

**DEPARTMENT OF HUMAN SETTLEMENT**

**MINISTRY OF WORKS AND HUMAN  
SETTLEMENT**



VOLUME-1

**CORE LOCAL AREA PLAN**

**PHUENTSHOLING**

**2019**





## Foreword

The Phuentsholing Urban Core LAP is one among the 11 LAPs within the Phuentsholing Thromde. It is located in the centre of the Thromde and is the main commercial centre for the Thromde and for the Nation as a whole. It occupies an area of 440 Acres with the total resident population of 12480, which accounts for 45% of the Thromde population. Thereby, the core unlike the other LAPs which are comparatively less dense faces all the issues related to the lack of adequate infrastructure, lack of social spaces, and similarly deteriorating environmental conditions. The present Phuentsholing core has limitations in order to expand due to unavailability of suitable land. Hence, the Amochhu LAP will act as an extension to it.

The Review of Phuentsholing Core Area has been carried out on considering the overall proposal of Phuentsholing Structure Plan and taking into consideration such as Phuentsholing Urban Development Plan (2002-2017) and other documents related to the Core Area. The Review of Phuentsholing Urban Core is based on analytical assessment of existing situation, looking into aspects such as the present land use pattern, existing buildings, existing road connectivity and circulation, pedestrian, existing utility and infrastructure layouts and other environmental factors have also shaped the plan. Thus aiming towards Decongestion and pedestrianization of the city core as the highest priority. Efforts are required to make the city core as a lively community gathering space that is pedestrian friendly and people oriented.

The Review of Phuentsholing Urban Core is a product of the collaborative efforts of the agencies at the central, the Thromde, the local levels including the land owners and has been prepared through a consultative and participatory approach. The real success of the town will depend on the sincerity, integrity and ingenuity of the stakeholders in taking the Plan forward. Therefore, I urge all stakeholders to interpret and implement the plan in its true spirit and intention. The Plan has been approved by the National Committee of Human Settlements in its Meeting convened on 12<sup>th</sup> September, 2019. Periodic review of the Plan shall be carried out every five years. If any revision or amendment to the plan is deemed necessary before the scheduled review, the request should be submitted through the Ministry.

Tashi Delek.



(Dorji Tshering)

**Zhabtog Lyonpo**

## Acknowledgement

We would like to take this opportunity to express our gratitude to all those people who took immense pleasure in helping out with this report. It would not have been possible without the kind support and help of many individuals and organizations. We would like to extend our sincere thanks to all of them.

We are grateful to our Hon'ble Zhabtog Lyonpo Dorji Tshering for his extraordinary direction and support during the review of Phuentsholing Core Local Area Plan and Dasho Secretary Chencho Dorji for the guidance during the plan review. We express our profound thanks to Phuentsholing Thrompon for his unwavering support and for playing a vital role in the review of Core Local Area Plan. We would also like to extend our sincere thanks to the Urban Planners of Phuentsholing Thromde and other Thromde officials for facilitating and easing our plan review process.

The Director of DHS, Mr. Karma Sonam, with his far sightedness has always extended his support and guidance throughout the process of the review of Local Area Plan. We would also like to convey our heartfelt gratitude to Mr. Chhado Drukpa, the Chief Urban Planner of RRPD, Mr. Tshering Dorji, the Chief Urban Planner of CDRD, Ms. Bhawana Chhetri, the chief Urban Planner of SGISD and DHS officials for their contributions and critical review of the proposals.

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### Team member

1. Tshering Phuntsho, Sr. Urban Planner (Team Leader)
2. Yeshey Jamtsho, Sr. Urban Planner
3. Gyembo Dorji, Urban Planner
4. Sonam Selden Dema, Urban Planner
5. Kinley Wangyel, Urban Planner
6. Thinley Paday, Urban Planner
7. Sangay Wangdi, Urban Planner
8. Ugyen, Sr. Urban Planner, Phuentsholing Thromde

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# 1. Introduction

Bhutan is located on the southern slopes of the Eastern Himalayas and circumvents an area equivalent to 38,394 square kilometers. As per the UN records, the world in 2014 became 50% urbanized (50% of its population resided in urban areas), similarly, Bhutan has seen the growth of its urban centers viz. Thimphu, Phuentsholing, Samdrupjongkhar, and Gelephu. Unlike Thimphu, which by virtue of being the capital city and the administrative center grew as the largest city in the country, the rest of the towns grew due to their proximity to the neighboring Indian towns such as the Jaigaon, which is next to Phuentsholing town.

Today, these commercial towns remain highly vibrant and prospective business center. Phuentsholing Thromde is the most vibrant and often considered as the economic hub of the country.

Due to nearness to the Indian border it has created a strong economic base and attracts people from various parts of the country and from across the border for trading purpose. People from the surrounding villages are dependent on Phuentsholing for their daily needs and livelihood. With higher industrial growth in Pasakha, proposal for a hydro-power development on the Amochhu and increasing level of commercial activities, Phuentsholing is considered as one the most important growth centers of Bhutan.

## 1.1. Location

Phuentsholing Thromde is a municipality located in the southern part of the country. Although it is the Dzongkhag Thromde for Chhukha Dzongkhag, it is located at the southern end thereof abutting the Indian town of Jaigaon in West Bengal at a distance of 85 kilometers from the main administrative centre of the Dzongkhag located at Tsimasham. It is accessible by road from India and the nearest airport is located at Bagdogra in India, which is about 4 hour's road journey from the city. The city is about 151 kilometers away from Thimphu, the capital of Bhutan.

Geographically, it is located at a latitude of  $26^{\circ} 51' N$  and  $89^{\circ} 23' E$  and the altitude of 160 m above mean sea level, Phuentsholing Thromde falls entirely under the Tertiary Himalayan Geology. It occupies the river terraces of the Omchhu, which are defined by the steeply rising foothills of the Himalayas, to the North and East, and by the Amochhu to the west. By virtue of its location, Phuentsholing enjoys a warm, sub-tropical climate with an average annual rainfall varying between 500-1000 mm.

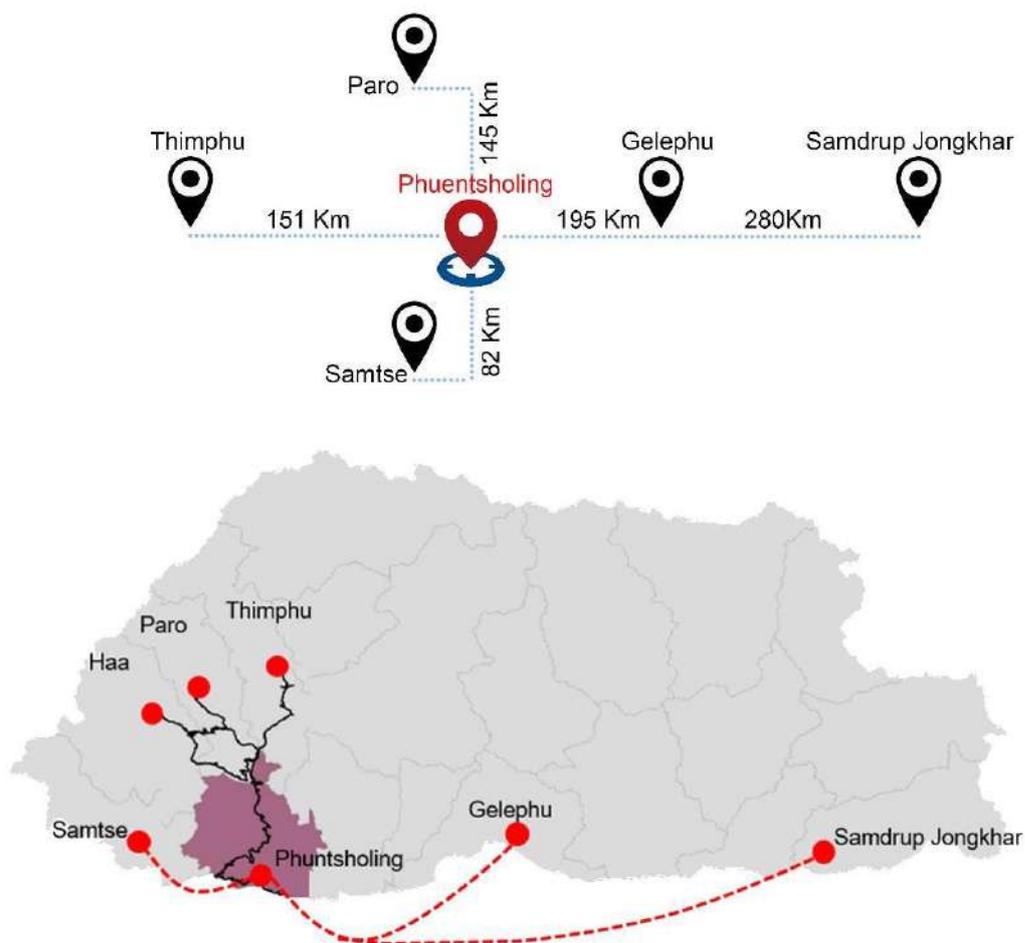


Figure 1 Location map of Phuentsholing Thromde

## 1.2. Structure Plan

The first Development Plan was prepared in 1987 with horizon year as 2001. However, the plan could not be implemented as envisaged due to various reason. The Urban Development Plan for Phuentsholing (2002-2017) was prepared by MoWHS in 2002. The Plan proposed for a wider, regional perspective for the city and emphasized on: Trade and Commerce, warehousing, industrial development, and construction.

To provide a strategic framework, policy guideline and a vision for the coordinated provision and arrangement of future land use (precincts), subdivision and development in new urban areas and in existing developed/redevelopment areas in the core and extended areas of the Phuentsholing Municipality, the Phuentsholing Structure Plan (2013-2028) was prepared in 2013 and approved on 25<sup>th</sup> February, 2014 by 13<sup>th</sup> NCCHS. It coordinates the provision of transport networks, public open space (POS), utility and service networks, urban water management, development standards and community and other infrastructure investment and staging program.

### 1.2.1. Vision:

The structure plan envisions:

“To Create Phuentsholing as a socially and culturally vibrant city with the emphasis on Sustainable Business and Tourism by applying smart growth principles”.

The underpinning guiding principle to achieve the long-term vision of the structure plan is the Smart Growth Principles. The Smart Growth Principle is an urban planning and transportation theory emerged in the early 1990’s that concentrate growth in compact walkable urban centers to avoid sprawl. It apportioned into 8 principles:

1. Community and Stakeholder Involvement
2. Walk-able Neighborhood
3. Create Attractive Communities with A Strong Sense of Place
4. Mixed Land Uses
5. Make Development Fair and Cost Effective
6. Preserve Open Space, Natural Beauty and Critical Environmental Areas
7. Provide a variety of Transportation Options
8. Create a range of Housing Opportunity

### 1.2.2. Local Area Plans (LAPs)

The Local Area Plan is a plan that outlay details pertaining to the implementation of the overall Structure Plan. The Local Area Plan is prepared in consonant with the main guiding principles of the structure plan. That said, the Phuentsholing Local Area Plans are prepared considering the central tenets of the Smart Growth Principles such as walkability, preservation of the environmentally sensitive areas, etc. There are 11 LAPs namely, Core Area LAP, Amochhu LAP, Damdara LAP, Kabreytar LAP, Toorsa Tar LAP, Khareyphu LAP, Rinchending LAP, Pasakha LAP, Alley LAP, Perkarshing LAP, and Pasakha Industrial Estate LAP. All the LAPs are under the process of implementation. Rinchending LAP is the largest Lap with the area of 627.241 Acres while Amochhu LAP is the smallest with an area of 98.622 Acres.

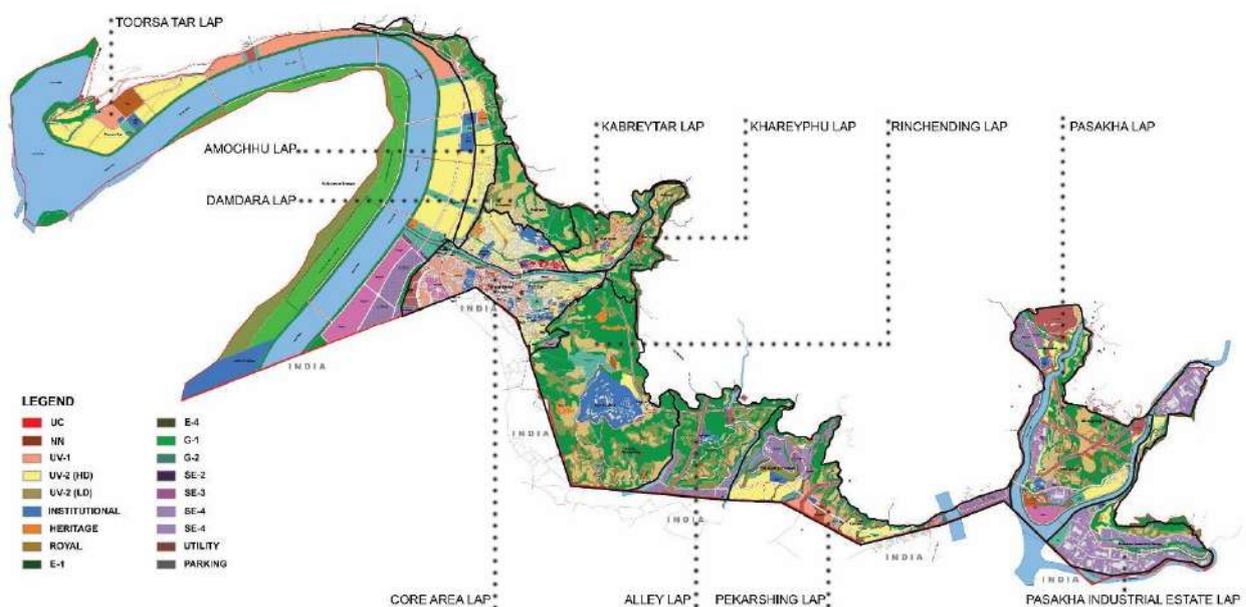


Figure 2 Local Area Plan of Phuentsholing Thromde and their locations.

