial Zone
- 5 Industry Service Center
- 6 Innovation Development Center
- 7 Education center





4.6 Great Places: Character Districts

City Center

Showcasing economic progress articulated through iconic structures and vibrant public spaces, the city Center is proposed as the hub of commercial activity in NYC. Planned as a TOD, the two MRT lines from north and east are proposed to intersect at the city Center. The land use allows for a core of commercial activities surrounded by mixed uses. The proposed Convention Center will potentially be the largest in Myanmar and can be used for national events.

- 1 Smart City hub
- 2 Convention Center
- 3 International Business Exchange Platform
- 4 Business Center
- 5 Retail – Office Mixed Use
- 6 Lifestyle Commercial Street
- 7 Civic Center
- 8 Transit Mall
- 9 MRT Interchange Station





4.6 Great Places: Character Districts

Concorde Plaza

Symbolizing openness and transparency, the Concorde Plaza is proposed as the hub of city administrative functions. Together with the City Hall and other offices, this district will be home to administration and culture.

The central Pagoda and surrounding park are proposed to be the primary formal open space for NYC. Commanding views of Shwedagon Pagoda and existing city, this park is envisaged become a place for quiet leisure and relaxation for the residents.

- 1 City Hall
- 2 Mixed use
- 3 Iconic Pagoda
- 4 Cultural Thematic Street
- 5 Multimedia Exhibition Center
- 6 NYC City Gallery
- 7 Contemporary Art Gallery
- 8 Government Administrative Quarter





4.7 Industrial Ecosystem

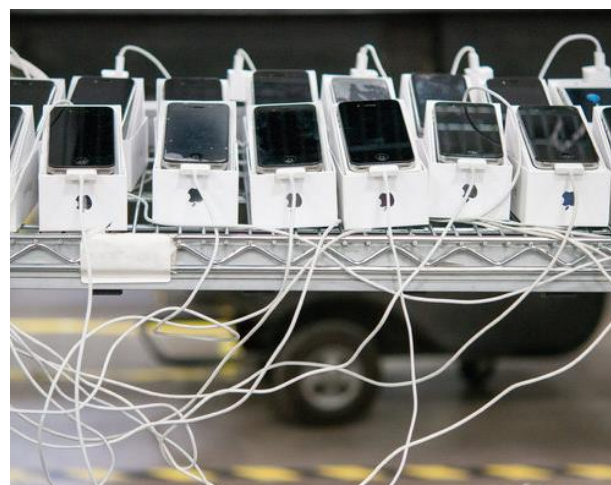
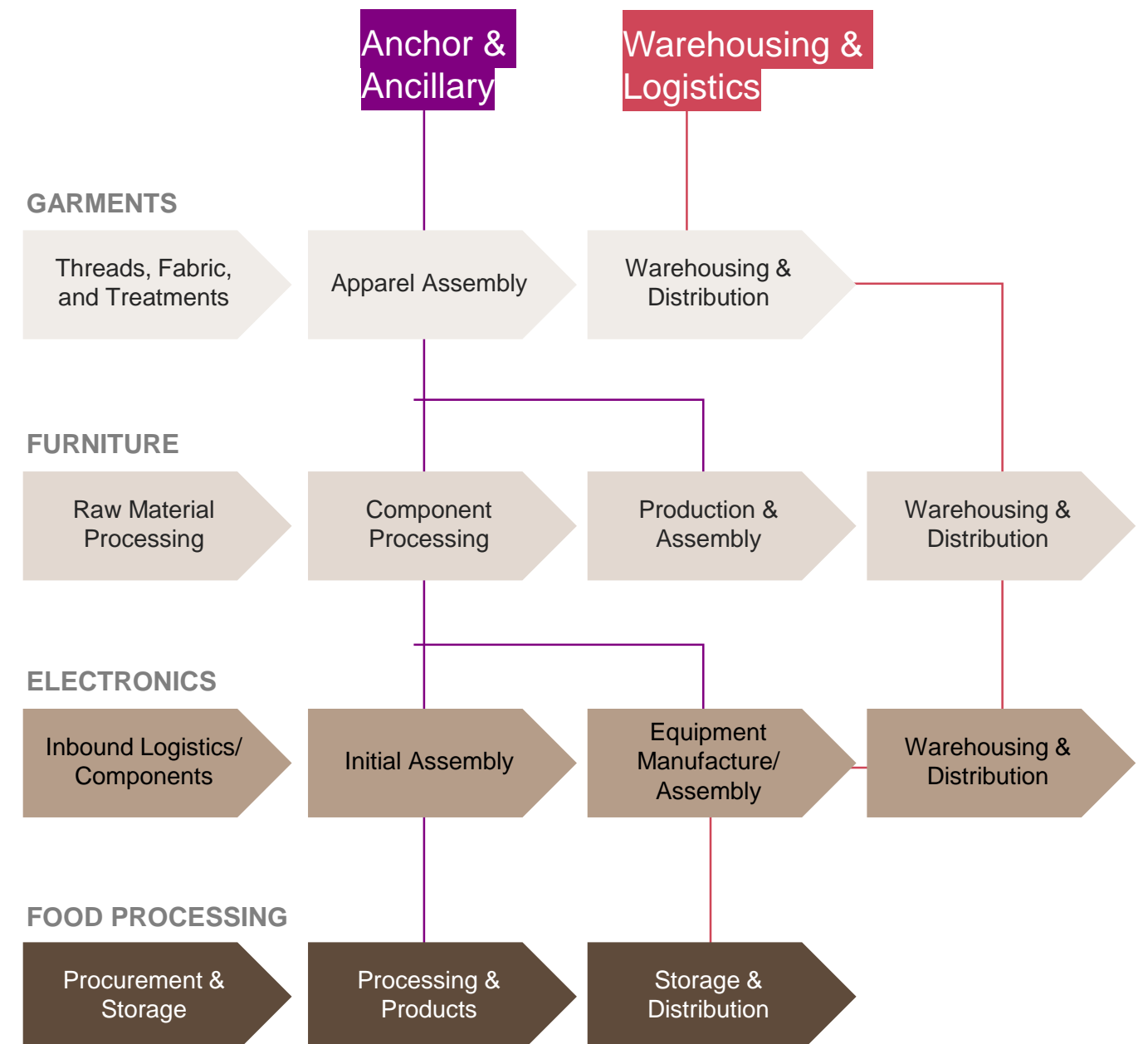
Industry Value Chains

Industry will be a cornerstone of New Yangon generating 900,000 jobs by 2050. While the city may be starting with industry sectors such as Garments, Furniture, Electronics, and Food Processing, it is expected that the city will cater to higher-order industries in the next few decades. A study of industry value chains indicates the need for backward and forward linkages for training, research & development, logistics & warehousing, and inter-relationships such as anchor-ancillary industries and components-assembly industries.