### 1.2.3. LAP profile (Core LAP)

The Core LAP is the most compact and densified area in Phuentsholing. It has a total resident population of 12480, which accounts for 45% of the Thromde population (27658 as per PHCB 2017) in an area of 440.4 acres. The population has increased at a higher rate compared to the neighbouring towns and the increase has been majorly attributed to the immigration trend. As per PHCB 2017, a total of 19,038 persons have in-migrated to Phuentsholing Thromde and 6,371 have out-migrated from Phuentsholing Thromde, which accounts to a gain of 12,667 persons. Most of these people reside in the existing core. Thereby, the core unlike the other LAPs which are comparatively less dense faces all the issues related to the lack of adequate infrastructure, lack of social spaces, and similarly, deteriorating environmental conditions. For instance, the lack of housing facilities, discontinuous pedestrian walkways, inadequate green open spaces and the aggravating urban heat island effect, traffic congestion and the concomitant noise and air pollution are all manifesting in the core.

The local area plan for the core area was prepared and approved and is under implementation. A number of planning proposals were made in the Plan, but their implementation did not take place as envisaged. The present situation indicates that the city has grown and developed without proper approach to planning and without adequate infrastructure. The present Phuentsholing core has limitations in order to expand due to unavailability of suitable land. Hence, the Amochhu LAP will act as an extension to it.

Decongestion and pedestrianization of the city core is felt to be on highest priority. Efforts are required to make the city core as a lively community gathering space that is pedestrian friendly and people oriented. Sufficient parking spaces for visitors and residents need to be allocated. An alternative location, which will act as an extension to the present city core, preferably towards the far eastern end of the municipal limits will help ease out the pressure on the present city core. It must be attractive to the visitors and citizen alike.

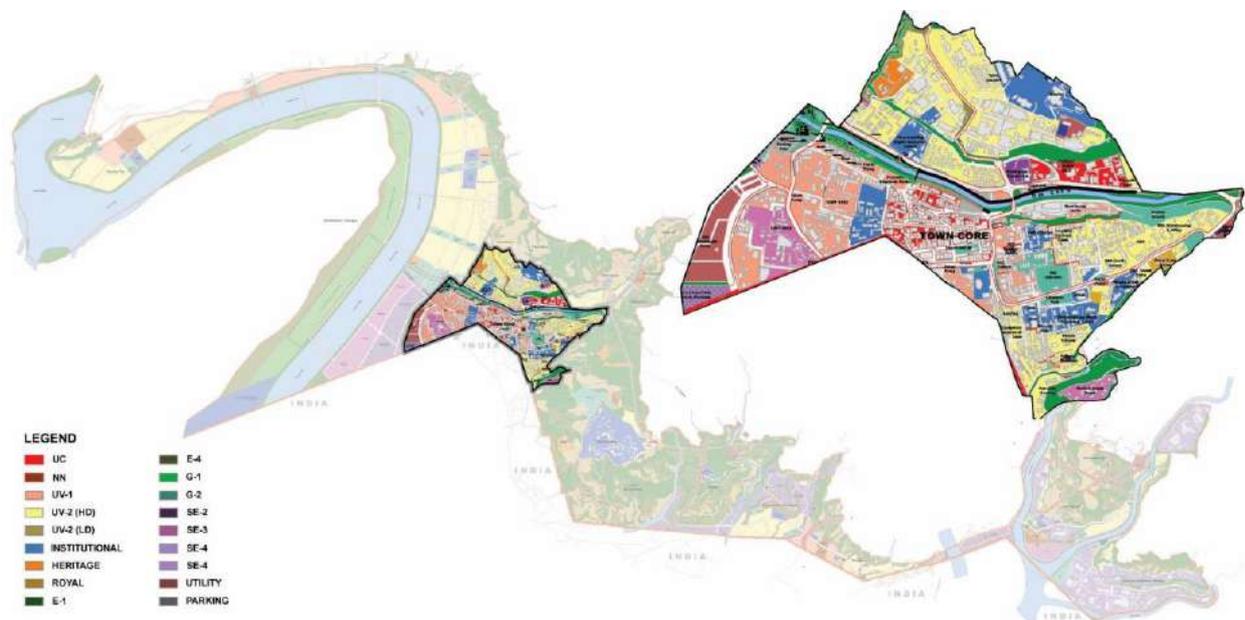


Figure 3 Location map of Core LAP.



Figure 4 Services and amenities in the Core LAP.

#### 1.2.4. Proposal for Core LAP in Structure Plan

The Structure Plan has provisions for detailed LAP proposals for action to make the plan operational. The proposals include creation of Environmental Enhancement Precincts through enhancement proposals for the forest and eco-fragile areas of the town, as well as through attempts to preserve these areas for future generations. River training and flood protection works are also reflected as an essential task for the future development of Phuentsholing Thromde and particularly the dense core area. In addition, Open Space Network, natural environment zones and their appropriate uses like pedestrian walkways and bicycle tracks linking important destinations across the Omchhu, passive and active recreation areas etc. are also proposed for implementation.

The most compelling structural aspect of the plan is the proposal pertaining to the traffic and circulation system. This proposal lays out a set of movement possibilities including an Urban Corridor, Arterial Roads and Connector Roads with the least possible damage to the existing natural environment. The present bus station shall act as a multi-modal transit station integrating road networks and various transport facilities along the proposed 4-lane by-pass. It facilitates the basic services like distribution of potable water, electricity and communications networks and collection and disposal of storm water drainage, sewage and solid waste.

Severe shortage of land suitable for urban extension or development has also been identified as a pressing issue, so various measures like reclamation of river bed, relocation of industries and warehouses, densification or redevelopment of government housing colonies and land restructuring are proposed. Providing sufficient affordable housing for all is considered as an important objective of the Structure Plan and it is recommended that the Thromde and other government bodies should play an active role in achieving this.

### 1.3 Need for Review

The need for the review of Core LAP surfaced due to issues concerning:

1. Incompatible use of Precinct
2. Poor connectivity and circulation
3. Inadequate parking spaces
4. Lack of a green space/open space network
5. Inadequacy of utilities and services
6. Lack of architectural identity

1. **Incompatible use of precincts:** There are certain precincts issues which has been attributed to the discrepancies with regard to the use of improper base-map during the preparation of the plan. Also, there are inconsistencies in the precinct designations as many precincts are designated for similar uses, for instance, S1-S4, and similarly, institutional precincts such as the RBP/RBA colonies named as

UV2. Furthermore, non-compliance at planning (as indicated earlier) and building level is the biggest deterrent to the implementation of the plans. For instance, most of the residential areas/precincts in the Core LAP are used for other purposes such as the industrial use in UV2 precinct below the hospital area.

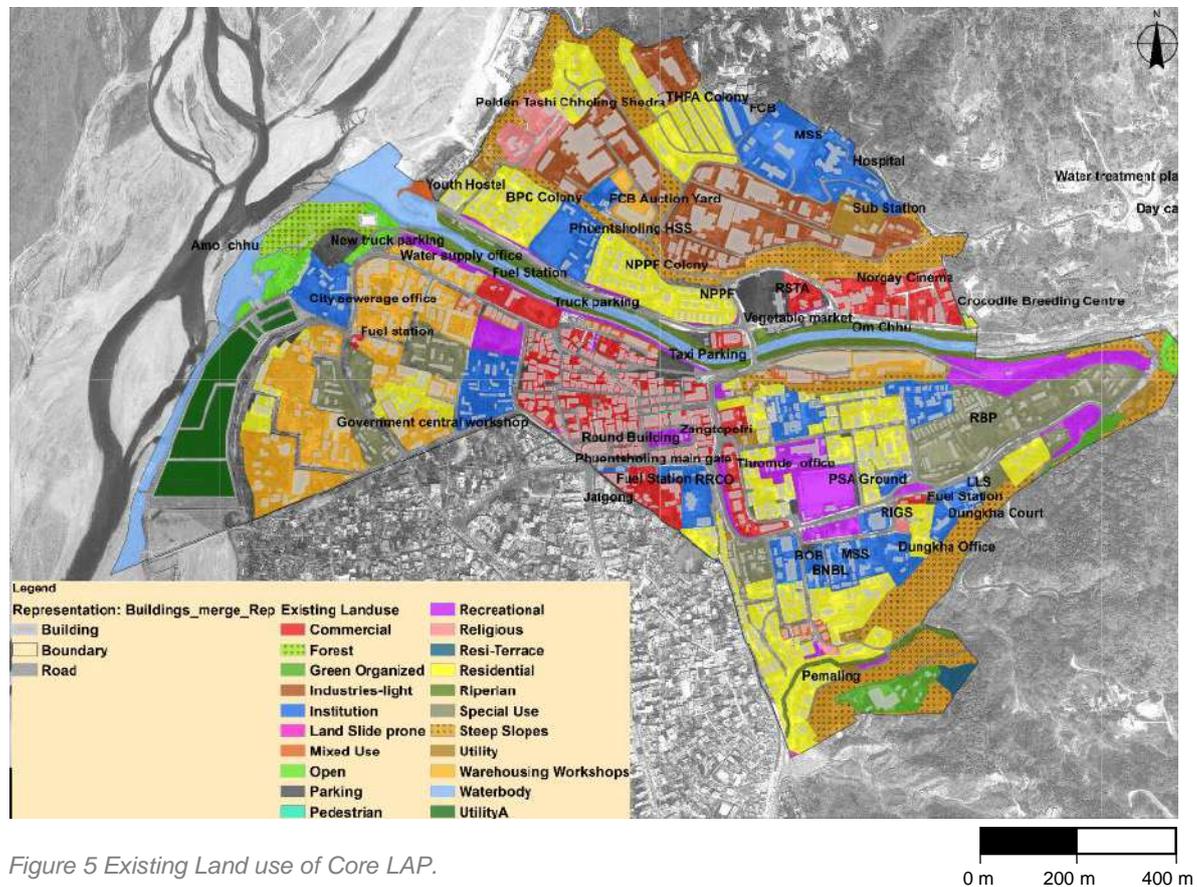


Figure 5 Existing Land use of Core LAP.

2. **Poor connectivity and circulation; parking; and green open spaces:** There are no thematic/specific master plans that corresponds to the planning considerations or the smart growth principles. For instance, the lack of circulation (pedestrian and vehicular), green open space network (Green infrastructure Plan) plans, Infrastructure Plan, etc., thereby, currently, many footpaths can be seen disjointed, whilst, many roads either leads to a dead end or are narrow.
3. **Inadequate utilities and services:** Lack of proper strategies for socially and ecologically vulnerable areas. While there is an acute shortage of housing in core area and even more so affordable housing, due to non-compliance in uses in the core area, the pressure of this crisis is borne by surrounding LAPs, which are on steeper and precarious terrains compared to the core. This projects an impeding risk in terms of unequal distribution of services (mostly located in the core and some areas are unfeasible for infrastructure provision such as the road) to the general populace, as well as, environmental hazard.

4. **Lack of Architectural identity:** Given that Phuentsholing Thromde, and in particular, the Core area is considered the gateway to Bhutan, the lack of architectural identity (traditional Bhutanese architecture) of the core area is also a major issue.



Figure 6 The streetscape of Phuentsholing depicting the lack of traditional architectural identity.

## 1.4 Aims and Objectives

To address the mentioned issues, the Structure Plan has laid out the following Aims and Objectives:

- Establishment of an alternative Commercial Zone in the eastern region of the municipal area.
- Designate a sizable land in appropriate location for dry port activities and supportive industrial development.
- The ongoing proposal for Amochhu Land Reclamation Project will address the land shortage for future urban development. Channelization of the river and reclamation of about 865 acres of land is proposed.
- Promote tourism and trade by creating recreational and commercial facilities along Amochhu River.
- Efforts will be made to meet the present housing gap and also create additional houses for the projected demands over the next two decades.
- Improvement of the existing infrastructure in order to cut down the total infrastructural development cost.
- Provide easy, safe and convenient movement for people and goods to all areas of the settlement by a road and pedestrian network.
- Enhance public amenities through series of public consultation.
- Create harmony between new development and traditional spaces by conservation and improvement of natural, religious or cultural features.
- Security should be a key concern as Phuentsholing is the border city and shares its international boundary with India. Its planning should be dealt in a special manner and buffer zone should be provided.
- Decongestion of existing core area.

- In-fill development on the vacant land.
- Review the existing Phuentsholing Structure Plan in order to identify the lacunae.
- Propose new structure plan that can bridge the lacunae and provide a framework for physical planning and use of land within the Municipality /Plan Area for a period of two decades. It will also guide the detailed policies and proposals of local area plans.
- Create ownership of the structure plan in a participatory process with involvement of all relevant stakeholders.
- Ensure a well-balanced distribution between the major activities by an adequate Land use pattern, which locates the areas for agriculture, commerce, housing, public buildings and public open spaces.
- Guarantee a step-by-step procedure by phasing the building areas and infrastructure.

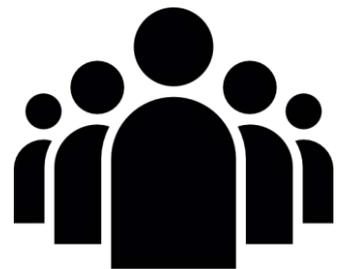
## 2. Planning Considerations

### 2.1 Guiding Principle of Structure Plan

The local area plan is a detailed implementation plan that is aimed at making the strategic Structure Plan more operational. Therefore, the planning and preparation thereof should take into consideration the main guiding principles of the Structure Plan. The Phuentsholing Structure Plan is based on the smart growth principles, which mainly concentrates growth in compact walkable urban centers to avoid sprawl. It accepts that growth and development will continue to occur, and so seeks to direct that growth in an intentional, comprehensive way. Its goals are to achieve a unique sense of community and place; expand the range of transportation, employment, and housing choices; equitably distribute the costs and benefits of development; preserve and enhance natural and cultural resources and promote public health. Smart Growth principles are directed at developing sustainable communities that are good places to live, to do business, to work, and to raise families. Smart growth is related to the principles of intelligent urbanism and more appropriate in case of Phuentsholing considering its present status. The following eight principles represent the basis of smart growth in case of Phuentsholing.