Following are the key considerations while planning for an industrial ecosystem in New Yangon:

- Space for a diverse set of industry types that can absorb new value chains
- Safeguarding of future expansion to capture changes to economy and market
- Creating an industry 'service spine' supporting industrial uses and logistics
- Diverse plot types for different sizes of industries

The industrial area is proposed to be along the existing highway and future Outer Ring Road to leverage connectivity for movement of goods to the ports. The industrial area in the north is proposed to be activated in early stages with heavy industry types as an Industrial Hub. The area in the south is proposed to have lighter and higher order industries that involve assembly and research & development, as an Innovation Hub. The industrial area is proposed to have integrated nodes connected to each other for a mix of uses that can support the industrial development.



Electronics Industry



Garment Industry

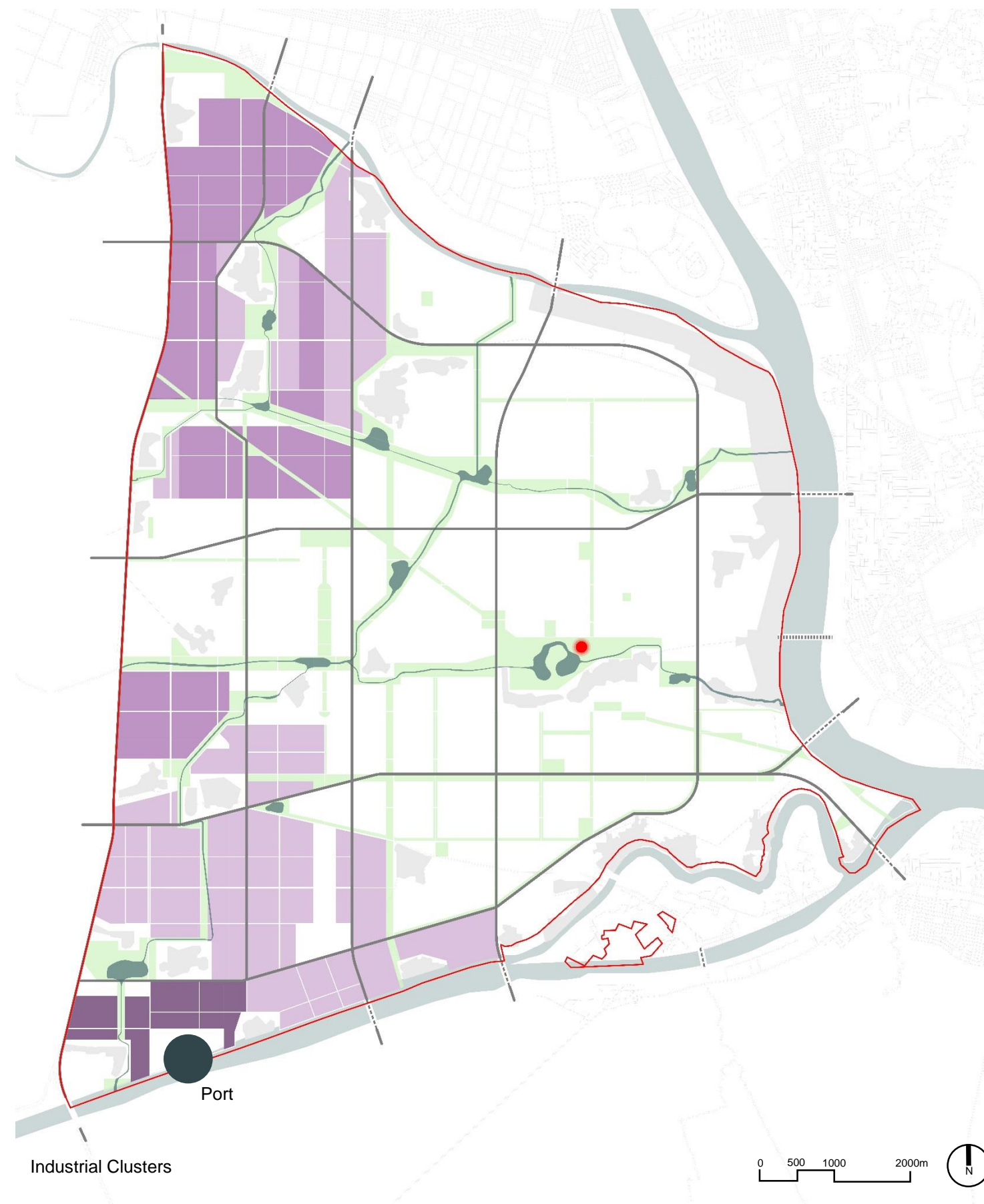
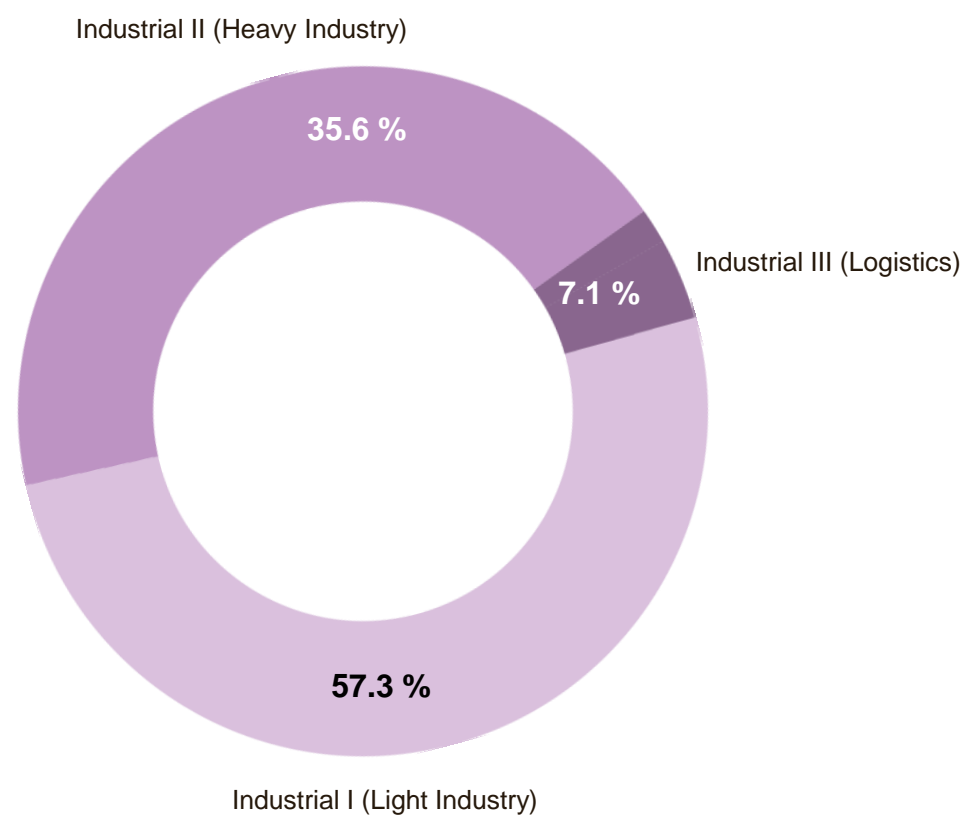


Furniture Industry



Food-Processing Industry

LAND USE	LAND AREA (IN SQKM)	% LAND USE DISTRIBUTION
Industrial I (Light Industry)	12.82	14.52%
Industrial II (Heavy Industry)	7.96	9.01%
Industrial III (Logistics warehousing park)	1.59	1.80%
Industrial	22.37	25.33%



4.7 Industrial Ecosystem

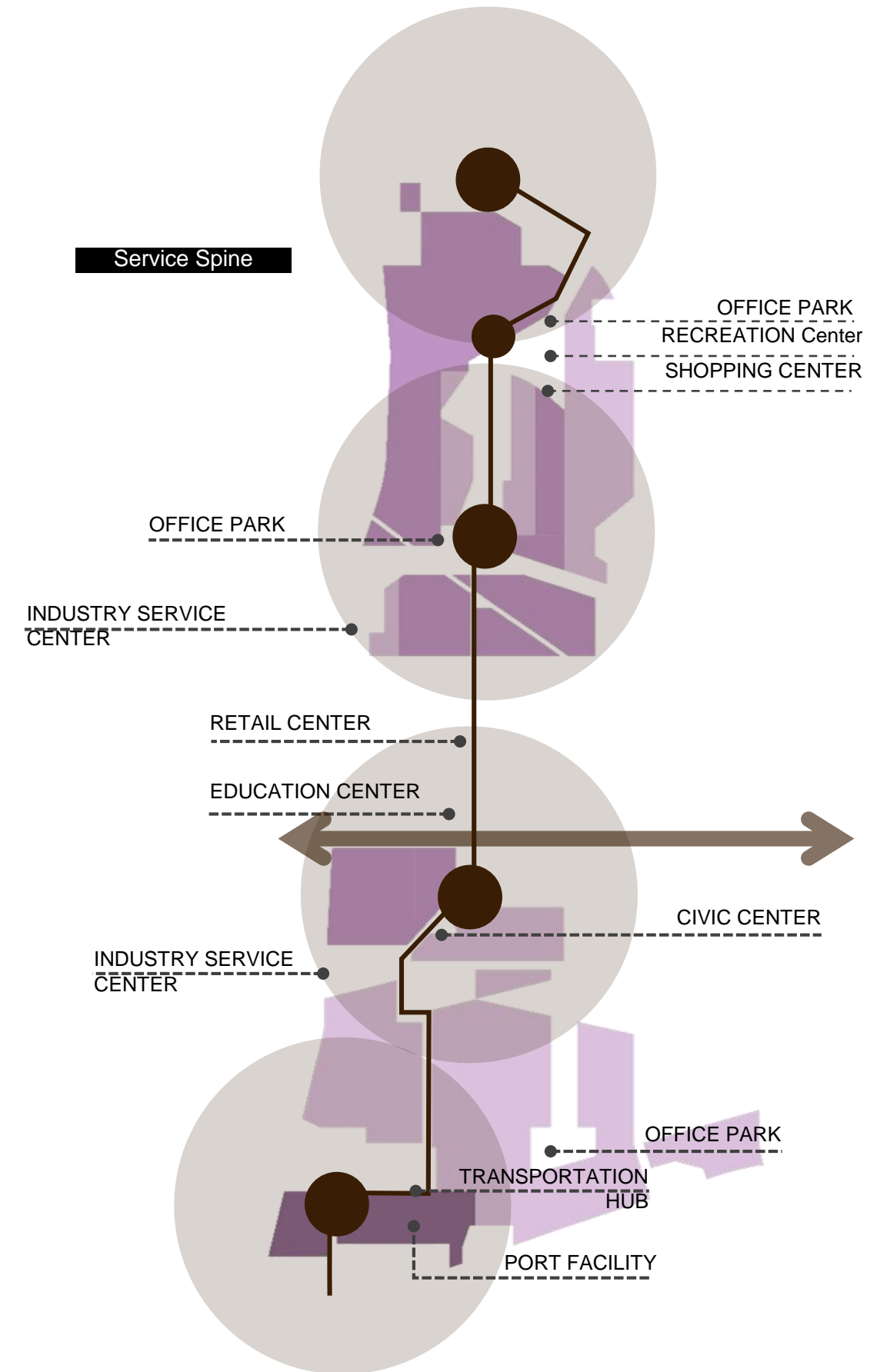
Industry Service Corridors

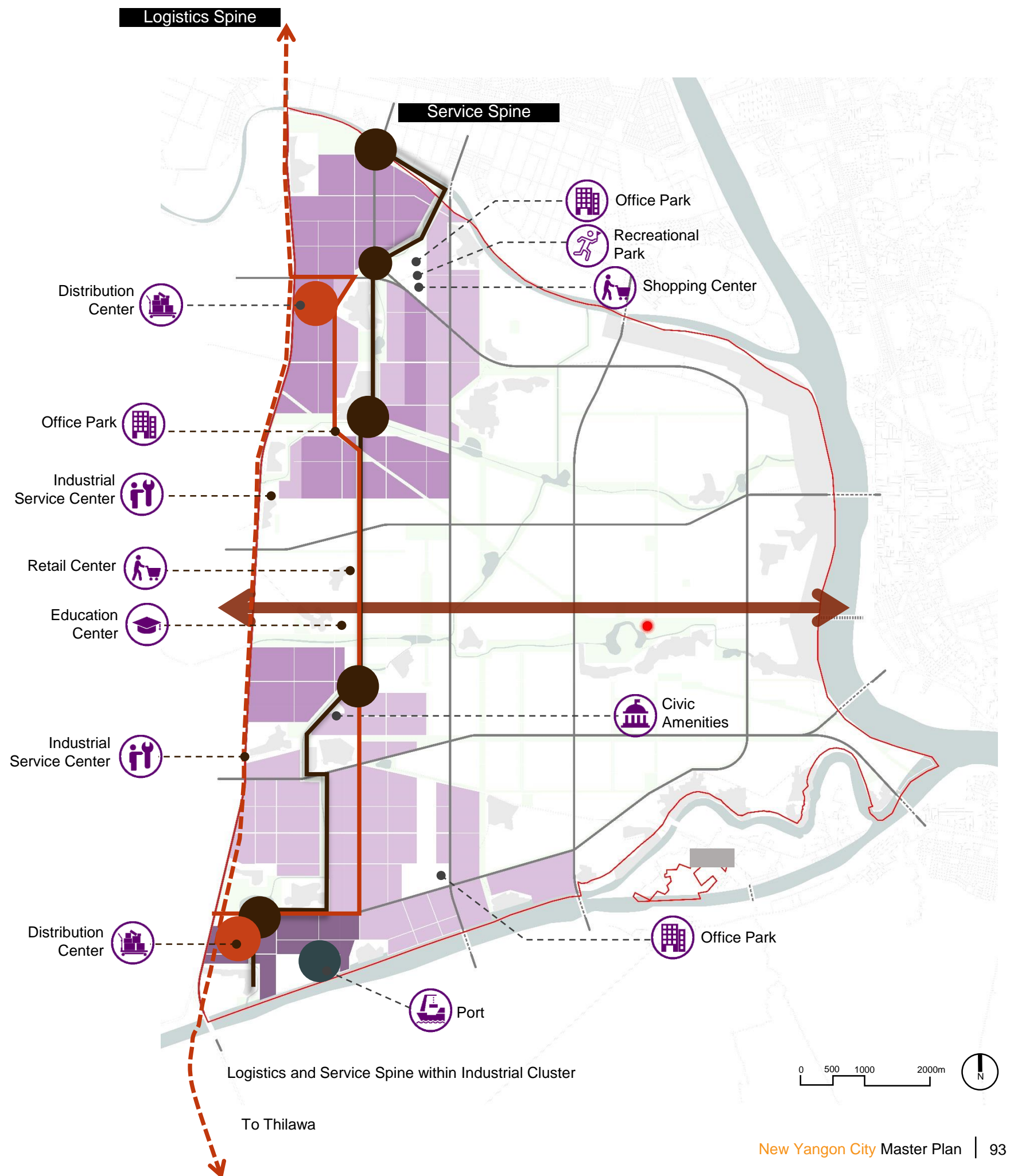
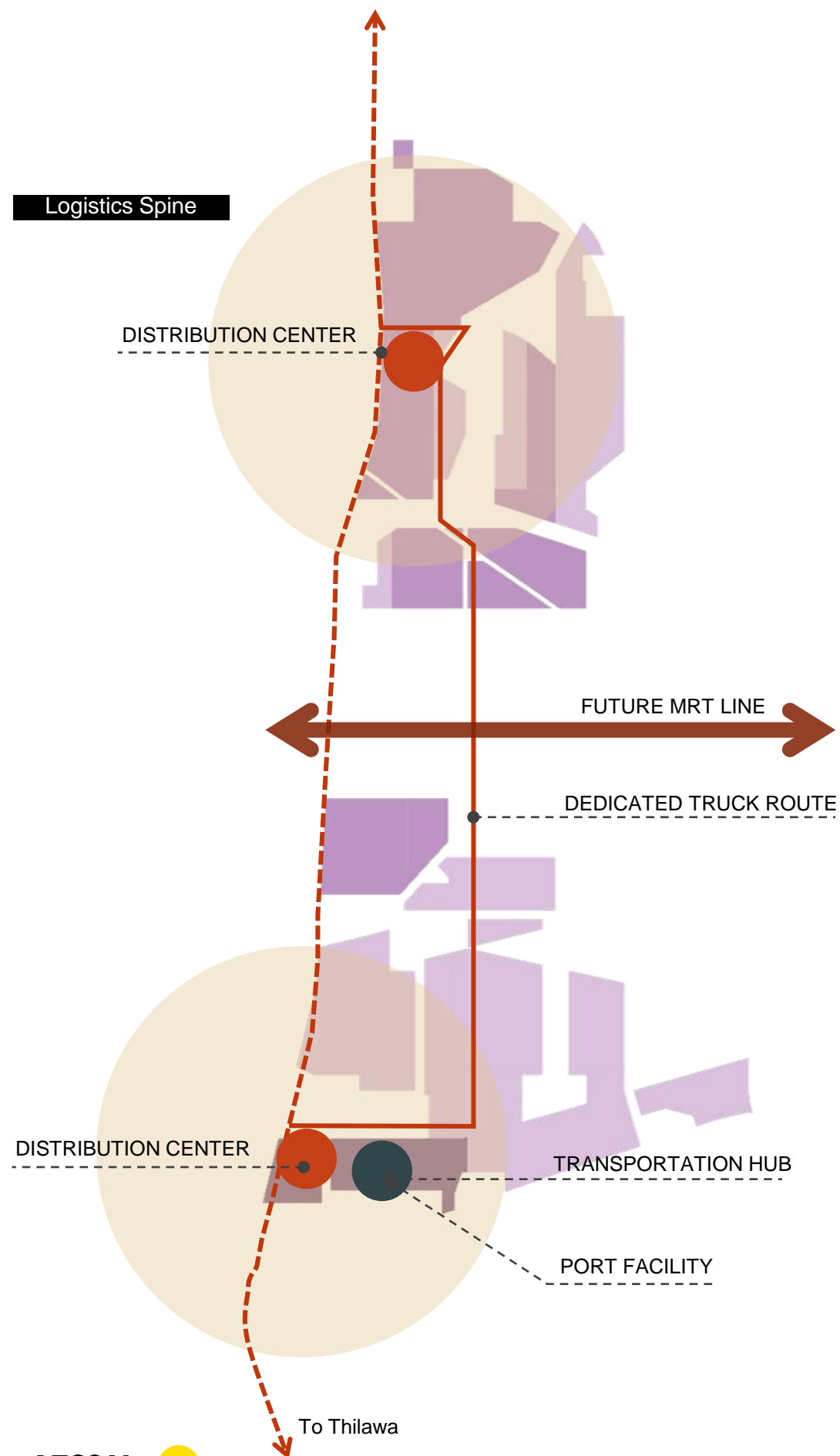
The industrial estate in New Yangon is planned as a series of clustered enclaves punctuated by support services, commercial uses, and villages. Each clustered enclave can potentially become the hub of a type of industry, co-locating with an anchor surrounded by its ancillaries. Future revisions of the plan can review the land under industrial use based on demand and reallocate some of the industrial enclaves to other uses, or either type of industries.