#### 2.1.1. Principle One: Community and stakeholder involvement

The Smart Growth ensures that the planning process is consultative and participatory. The frequented involvement of the stakeholders identifies and ensures that their specific needs and concerns are addressed. More importantly, the community participation assures that the collective vision of the area is effectively implemented through the involvement, understanding, and support of the populace for the implementation of detailed plans such as the Local Area Plans.



### 2.1.2. Principle Two: Walk able neighborhood

The aspect of walkability is essential for an areas and even more so for the residents, as it enhances mobility, reduce negative environmental consequences, strengthen economies, and support stronger communities through improved social interaction. Communities can be built so that walking to destinations is a viable alternative, thereby improving access to services for the one-third of the population that is too old, too young, or too poor to drive. In addition, improved pedestrian access also provides many benefits pertaining to the environment and the personal health.



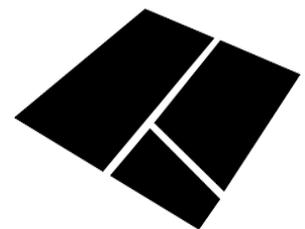
### 2.1.3. Principle Three: Create Attractive Communities with Strong Sense of Place

Smart Growth also corroborates the development of communities that are distinct and unique. Smart growth seeks to foster the types of physical environments that create a sense of civic pride, and therefore support a more cohesive community fabric. As a result, economic benefits accrue as well; high-quality communities with architectural and natural elements that reflect the interests of all residents are more likely to retain their economic vitality and value over time. This can be achieved by respecting traditional building practices, retaining existing cultural assets and addressing local geo-climatic conditions when planning for the future.



### 2.1.4. Principle Four: Mix Land uses

Mixing Land uses like commercial, residential, recreational, institutional, and others in urban villages or places that are accessible by foot can create vibrant and diverse communities. A mix of uses attracts people to shop, meet friends, and live in urban villages like traditional Bhutanese small towns and villages. Mixed Land uses are critical to achieve the great places to live, work, and play that smart growth encourages.



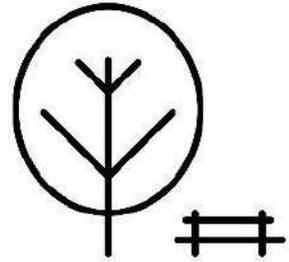
### 2.1.5. Principle Five: Make Development Fair and Cost Effective

Various components of the plan must be cost effective, so that smart growth principles work altogether. Efficiency promotes a balance between the consumption of resources like energy, time and finance, with planned achievements in comfort, safety, security, access, tenure, and hygiene. It encourages optimum sharing of land, roads, facilities, services and infrastructural networks reducing per household costs, while increasing affordability and civic viability.



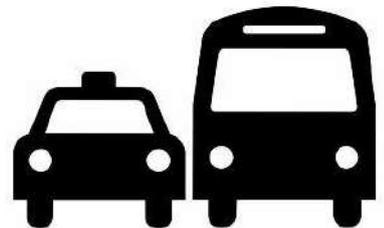
### 2.1.6. Principle Six: Preserve Open space, Natural Beauty and Critical Environmental Areas

Open space should be viewed as land that is not just an un-used land, but a resource worthy of protection, preservation or appropriate use. Open space serves many purposes, such as green space, animal habitats, plant growth zones, production lands, recreation experiences and wet lands. Additionally, open space may be a part of the natural beauty of the community that supports quality of life experiences. Networks of preserved open space and waterways can shape and direct urban form and at the same time prevent haphazard developments. These networks, known as “green infrastructure,” help frame new growth by locating new development in the most cost-efficient places. There is significant fiscal, environmental quality and health benefits associated with the protection of open space. Preservation of open spaces benefits the environment by combating air pollution, attenuating noise, controlling wind, providing erosion control, and moderating temperatures. Open space also protects surface and ground water resources by filtering trash, debris, and chemical pollutants before they enter the community’s water system.



### 2.1.7. Principle Seven: Provide a variety of Transportation Options

A well-defined transportation plan with various mobility options that are time and cost efficient is yet another important component for a Smart Growth of an area. This would also mean coordination between land use and public transportation as transit services would require supportive Land use in order to be most cost effective. The provision of parking lots at convenient locations is also important as that will influence an individual’s choice to drive, walk or take public transport.



### 2.1.8. Principle Eight: Create a range of Housing Opportunity

Housing provides people with shelter and is a key factor in determining a household’s access to transportation, commuting patterns, access to services and consumption of energy and other natural resources. Providing quality housing for people of all income levels is an integral component in any smart growth strategy.



In summary, smart growth principles can help create a city that is a medium for personal, social, and economic development by providing a variety of opportunities for education, recreation, employment, business, mobility, shelter, health, safety and basic needs.

## 2.2. Other Consideration

### 2.2.1. Gross National Happiness

The guiding principle of the nation, 'the gross national happiness' is an indispensable aspect and the tenets/pillars and domains of which needs to be taken a top consideration whilst the preparation and the subsequent implementation of the plan.

### 2.2.2. Creating an Economic Base

By virtue of its geographical location at the India-Bhutan border, Phuentsholing is deemed as a commercial capital of the country. It has the easiest access to imported goods and cheap labor. The proximity to the Indian market and the complimentary industrial areas within its limits projects a financially lucrative prospect for the Thromde. Creating an economic base is already a viable option when it comes to Phuentsholing and accordingly it should be one of the important consideration whilst planning.

### 2.2.3. Gateway to the Kingdom

The Bhutan gate in Phuentsholing is the entry point for the road travelers. It is a good opportunity to plan the area thoughtfully and showcase traditional Bhutanese architecture and culture.

## 3. Existing Scenario

This section will elucidate on the physical setting of the core LAP of Phuentsholing Thromde. It will cover topographical aspects and cadastral aspects of the plan.

### 3.1 Physical setting

The physical setting will explore the topographical as well as geological aspects of any plan. The importance of conducting such a study whilst preparing a plan is paramount. The need of having a correct and consistent database and base map of the planning area is important. This is so because any proposal and analysis that is done, is based on the data and the site condition that is captured on the database. The topographic data for the core LAP for Phuentsholing Thromde however has only been updated since the preparation of the structure Plan during 2014. Thus the slope analysis for the area has been done based on this data.

However, with the constant efforts that has been put in by the Thromde, the Geo-database for the whole of the Thromde is under preparation. The Geo-database contains information on every individual structure/building in the Thromde. The data includes particulars such as building height, the number of units and the unit use.

### 3.1.1 Location and Area

Phuentsholing Thromde is the commercial and industrial capital of the country. It is home to headquarters of many corporations and industrial centers. Being the closest town to the border with India, it is also a freight hub for the entire country as thousands of goods passes through this town on a daily basis.

Phuentsholing is one of the four major towns in the country and is also the administrative center for Chhukha Dzongkhag. It covers parts of both Phuentsholing Gewog and Sampheling Gewog.

The Core LAP is in the centre of the Phuentsholing and it encompasses of an area of **440 Acres** which is just 8.4% of the total land mass. The Core LAP is surrounded by Kabreytar LAP and Damdara LAP to the North, Rinchending LAP to the east, Amochhu to the west and by India to the south.

The Core Area lies on the foothill plains of the country at an elevation of 293 meters. It shares similar physical and climatic conditions with the neighbouring Indian towns. The climate is warm and temperate in Phuentsholing. When compared with winter, the summers receive abundant rainfall, especially during the monsoon seasons. The climate here is classified as Cwa (Humid sub-tropical climate) by the Köppen-Geiger system. The average annual temperature is 23.2 °C in Phuentsholing. In a year, the average rainfall is 4383 mm.

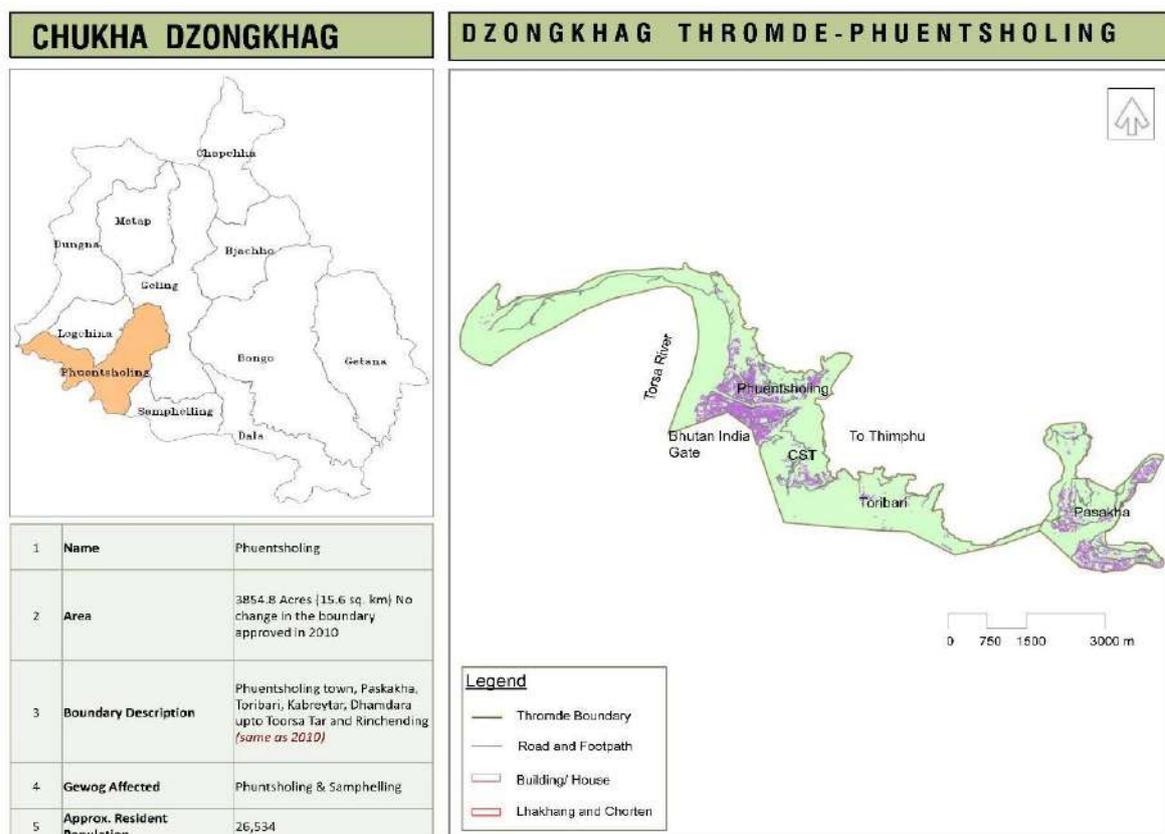


Figure 7 Map showing location of Phuentsholing Thromde.

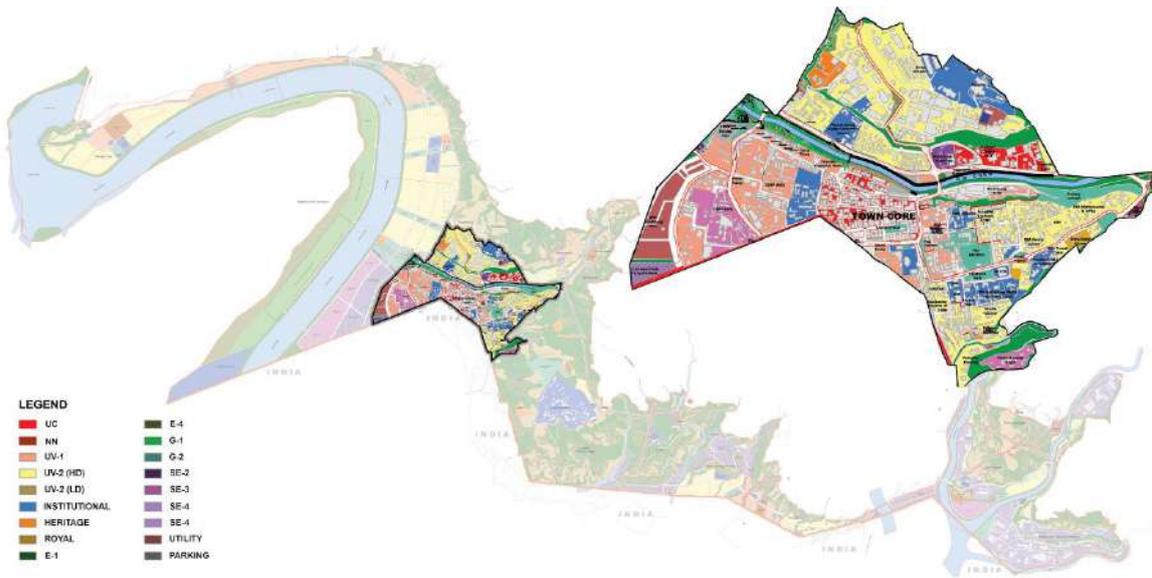


Figure 8 Map showing the location of Core LAP.

### 3.1.2 Topography

Phuentsholing Thromde and the Core LAP lies in relatively flat plains of the foothills of the country. Owing to its flat terrain, most of the areas are very suitable for development, thus we observe a high intensity of development activities in the area.

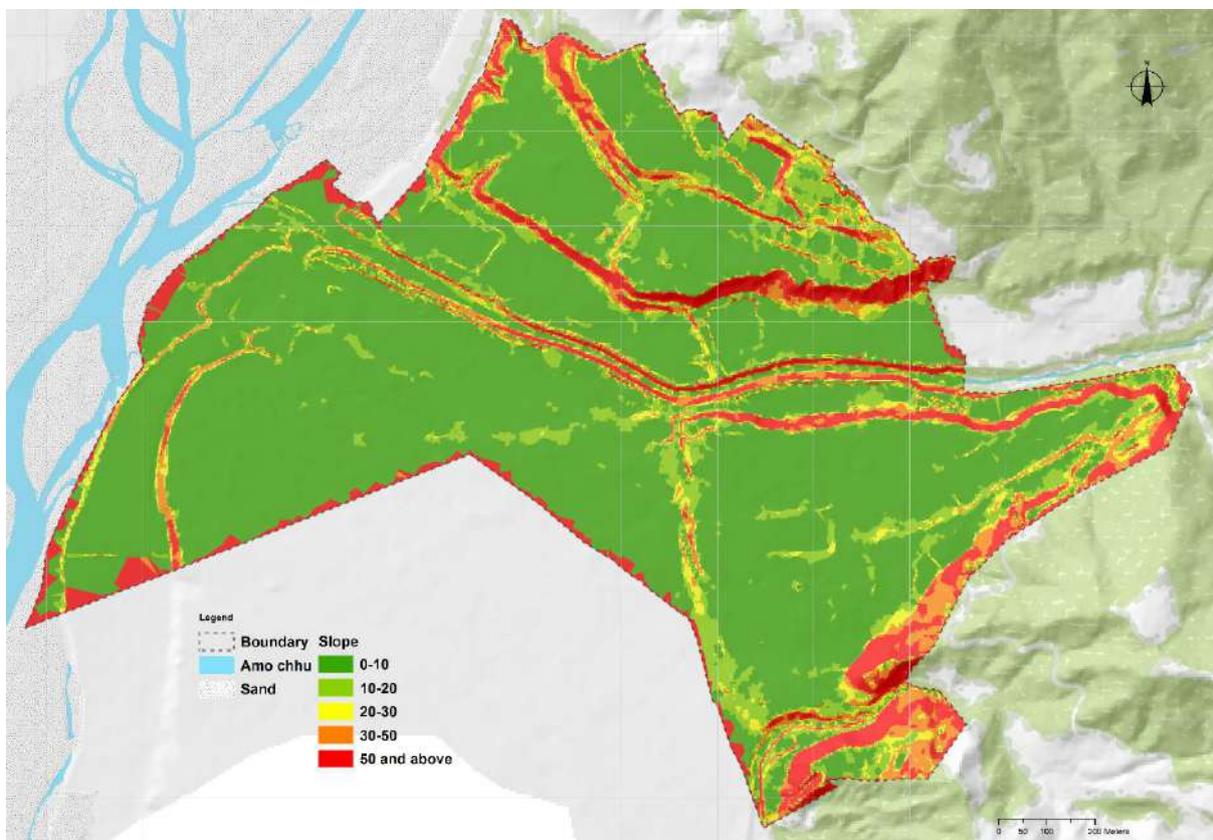
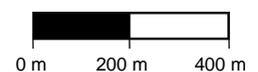


Figure 9 Slope analysis map.



As indicated in the map above, most of the area lies in the slope range of 0-30 percent, which is highly suitable for development. However further up north we can observe steep sloped area. These have currently been left as open spaces and green areas.

### 3.2 Existing land patterns

There are **605 plots** in the core LAP area. The plots owners vary from mostly government and corporate owners to private individuals. The real estate market has been booming in the town. However due to more commercial viability in the town, most of the development activity happens for hotels and commercial uses. Residential buildings are slower to respond to the ever increasing demand. Also there are prominently larger areas being occupied and used as ware house and storage units.

#### 3.2.1 Plot size

The plot size analysis was done for the core LAP. There are total of 605 plots in the area. The plot size analysis classifies the plot sizes into three different categories:

- a) Plots less than 10 decimals,
- b) Plots with sizes between 10 decimals and 13 decimals,
- c) Plots with sizes greater than 13 decimals.

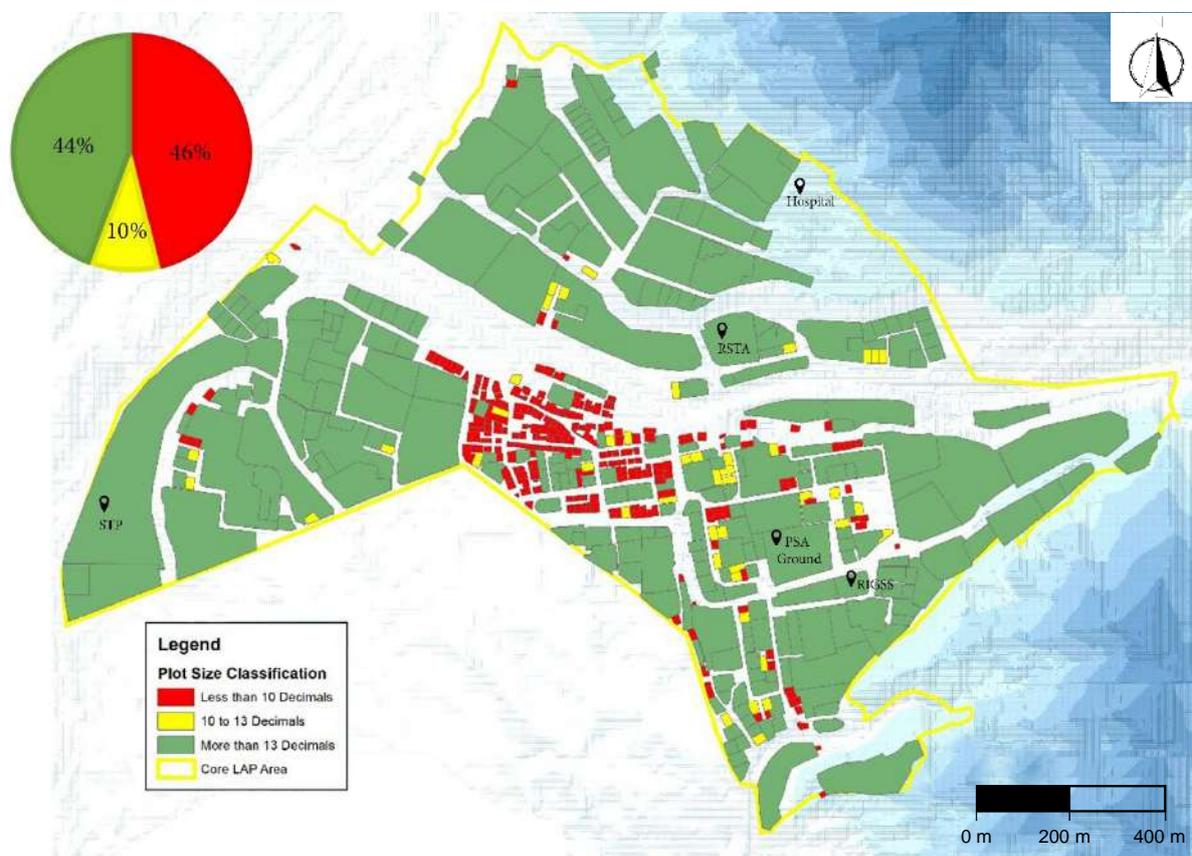


Figure 10 Plot size analysis map.

Upon analysis it was found that 278 plots (46%) were found to be under 10 decimals, 46 plots (8%) were between 10 and 13 decimals and 281 plots (46%) were greater than 13 decimals.

The plots size analysis is important for any planning activity since a larger percentage of undersized plots means that the implementation of any planning intervention will be difficult. In the case of implementing land pooling schemes it is difficult to pool land from those plots that are undersized since that would leave unbuildable land parcels.

The situation of the core area also reveals that there are lot of plots which are undersized. However, since the core LAP is already built up, it will be difficult to deploy land pooling and land readjustment as a planning scheme.

### 3.2.2 Land ownership

The land ownership of the Thromde could not be fully analyzed as most of the details for the land type and owner ship is still to be sorted out.

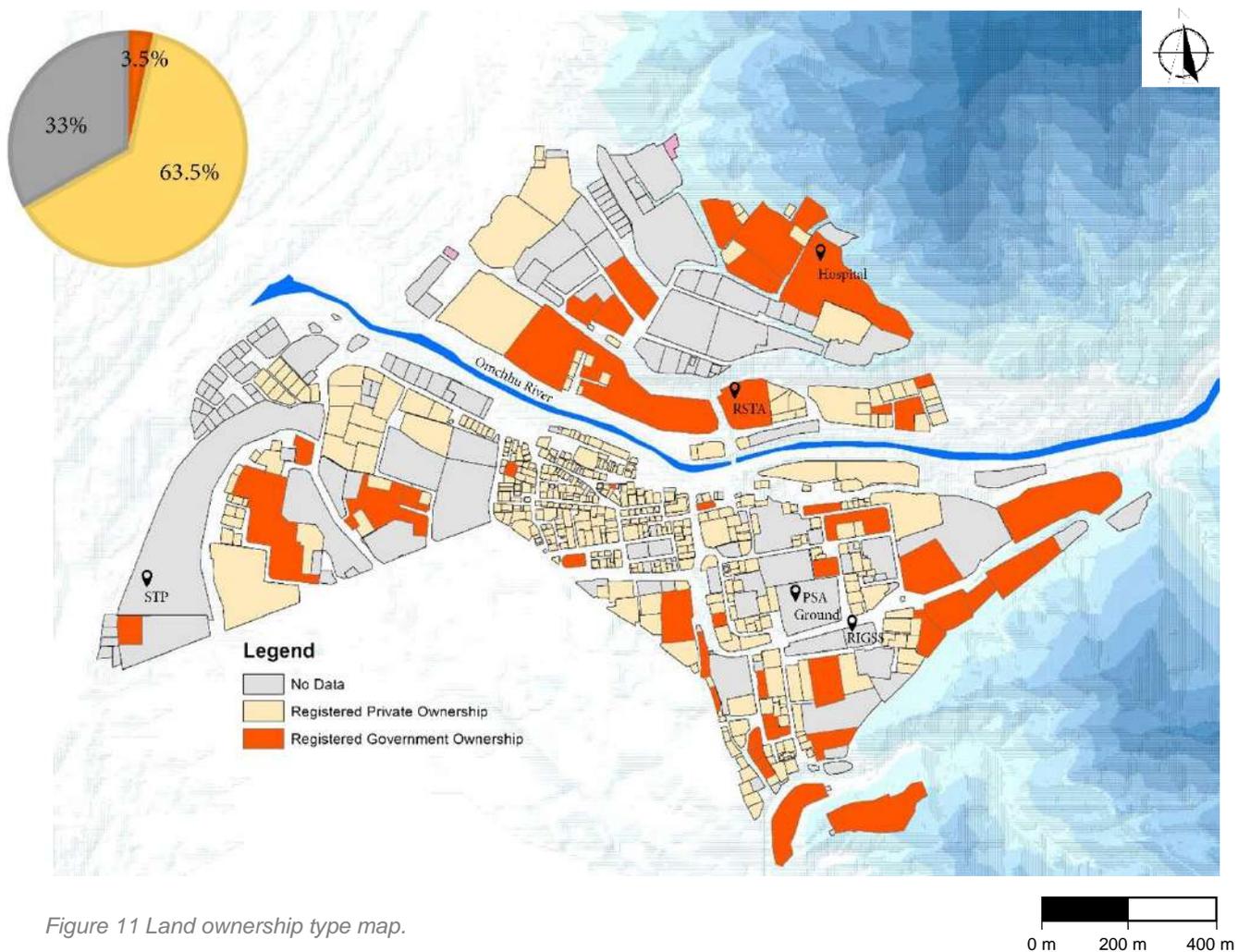


Figure 11 Land ownership type map.

### 3.2.3 Land Holding Status

The land holding status depicts the status of the ownership of the plots, categorized as freehold or leased. The freehold basically belongs to the people under private ownership, whilst the leased land belongs to the government which are leased out to private individuals or corporations for certain periods of time.



Figure 12 Land holding status map.

### 3.3 Existing Land Use

The precinct for the core LAP designates different land uses and permissible built environments in the area. The designated land use however if observed, is not strictly complied with. On proper site visits, it was observed that the actual use of the land on the ground was not as the one stipulated in the Structure Plan.

The need to study and analyze the existing land use was found imperative for the area since an ongoing trend of converting residential units to hotels and guest rooms were observed. Furthermore, contradicting land uses such as industrials and warehousing were observed in areas designated for residential uses.

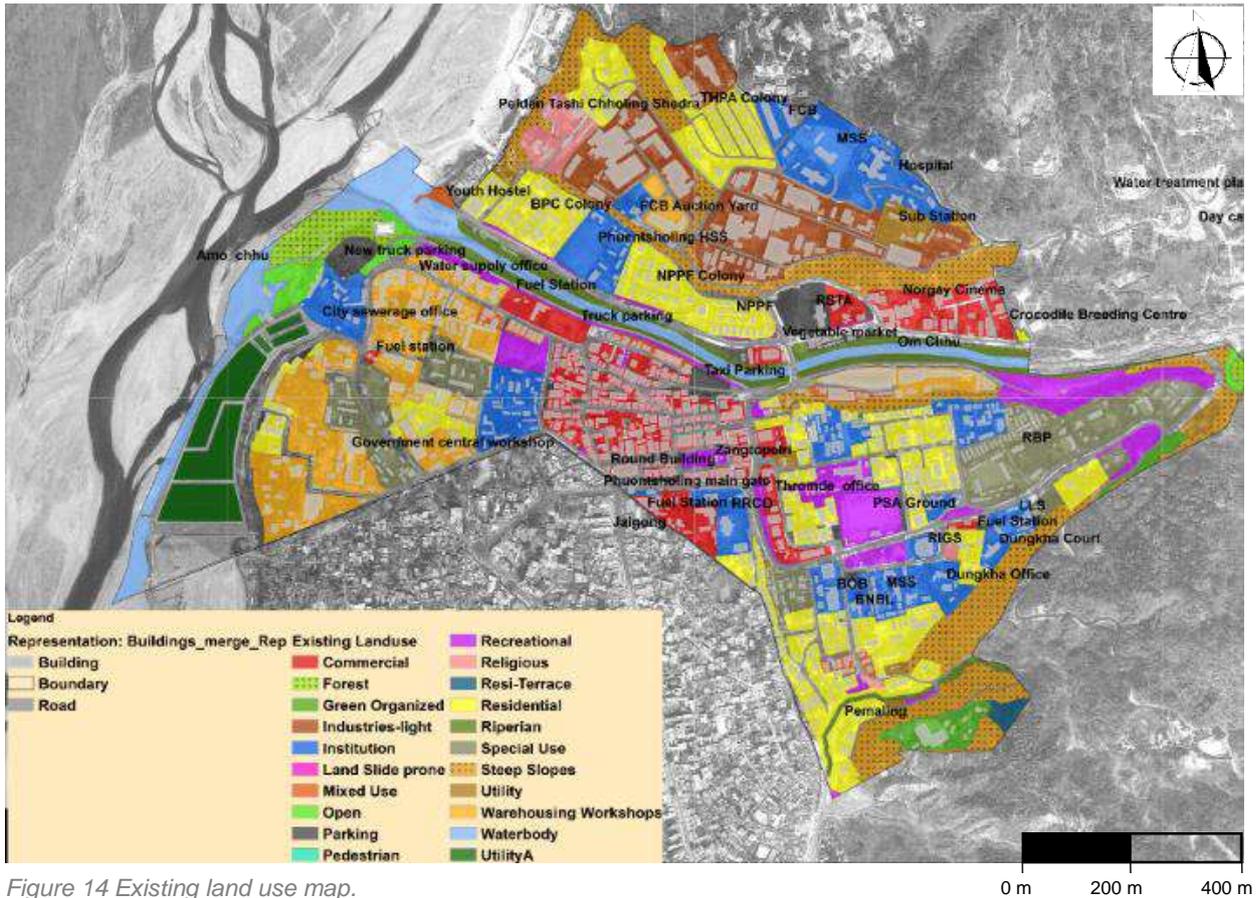


Figure 14 Existing land use map.