The most important factor for industries to develop is the ability to distribute to its potential market through a connected environment and immediate accessibility to the resources required. The Master Plan proposes a Service spine for supporting uses and a Logistics spine for movement of goods and people.

As such:

- An integrated corridor of services to support the industrial activities is envisaged to have nodes containing commercial and public use activities including skill development institutes and logistics facilities. The corridor is connected with a green spine promoting multiple modes of connectivity.
- Primary Logistics movement is envisaged on the ORR connecting to Thilawa Port. Tapping on the opportunity of proposed port in the South of NYC, the plan proposes an additional logistics system connecting the two main industrial estates in NYC. Dedicated distribution Centers have been proposed for efficient collection and distribution of goods within industrial estates.





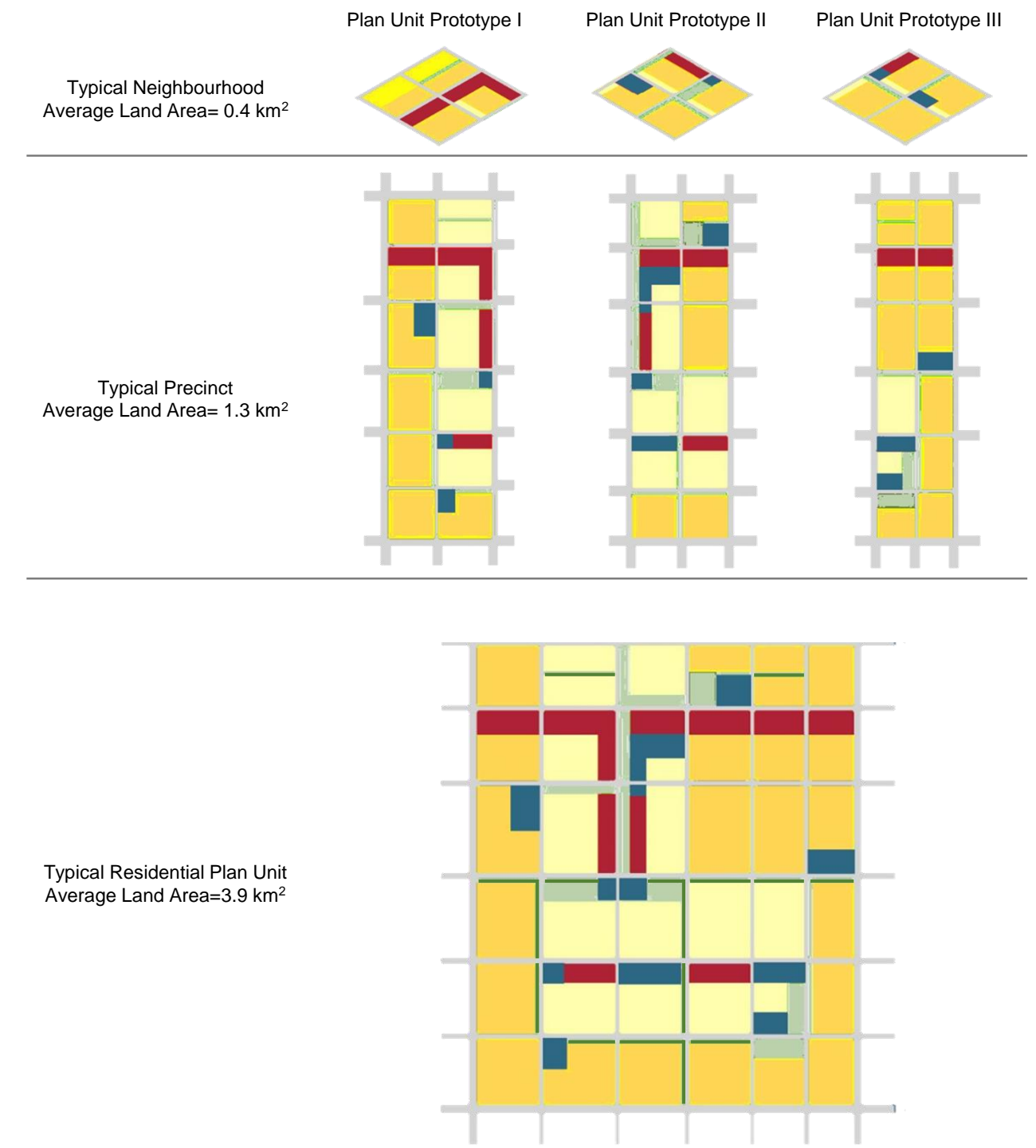
4.8 Planned Unit Development

Create Self-Sustained Communities

A large scale greenfield development such as New Yangon City requires multiples levels of planning and design. This plan proposes to establish the fundamentals that would guide next level of plans. In order to consistently program the future housing and mixed-use developments, planning models must drive equal access to civic amenities, commercial facilities and public resources (libraries, education, healthcare, commercial Centers) creating self sustained communities.

A Planned Unit (precinct/ neighbourhood/ new town) structure has been developed and proposed to be adopted for New Yangon. Based on population projection and defined land areas corresponding to density thresholds, the city is proposed to comprise of fifteen Planned Units. Each Planned Unit can then be assigned to have facilities and amenities based on the adopted norms.

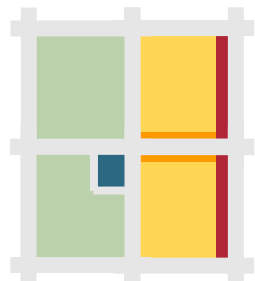
A typical Planned Unit is envisaged to have 80,000 to 120,000 residents. Depending on the applicable norm, some Planned Units may have to share city level facilities which can be appropriately located for each access. Local Streets should be provided inside each neighbourhood unit for direct access to each parcel. The system provides a guidance for incremental growth of population and development in each Planned Unit reducing redundancies in provision of amenities. Community Centers have been identified in each Planned Unit to house local & cluster facilities like primary schools, health clinics, hospitals, community multipurpose spaces, etc.



Typical hierarchy of a Planned Unit comprising of neighbourhoods that together form precincts, eventually coming together as a planned unit providing amenities for each hierarchy that are accessible to the residents.

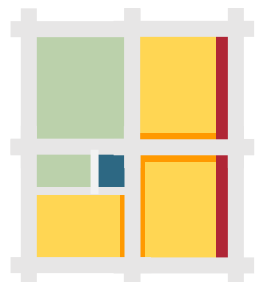
Phase I

Less residential demand
Priority development: Green +
Community Center + Residential



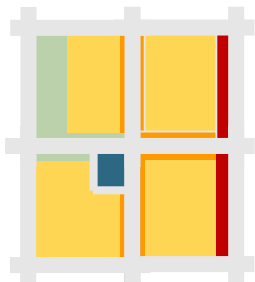
Phase II

Increasing residential demand
Build street front retail and
public realm



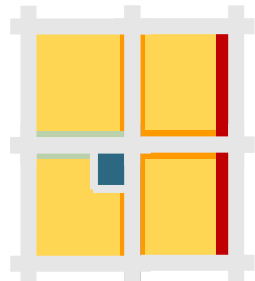
Phase III

Increasing residential demand
Develop the community park
Develop the public realm

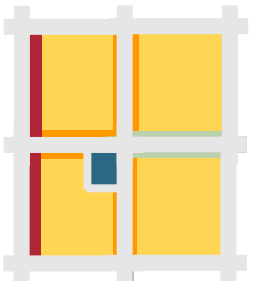
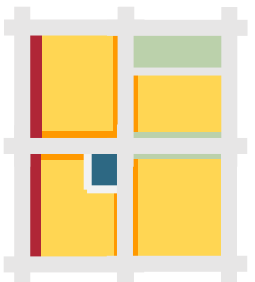
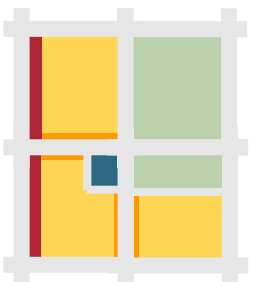
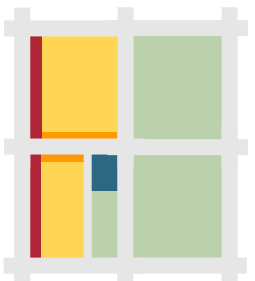


Phase III

Fully developed
residential community
Develop the eco-corridor

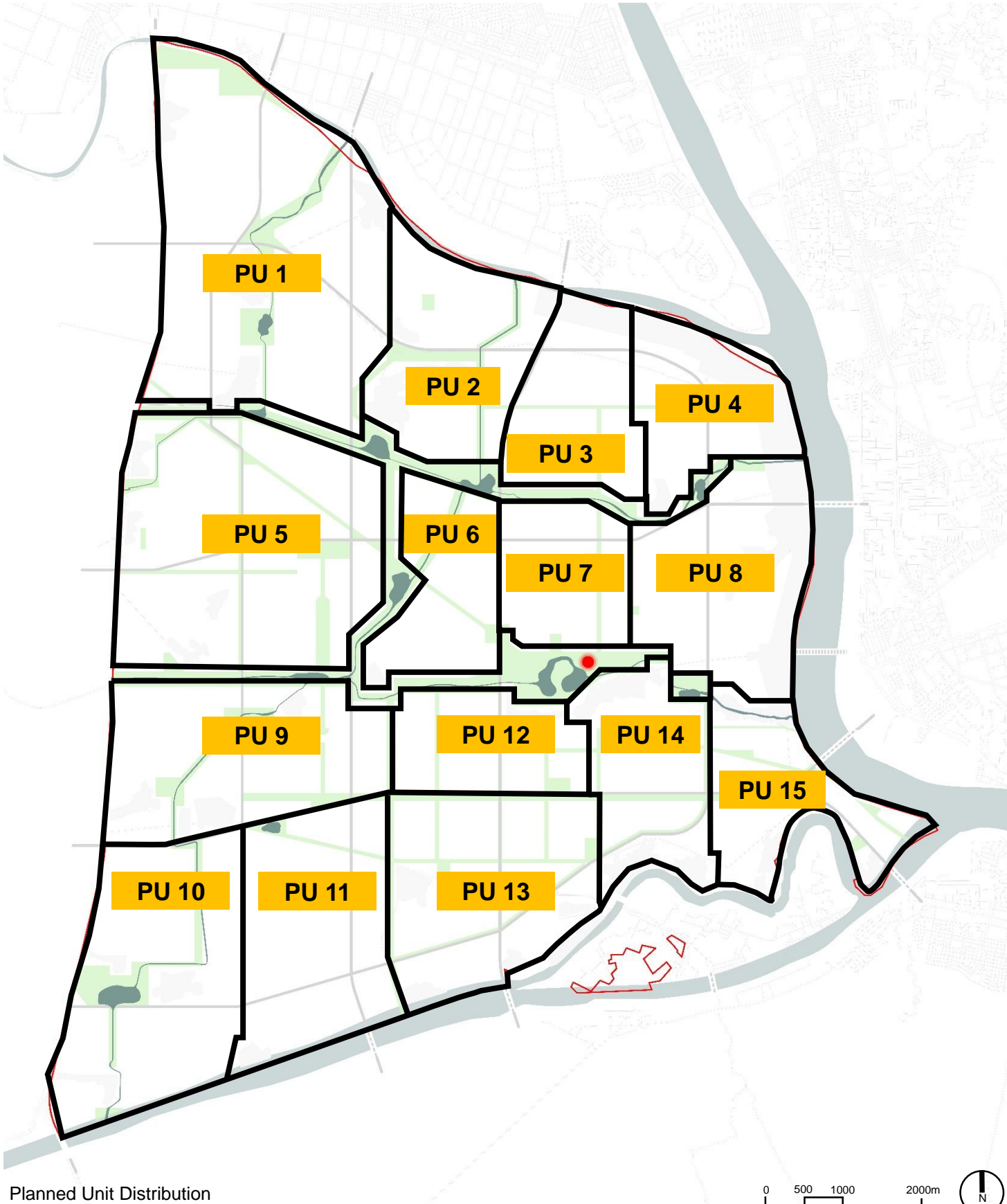


Plan Unit Prototype II



Plan Unit Prototype I

Planned Unit
boundary



Planned Unit Distribution

4.8 Planned Unit Development

Social Infrastructure Distribution

Based on the concept of Planned Unit Development and norms adopted for provision of social infrastructure, a numeric and spatial distribution of amenities is proposed for New Yangon.

Community Centers have been tentatively identified in each unit that can house local, cluster level, or district level facilities. This system allows implementation of such facilities as the city grows in size and prevents over investment in early stages.