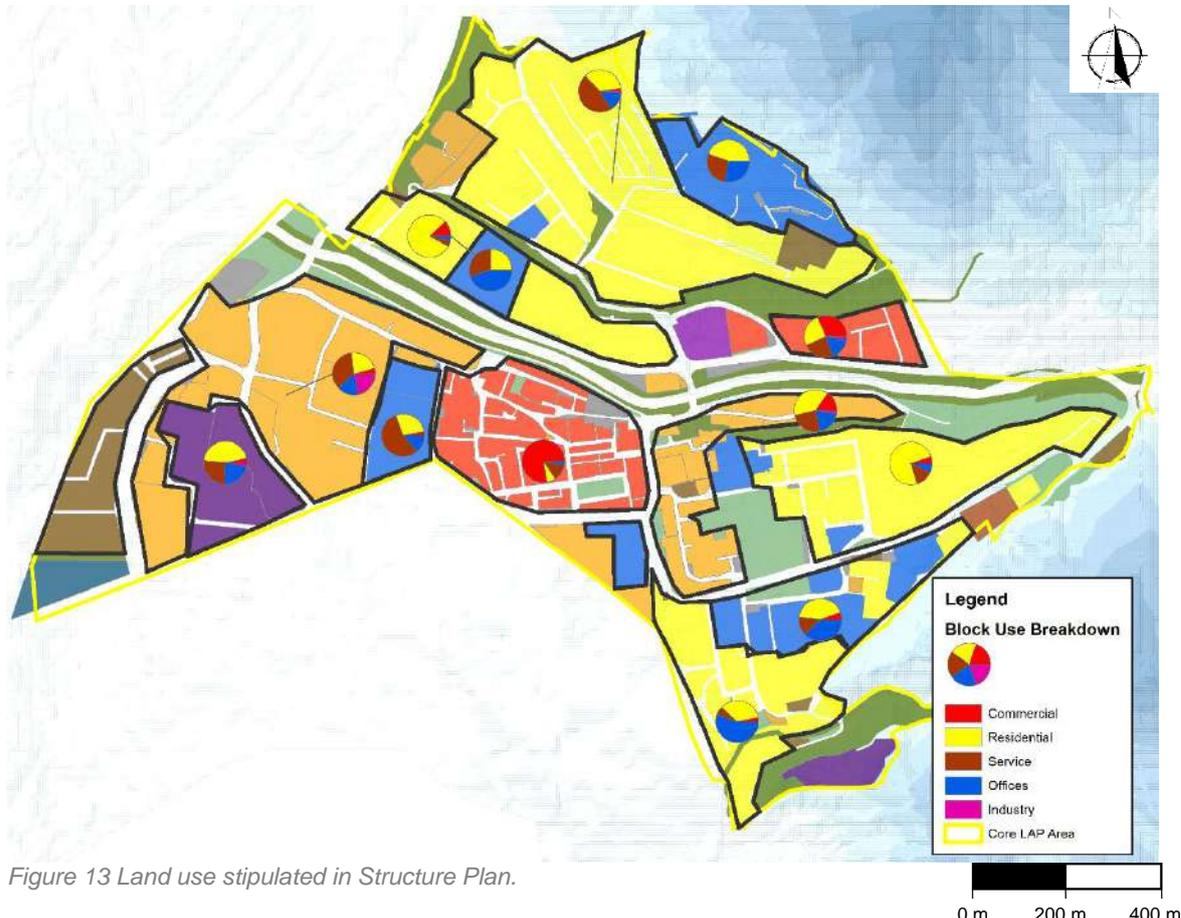


Figure 13 Land use stipulated in Structure Plan.

Analysis of the different existing uses were conducted and the result were compiled. The data was obtained from the Geo-database for Phuentsholing Thromde. The database provided extensive insight into the uses of the land. It detailed the uses down to each unit and also the figures for the number of units within a structure. This enabled a comprehensive compilation of the vast amount of uses of the units. However, since all of the uses were not necessary to be categorized into different sector, the uses with similar nature were clubbed together. For instance, hostels and residential units were clubbed together under the umbrella of residential use.

Using this similar technique, the uses were categorized into five different uses: a) Commercial b) Residential c) Services d) Offices e) Industries. Then the area was divided into different blocks depending of the predominant precinct designated to it. For instance, the area below the hospital was designated as one block since a large parcel of this area was designated as UV-2. Similarly, other uses were also clubbed using the same methodology.

Upon final analysis, a map illustrating the most predominant and the prevailing use on the ground was formulated in order to grasp a clear idea of the existing ground situations. The final inference was that the highest degree of contradiction use came from the area below the hospital. The uses were designated as residential but it can be seen that almost half of the place was used for services related activities. This included the use of the area as ware houses and industrial storage facility. It was reinforced by the fact that most of the area were leased out to the owners of the storage units.

### **3.4 Road**

Most of the places are connected and have access to road. However, there are few plots in the area around BOB and BNB that have no access from Bhutan. Such plots are only accessible from India.

Also there are no set road hierarchies and in the Urban Core precincts, the roads are slightly narrower and below the standard compared to the density and the traffic volume that is received. This aggravated the traffic conditions in the town and one can observe that there is lot of congestion and lack of parking space in the town.

A comprehensive study on the traffic condition for the town needs to be conducted along with a formulation of a comprehensive road network and traffic data. With such, it is significant to prepare a transportation Master Plan for the Thromde.

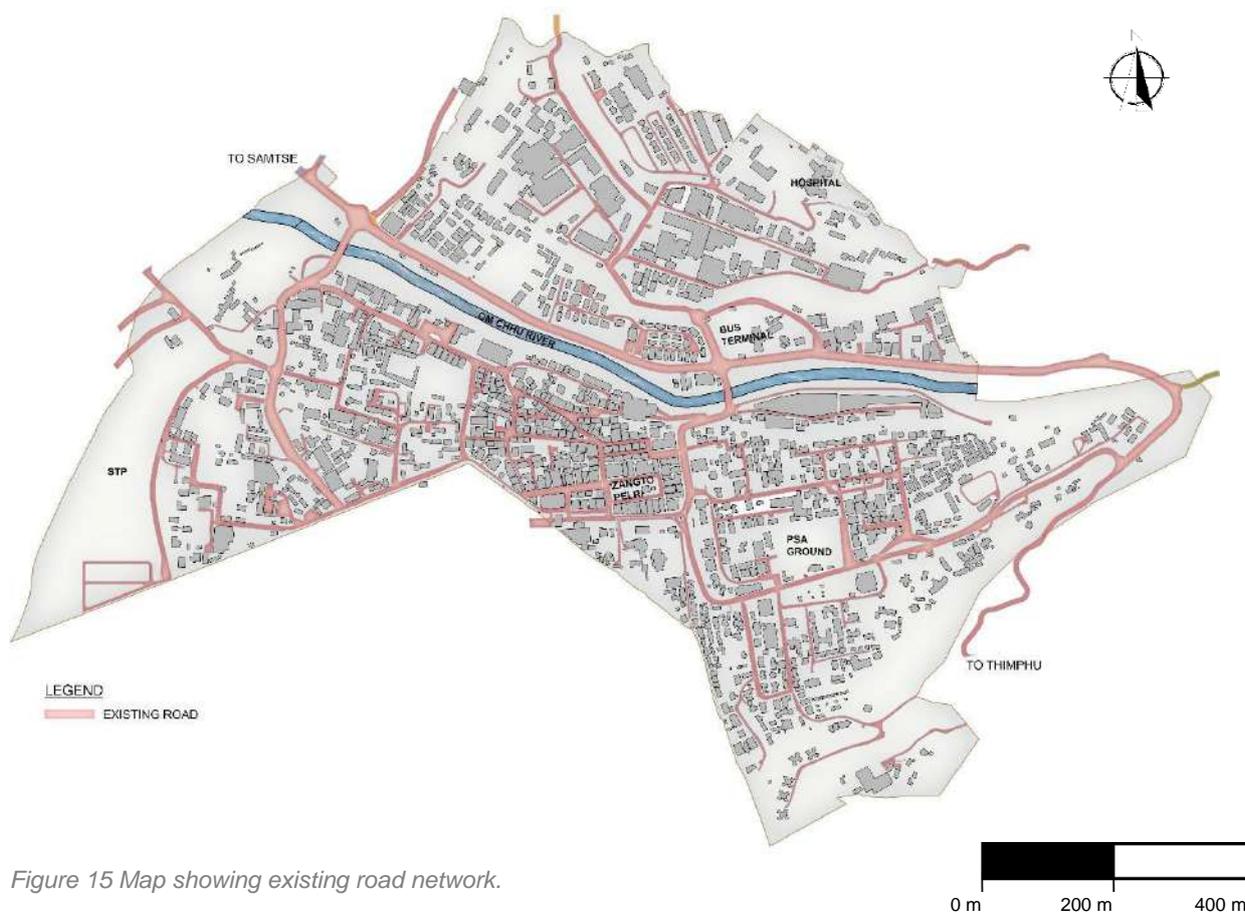


Figure 15 Map showing existing road network.

### 3.5 Built environment

The Core Area is intensely built and there is very little undeveloped area in the LAP. Understanding the severity of the issues and the concerns raised by the residents regarding the lack of adequate open spaces for the people to go around, it is crucial to propose measures to mitigate the issue through detailed studies involving built space and the open space in the Thromde.

Built area can be defined as the area occupied by the building or the structure. It is the building foot print of the structure. The area occupied by road is also considered as built area. On the other hand, the open spaces can be said to be areas such as parks and gardens that can be used by people for recreational purposes. “Open” implies that the area should be free of enclosures and roof.

The cadastral data for the Core LAP was collected and also the data for all the buildings were obtained. The area for the road was also incorporated into the analysis and the area was deducted from the overall area of the LAP.

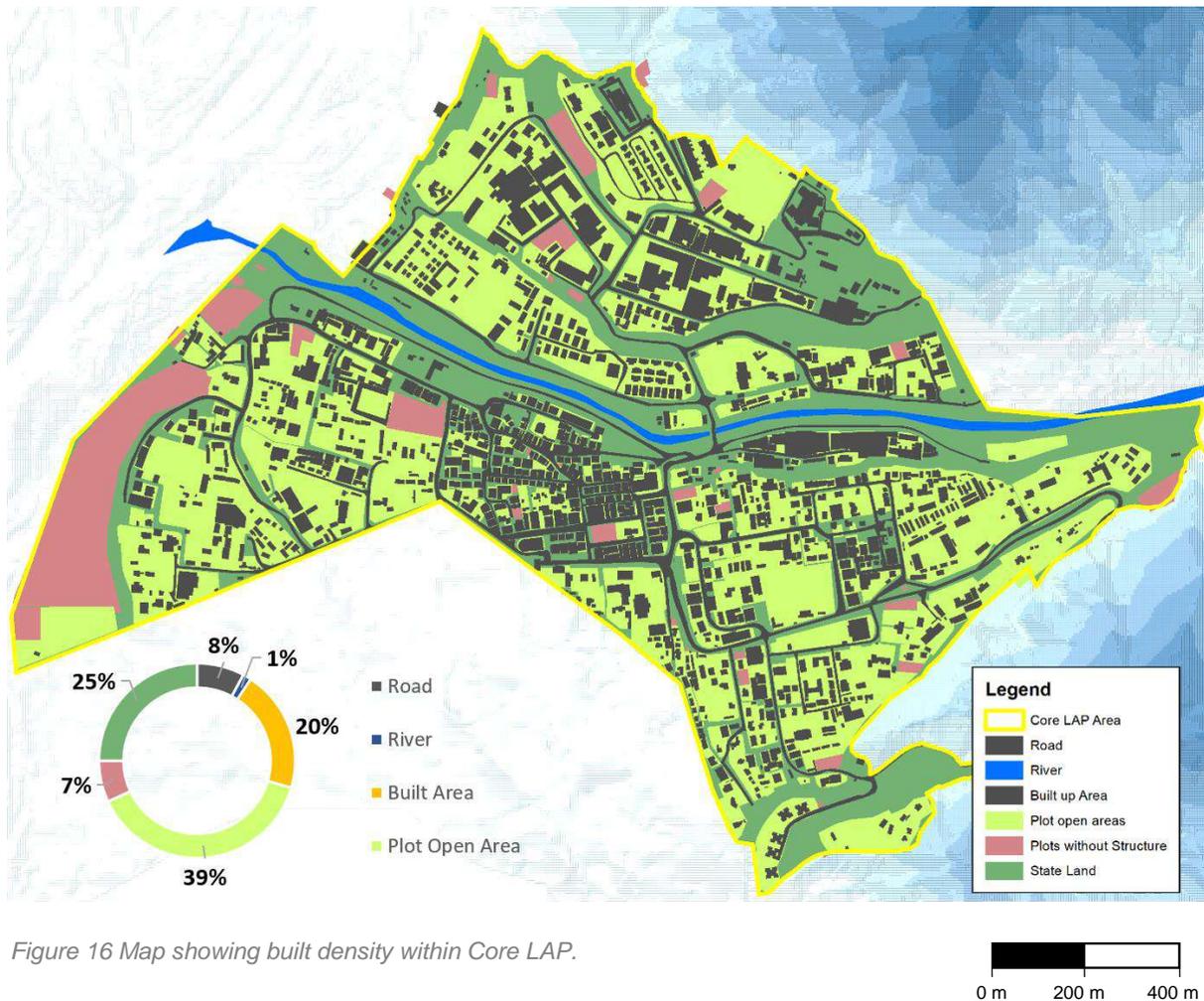


Figure 16 Map showing built density within Core LAP.