City level facilities and amenities such as the stadium and administrative areas have already been identified to be part of the main spine or cultural corridor. District level nodes have been tentatively identified in New Yangon to cater to shared facilities. These shared facilities, such as a university cater to a larger population and hence can be shared between multiple units.

Local nodes have been tentatively identified that can cater to facilities directly associated with smaller populations. While each residential area or unit is proposed to have a local node, the Service Spine in the Industrial area is proposed to house such facilities as per requirements.

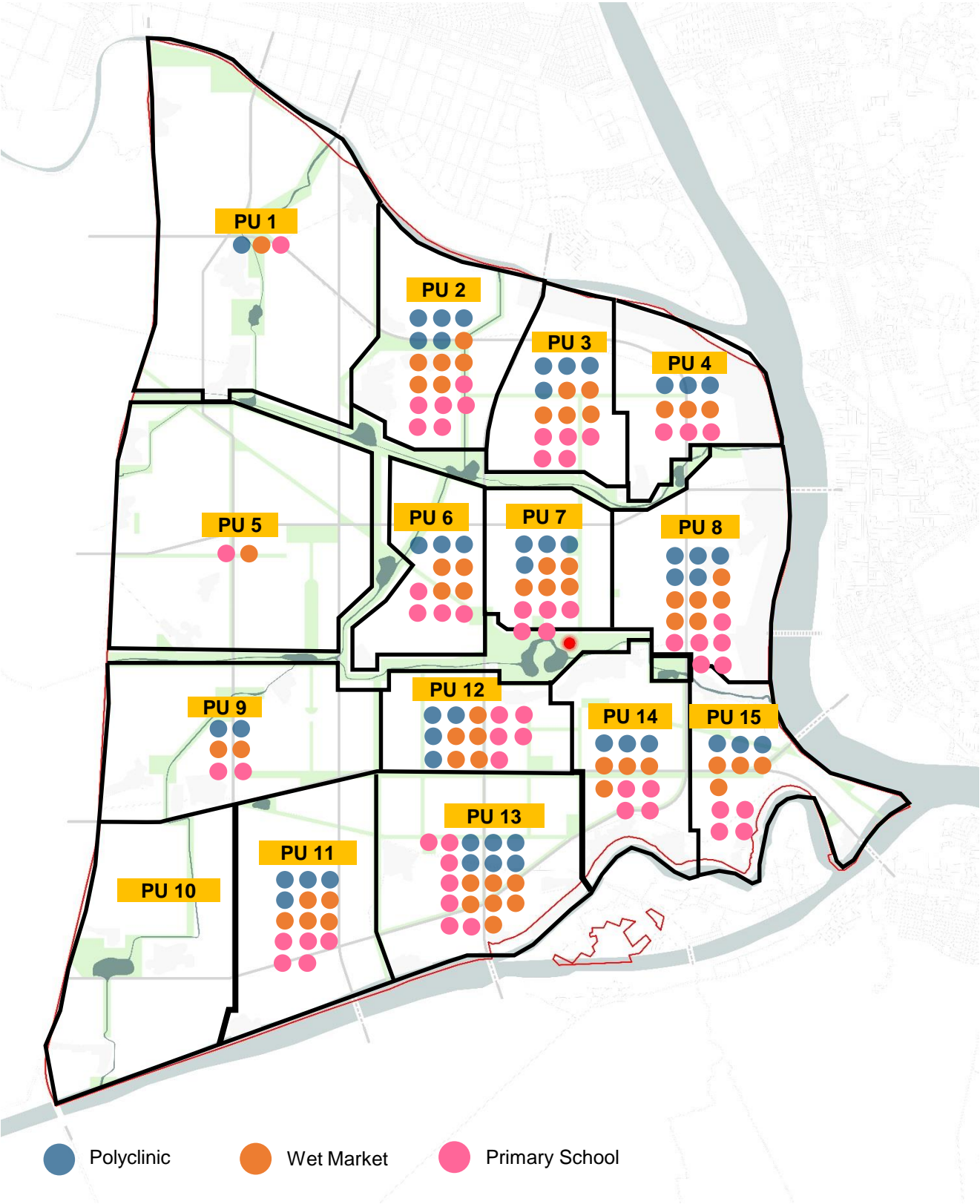
Table Showing Standard for Facility Distribution

Primary School	1 per 15,000 persons
High/Middle School	1 per 25,000 persons
College/ University	1 per 90,000 persons
Polyclinic	1 per 25,000 persons
Hospital	40 bed per 10,000 population
Wet Market	1 per 20,000 persons
Religious Sites	1 per 40,000 persons

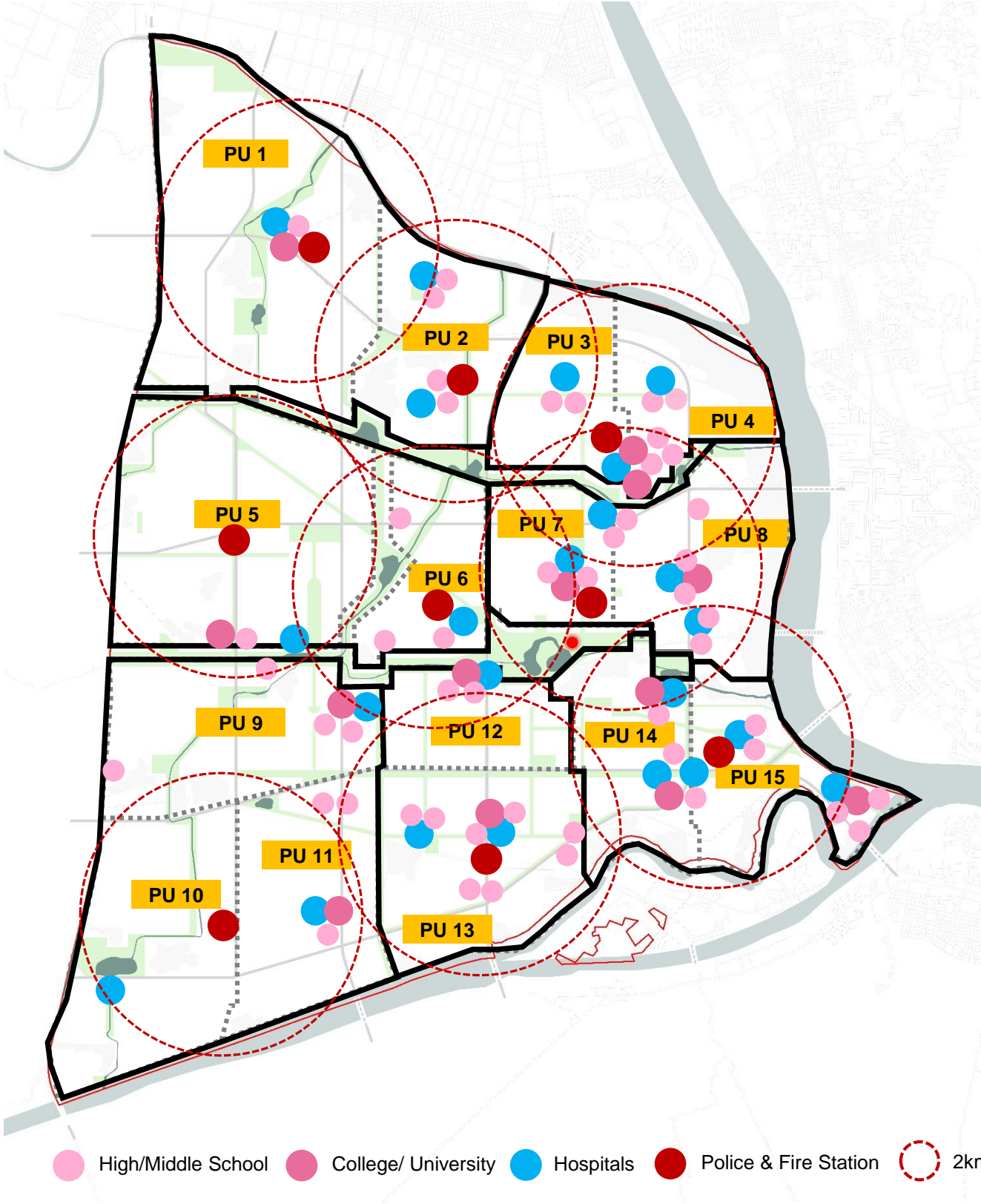
Table showing Amenity Distribution across Planned Units