In order to undertake a comprehensive analysis, the plot details were considered to categorize the plots into two, namely developed and undeveloped. The setbacks of the buildings and the underutilized area of a plot in the LAP has also been reflected in the map. This area has been depicted separately from the open area that belongs to the state.

It was inferred that most of the open space were the setbacks and the underutilized area of the plots. Therefore, in order to further promote green spaces, it is significant to utilize the area within the environs of the individual plots and to gear towards a strategy for maximizing on the available green spaces.

### 3.6 Utilities & Amenities

#### 3.6.1 Water Supply

The existing water supply system comprises of operational bore wells, four raw water streams, three treatment plants, 10 water reservoirs, one break-pressure tank. This is the

infrastructure for the whole Phuentsholing Thromde. The water supply for the core is also dependent on the aforementioned infrastructures. Since most of the existing infrastructure was constructed in the 1990s, the capacity of the system is not enough to support the growing demands of the residents (existing water demand of Phuentsholing Core LAP is 1.68 MLD). Therefore, Thromde currently faces the issue of not being able to provide continuous supply of water, resulting in intermittent water supply.

The raw water from various surface water intakes is transmitted to the treatment plants and then supplied through the storage tanks to individual households after treatment. The groundwater from bore wells is treated at the booster station. The treatment plants are of conventional type and adapt the process of rapid and slow gravity filtration with chlorination. As for the coverage of the water supply network, there is 100% coverage for all residents within the core LAP area.

However, some of the main issues for the water supply in the core and the overall area of Phuentsholing Thromde is that 60% of the water is supplied through bore well and ground water sources while the rest is supplied through surface water sources. Thus, if there are any power outages, for long periods of time, this could ultimately affect the water supply for more than 60% of the residents.

There is also the issue of high water loss due to the supply network being worn out. Also the water sources are prone to landslides and become turbid during monsoon. Overall the intermittent water supply also leads to greater risk of contamination.

### 3.6.2 Drainage

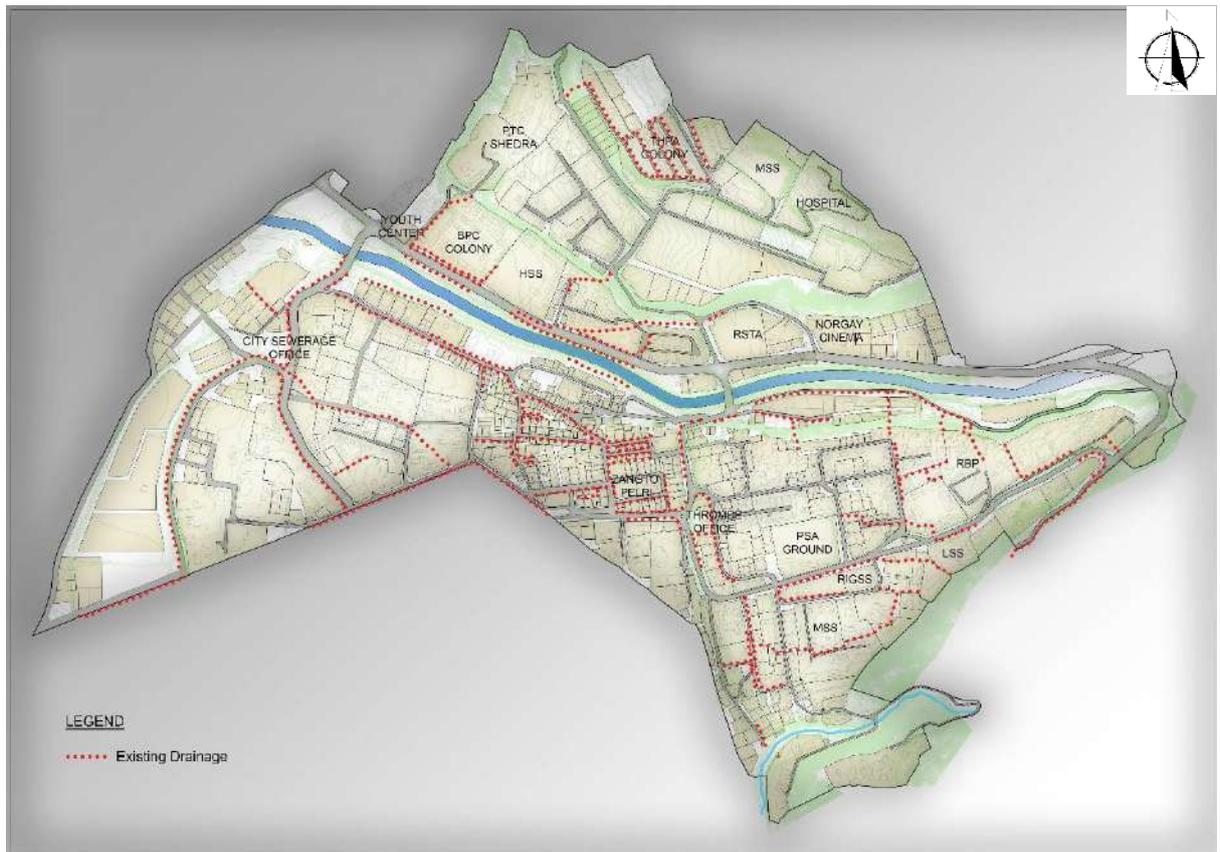


Figure 17 Existing drainage network.



The core area slopes gently towards the Amochhu and the Omchhu. These rivers being at the lowest level, serves as a natural sink for the storm waters. The existing storm water drains are laid along the roads with considering the natural drainage pattern. The existing storm water drains directly to those rivers and streams without any treatment.

The existing drainage system and its channel sections are not well designed to equip the load during the peak seasons, resulting in overflow of the storm water causing the flash flood within the region. Moreover, some of the drains are abruptly ending without having a designated sink, where it can be drained.

### 3.6.3 Sewerage System

The sewerage system in the core LAP covers most of the households. However there are still some of the households which have not been connected to the sewer network. Also the capacity of the existing Sewerage Treatment Plant i.e.2.5 MLD is limited.

The treatment plant is done using the conventional method and is located on the bank of the Amochhu occupying an area around 13 Acres.

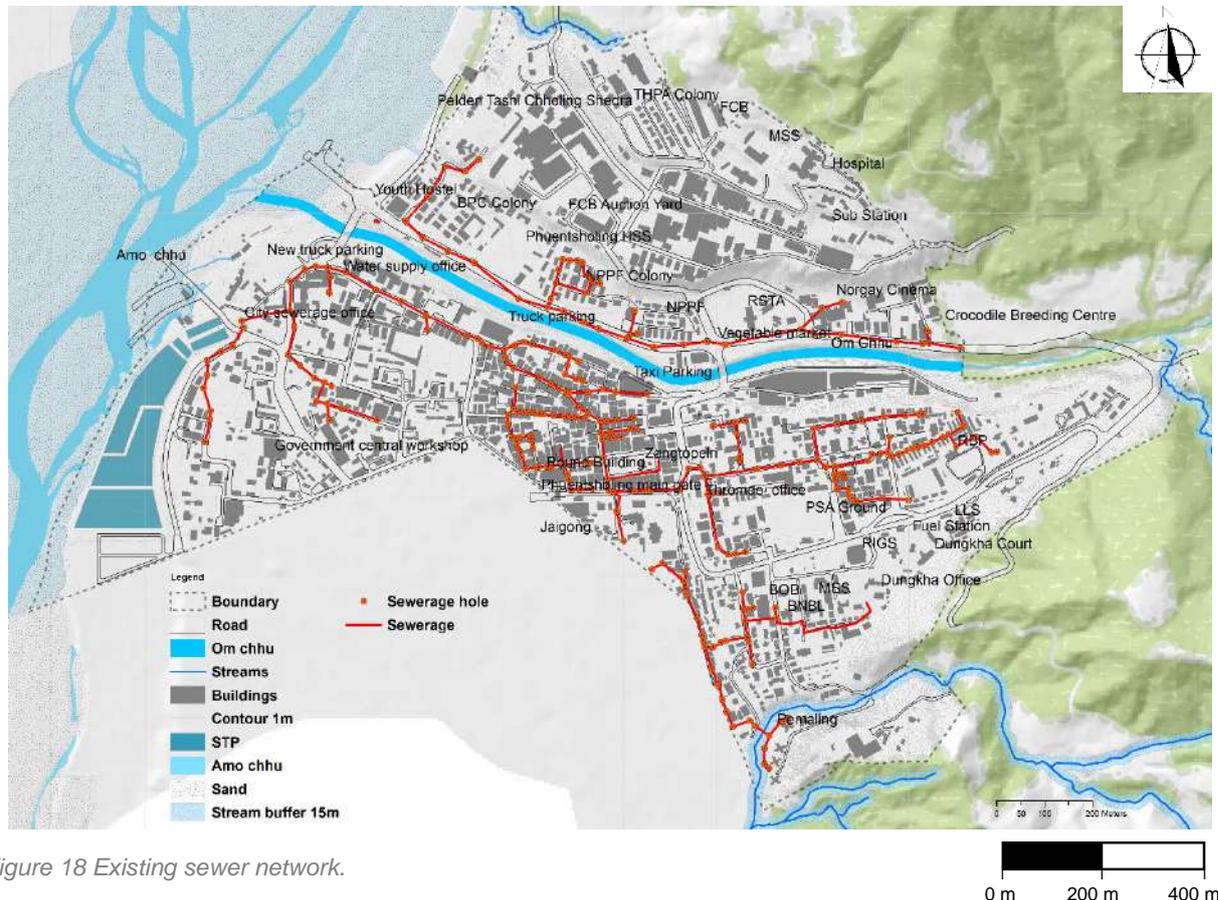


Figure 18 Existing sewer network.

### 3.6.4 Solid Waste System

Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue and waste from streets. This garbage is generated mainly from residential and commercial complexes. With rising urbanization and change in lifestyle and food habits, the quantity of municipal solid waste also increases.

The municipal manages the collection and management of the waste produced within the Thromde area. Door to door collection is done in the core LAP and is collected on a daily basis. The segregation of waste is practiced.

The collected waste is dumped in the landfill in Pekarzhing. The waste is also segregated during the process. A natural composting shed with a capacity of 15 MT has been built. The composting process takes around 3 months. The actual wet waste production is around 2MTs per day, which takes around a week' time to decompose and is shifted to other component of the compost.

The dry/non degradable waste is dumped openly in the land fill with standard procedures for dumping. The total area for dumping at the moment in the landfill is 1.2 acres that would suffice for another 10-15 years of waste disposal with a maximum waste generation of 10 MTs per day.

### 3.7 Green space

The Core LAP of Phuentsholing Thromde has a sparse network of open areas and green space system. Owing to the lack of space in the town and also due to the high intensity built environment, it is difficult to clearly define active and passive open spaces.

Moreover, the existing recreational spaces present in the core are relatively skewed in the south eastern part of the Thromde. Such a concentration of recreational spaces in one part of the Thromde poses issues of inaccessibility to the residents of the other parts of the Thromde. The location of some of the green spaces, by virtue of being lodged on slopes, renders them unsafe and unusable.

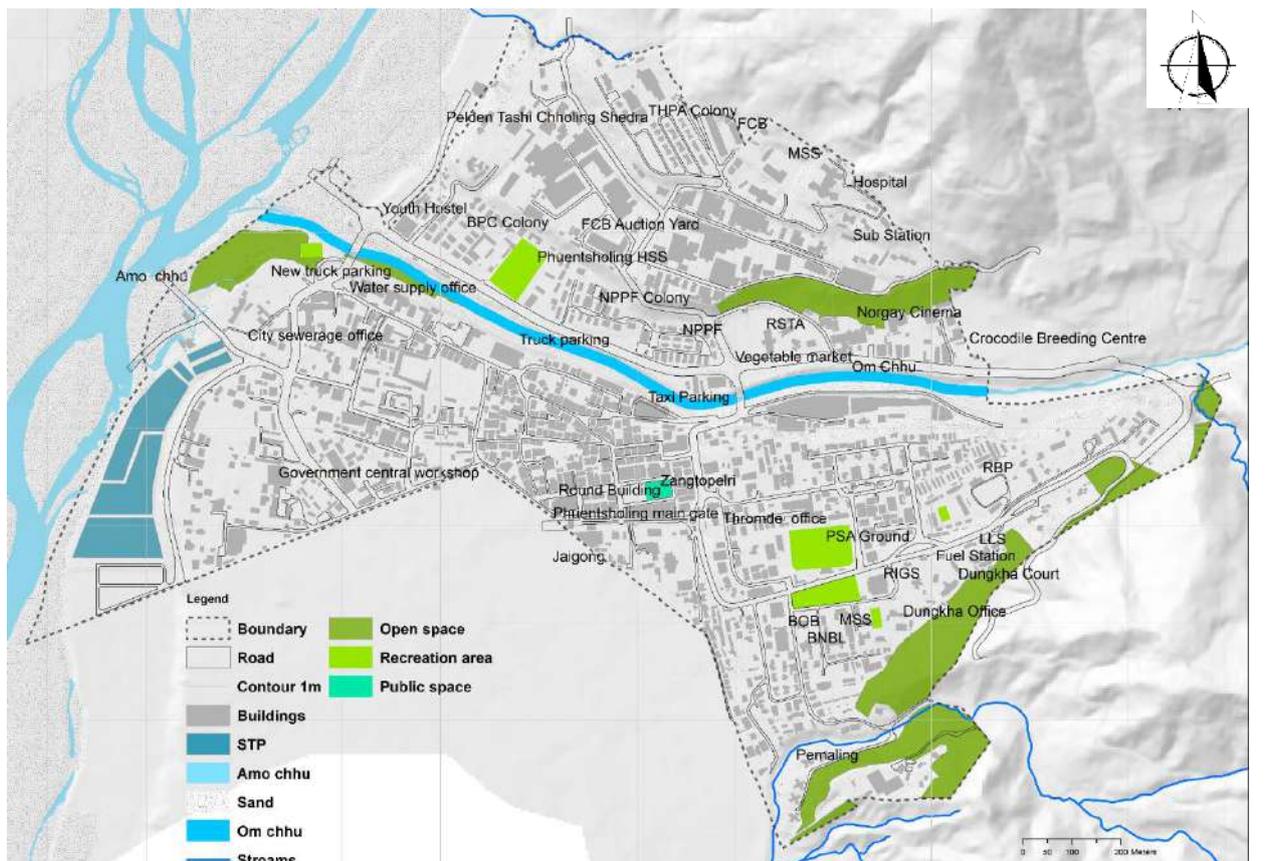


Figure 19 Existing open spaces.