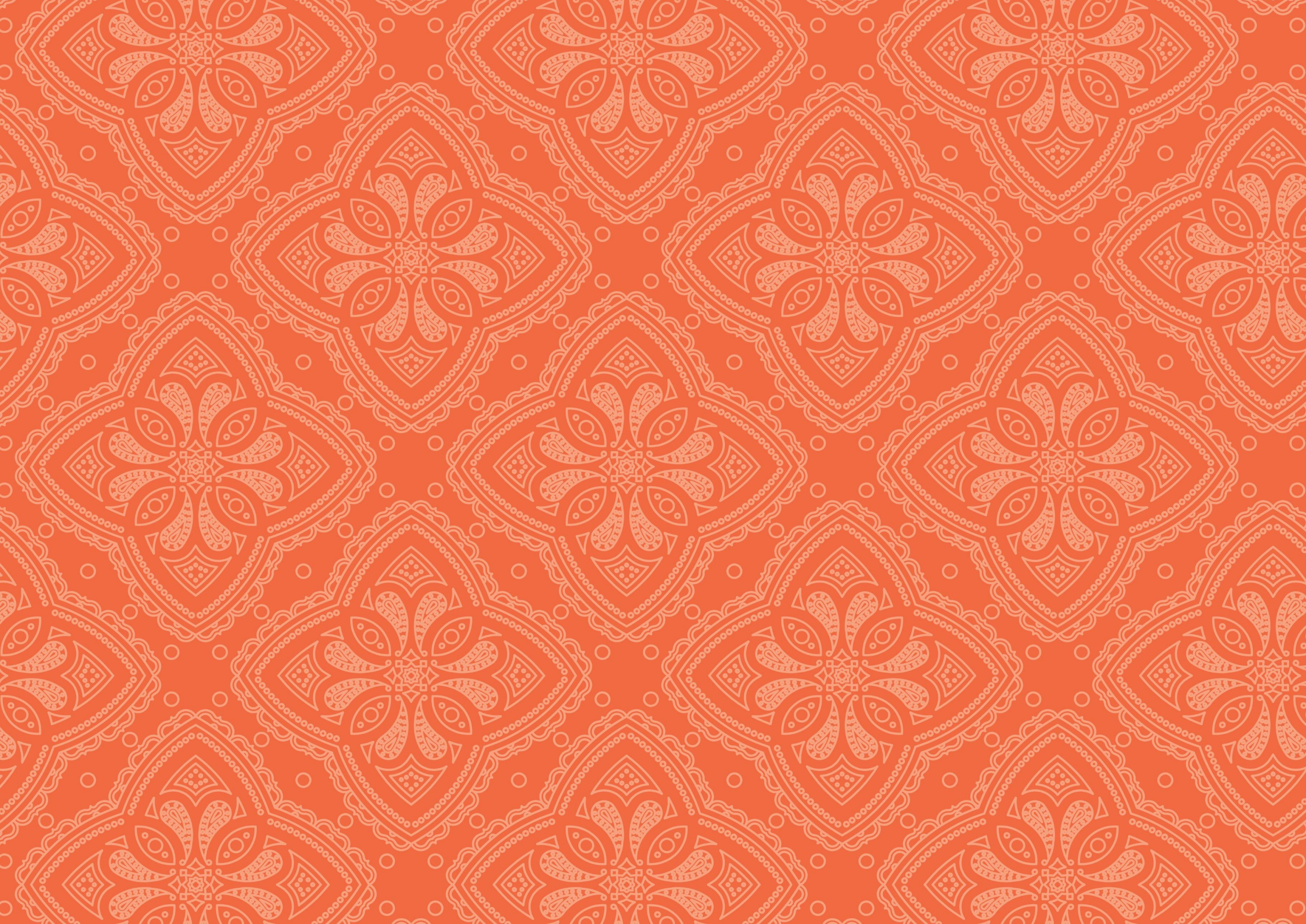
LAND USE (sqkm)						
AREA	Education			Healthcare		Others
	Primary School	High/Middle School	College/ University	Polyclinic	Hospital	Wet Market
PU_1	1	5	1	1	3	1
PU_2	6			5		6
PU_3	5			4		5
PU_4	3	7	2	3	3	3
PU_5	1			1		1
PU_6	4			3		4
PU_7	5	9	2	4	4	5
PU_8	6			5		6
PU_9	2			2		2
PU_10	0	6	2	0	3	0
PU_11	5			2		5
PU_12	5			4	5	2
PU_13	7	9	3	6		7
PU_14	4			3		4
PU_15	4			3	3	4
TOTAL	58	47	13	46	23	55

Primary Amenity Distribution



Secondary Amenity Distribution (Shared Facilities)







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