### 3.8 Demography

Phuentsholing Thromde is the second most populated city in the country. Being the commercial capital of the country, it also sees a high number of non-resident population, which includes business people, regional tourists and other officials.

The population of the Thromde has increased from 20,537 in 2005 (source- PHCB 2005) to 27,658 in 2017 (source- PHCB 2017). This is an annual growth rate of 2.5 % and an overall growth of 45% in the span of 12 years. In comparison to the other Dzongkhags, Chhukha Dzongkhag is one of the few Dzongkhags that has experienced a shrinking population. The population in Chhukha Dzongkhag has decreased from 74,387 in 2005 to 70,057 in 2017.

There is no proper data on population for the previous years for the Core LAP area, however the current population is 12,480. Considering the population growth rate of the Thromde, the population for the core LAP has been projected until the year 2039. Using the same growth rate (2.5 %), the population for the core LAP in 2039 has been projected to 22,022 from 12,480 in 2018.

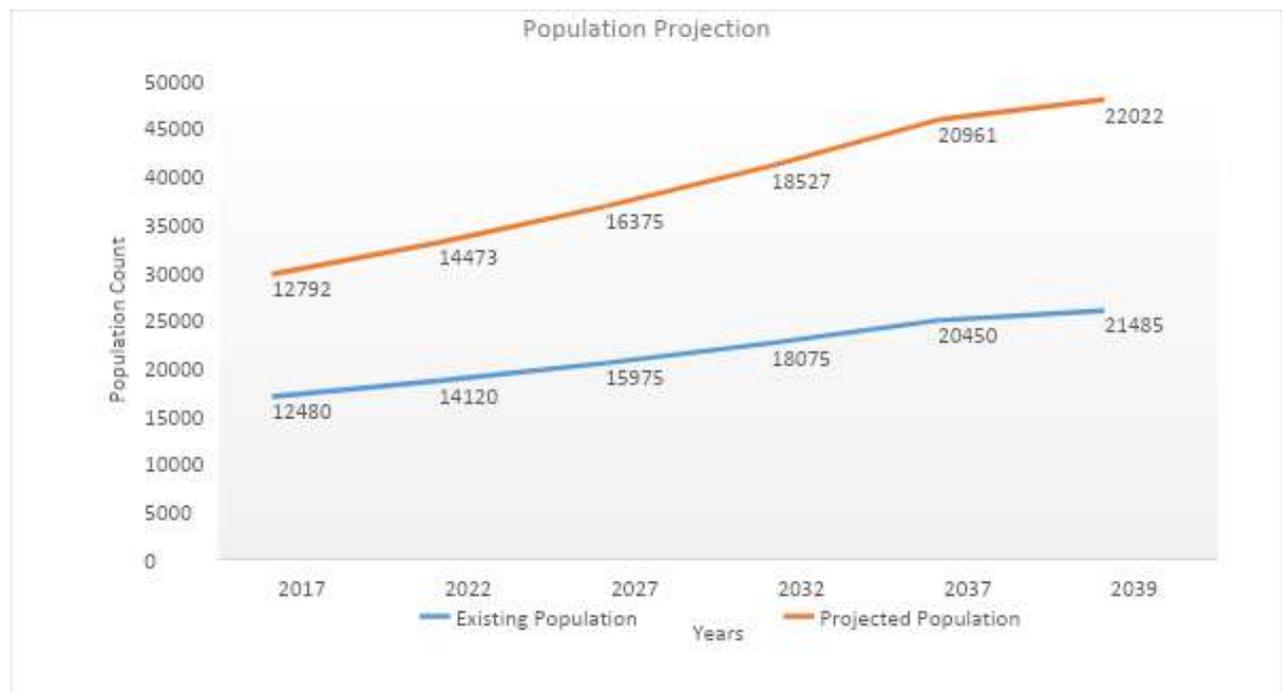
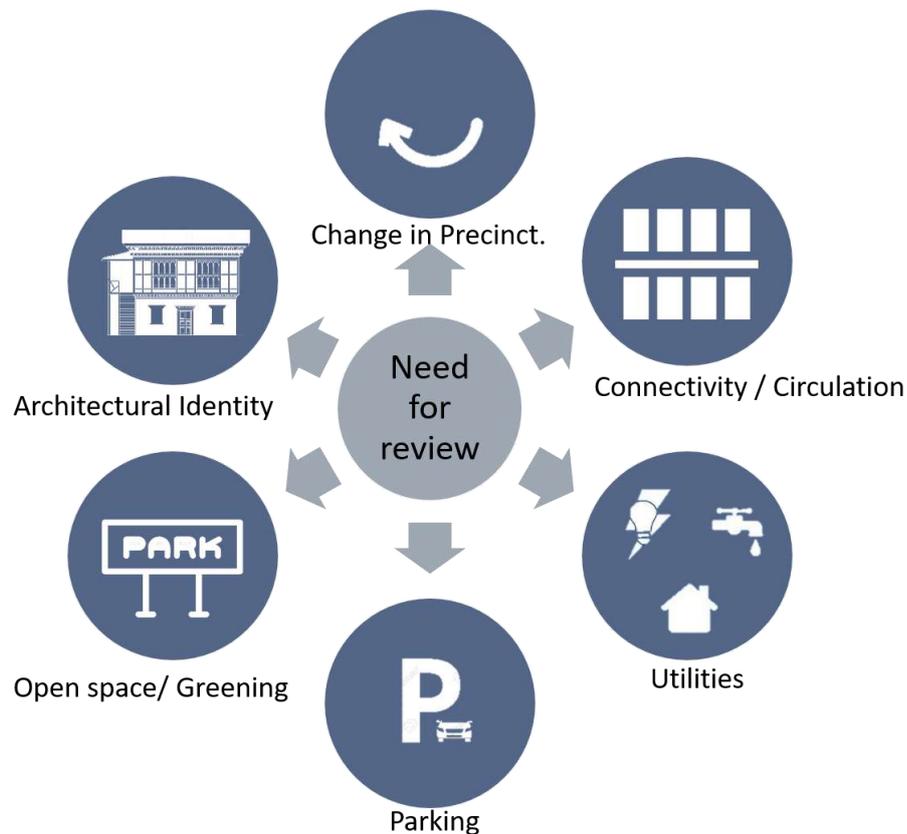


Figure 20 Population projection.

## 4. Issues:

The need for the review are mainly due to the following issues:



### 4.1 Change in Precinct.

As one of the main gateways into Bhutan, Phuentsholing is truly the economic capital of the country serving as the main entry and exit point. Phuentsholing Core Area has become a highly desirable shopping and leisure destination for both the local and regional visitors into the city. After the change in Thromde boundary in 2006, Phuentsholing structure plan (2013-2028) was adopted with a vision to create Phuentsholing into a socially and culturally vibrant city. However, the existing land use in most of the pockets within the Core Local Area Plan is not in line with the provision of Phuentsholing Structure Plan. This, as such, warrants a revision ensued by an in depth study of the existing scenario.

#### 4.1.1 Area below hospital

The agglomeration of the heavy industries situated below the hospital area depicts the mismatch between the designated land use in the Structure Plan and the existing land use on ground. In Phuentsholing structure plan (2013-2028), the area is designated as UV-2 (HD) precinct, which is predominantly residential mainly to cater to the residential requirements of the Thromde, for the next 20 years. However, currently the area has been used for heavy industries, thereby causing various kinds of pollution and also creating a

visually unpleasant built form. With a lot of heavy vehicular traffic plying on the road to and fro from the industries, it also poses great risk to the safety of the surrounding areas.

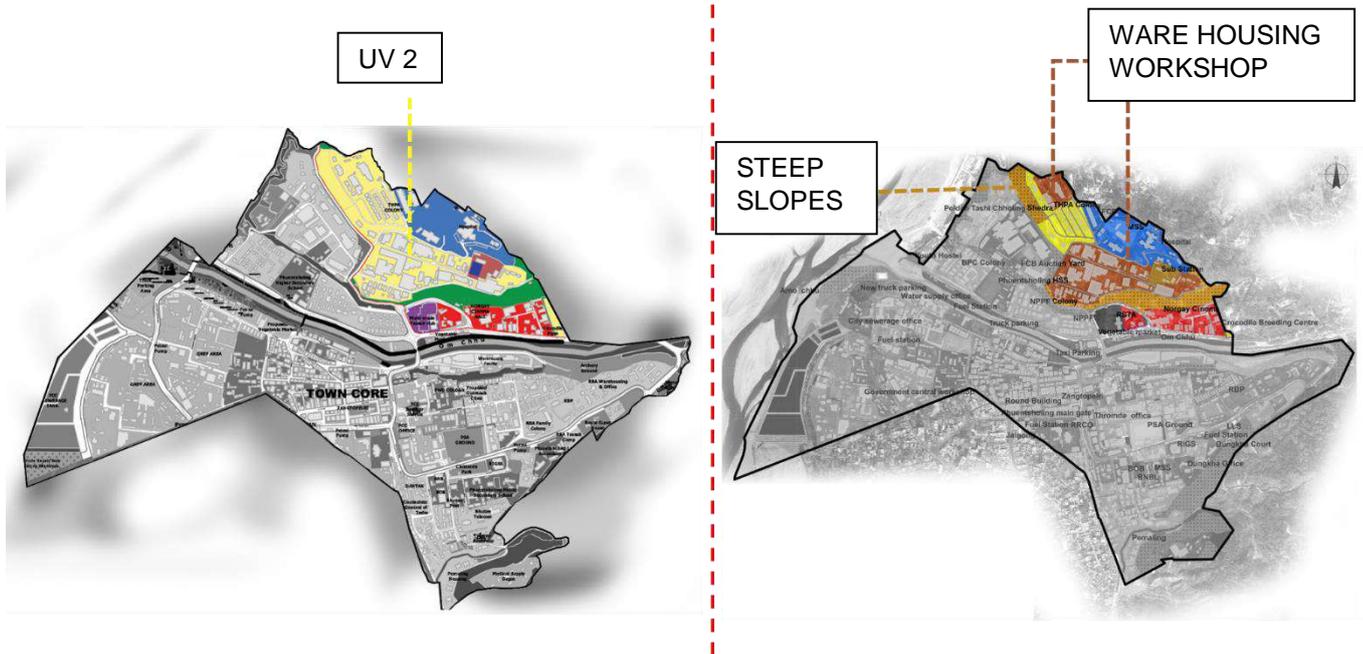


Figure 21 Difference in designated precinct (L) and existing Land use (R); Area below hospital.

#### 4.1.2 RBP area

The RBP area is designated as UV-2 (HD) precinct with the intent of creating more residential area within Thomde boundary as per the structure plan. Despite that, the area is currently used for warehousing, workshops and for other purposes by the RBP.

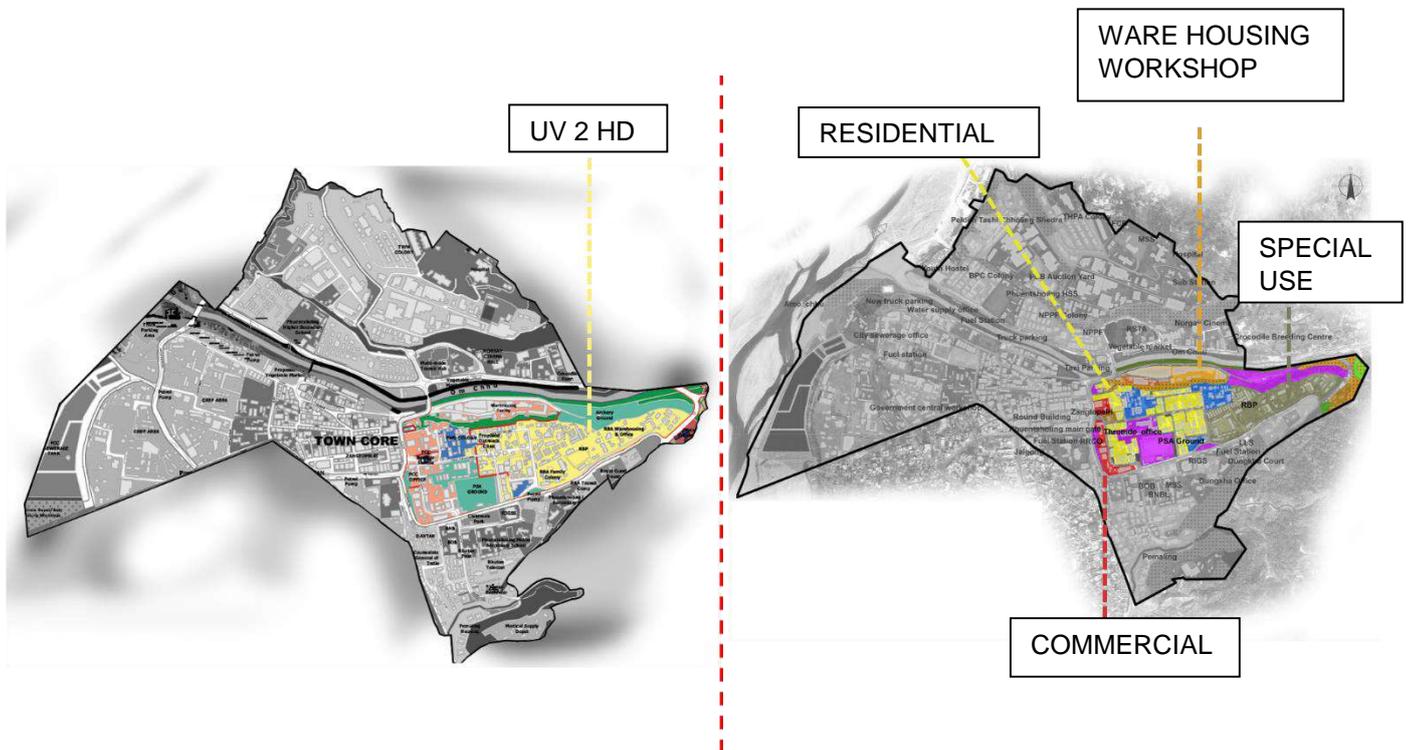


Figure 22 Difference in designated precinct (L) and existing Land Use (R); RBP area.

### 4.1.3 Area near medical supply depot

The existing medical supply depot is designated as SE-4 precinct as per Phuentsholing structure plan, although the land ownership of the particular area is under the Ministry of Health (MoH). As, the ownership lies with the MoH, it should then have been designated as an institutional precinct.

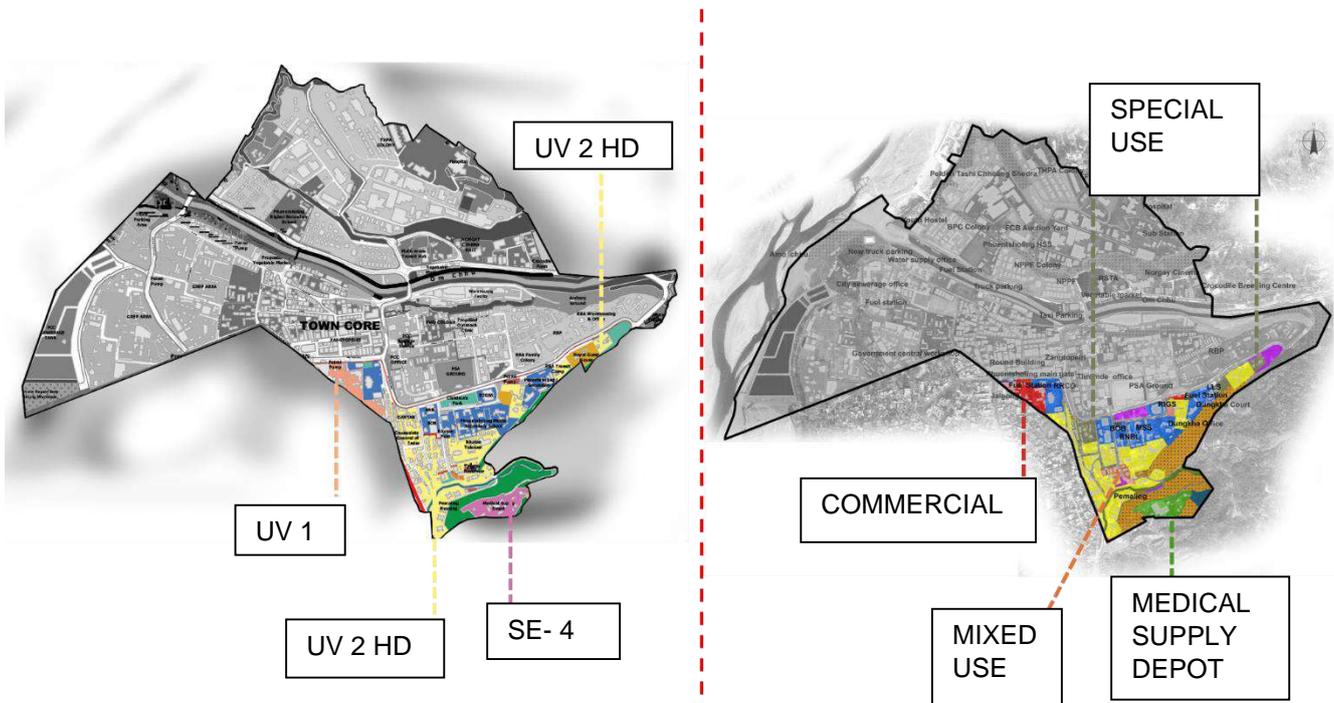


Figure 23 Difference between designated precinct (L) and existing Land Use (R); Area near medical supply depot.

### 4.1.4 Area near RIGSS, Dungkhaig court and RBP colony

The area near RIGSS, RBP colony and Dungkhaig court are designated as UV-2 HD precinct as per Phuentsholing Structure Plan. However, the area has been commercialized, occupied by uses like hotels, restaurants, retailers and cafes.

### 4.1.5 Area near GREF

According to the Structure Plan, the area near the existing GREF is designated as UV-1 precinct. Nevertheless, a certain portion of the area is used by GREF, meanwhile the rest has been used for warehousing and workshops. Such prevailing uses in the area not only pollutes the core area given its close proximity but also reflects on the deviations from the vision of Phuentsholing Structure Plan.

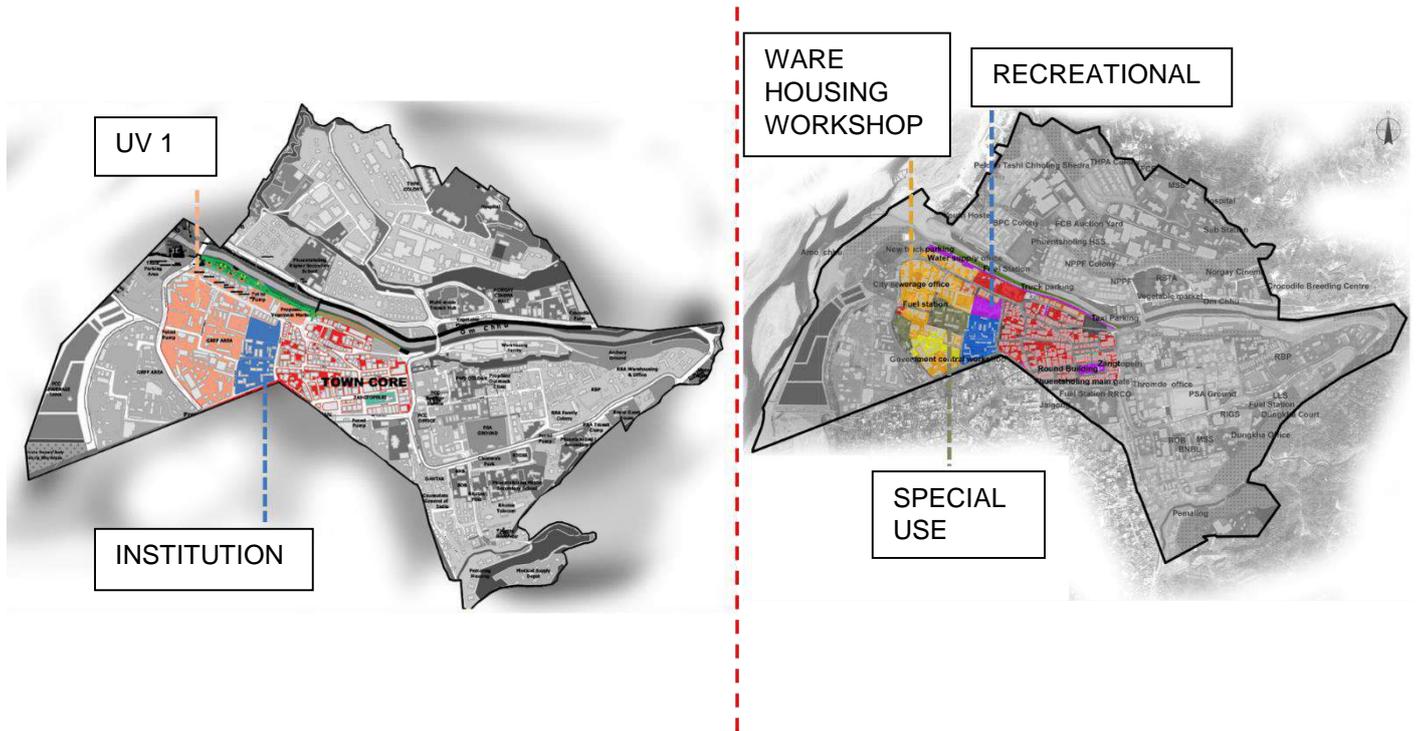


Figure 24 Difference between designated precinct (L) and existing Land Use (R); Area near GREF.

#### 4.1.6 Area near dry port.

Area near the dry port is proposed to be UV-1 HD precinct. However, the area is occupied by warehousing and workshops and uses complementary to institutional precincts

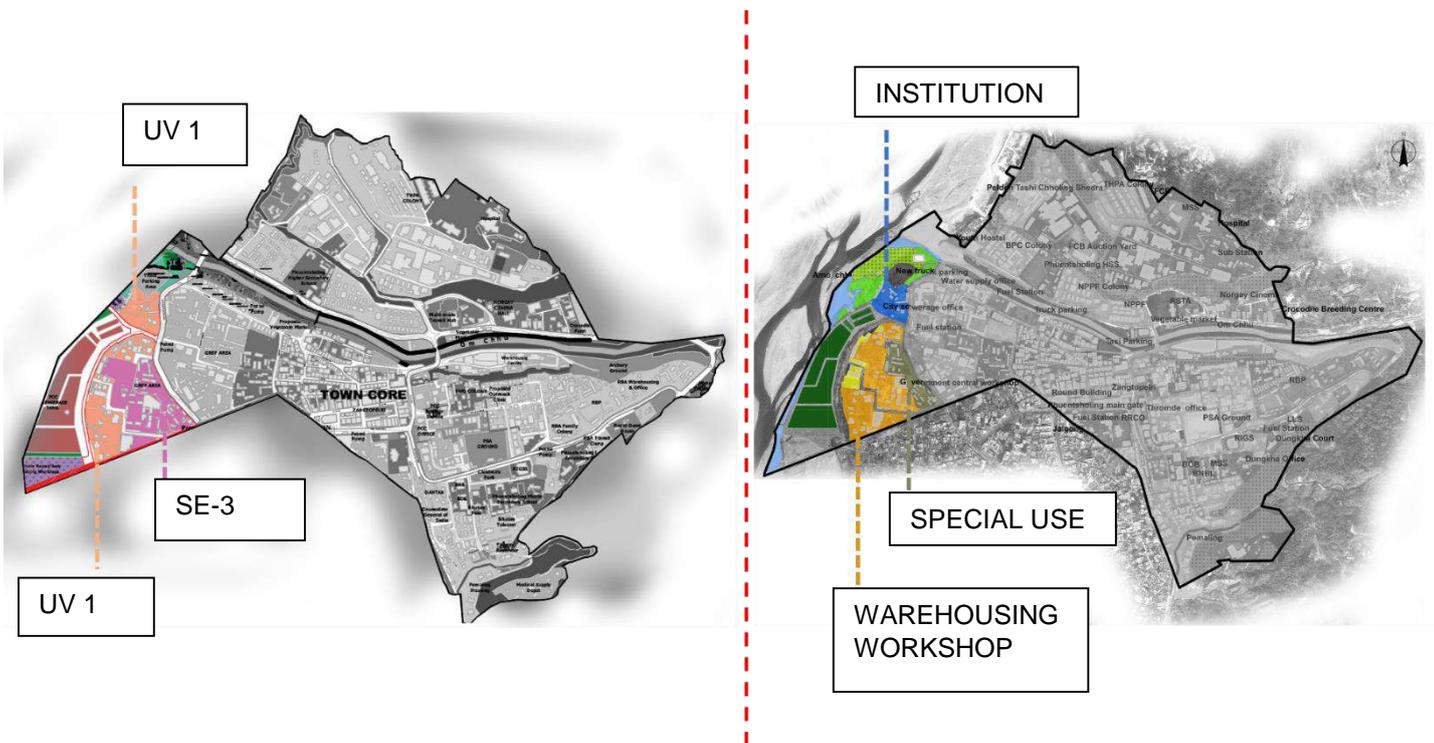


Figure 25 Difference between designated precinct (L) and existing Land Use (R); Area near dry port.

## 4.2 Connectivity and circulation.

Road connectivity and circulation with the surrounding region plays a vital role in growth and development of a city. Being a border town, Phuentsholing serves as the entry point to Bhutan with very good regional connectivity within the country as well as India. However, there are many issues pertaining to road connectivity and circulation within the core LAP. Some of the issues are as follows:

### 4.2.1 Traffic movement

The performance and capacity of a particular stretch of road depends on the traffic characteristics. In Phuentsholing, most of the roads are single lane (one-way movement) within the urban core and the traffic composition comprises of heavy vehicles, cars, etc. Taxis also form a substantial part of vehicular traffic on almost all major roads contributing to traffic congestion as there are no provision of pick and drop area. Some of the roads within the LAP leads to dead-end, reflecting on the lack of proper circulation network within the area.

Despite walkability being one of the underpinning principles of Phuentsholing Structure Plan (2013-2028), there are no proper pedestrian network within the Core Local Area Plan. The pedestrians are discouraged from using the footpaths due to uneven surfacing of the footpaths and abrupt discontinuation of roadside walkways.

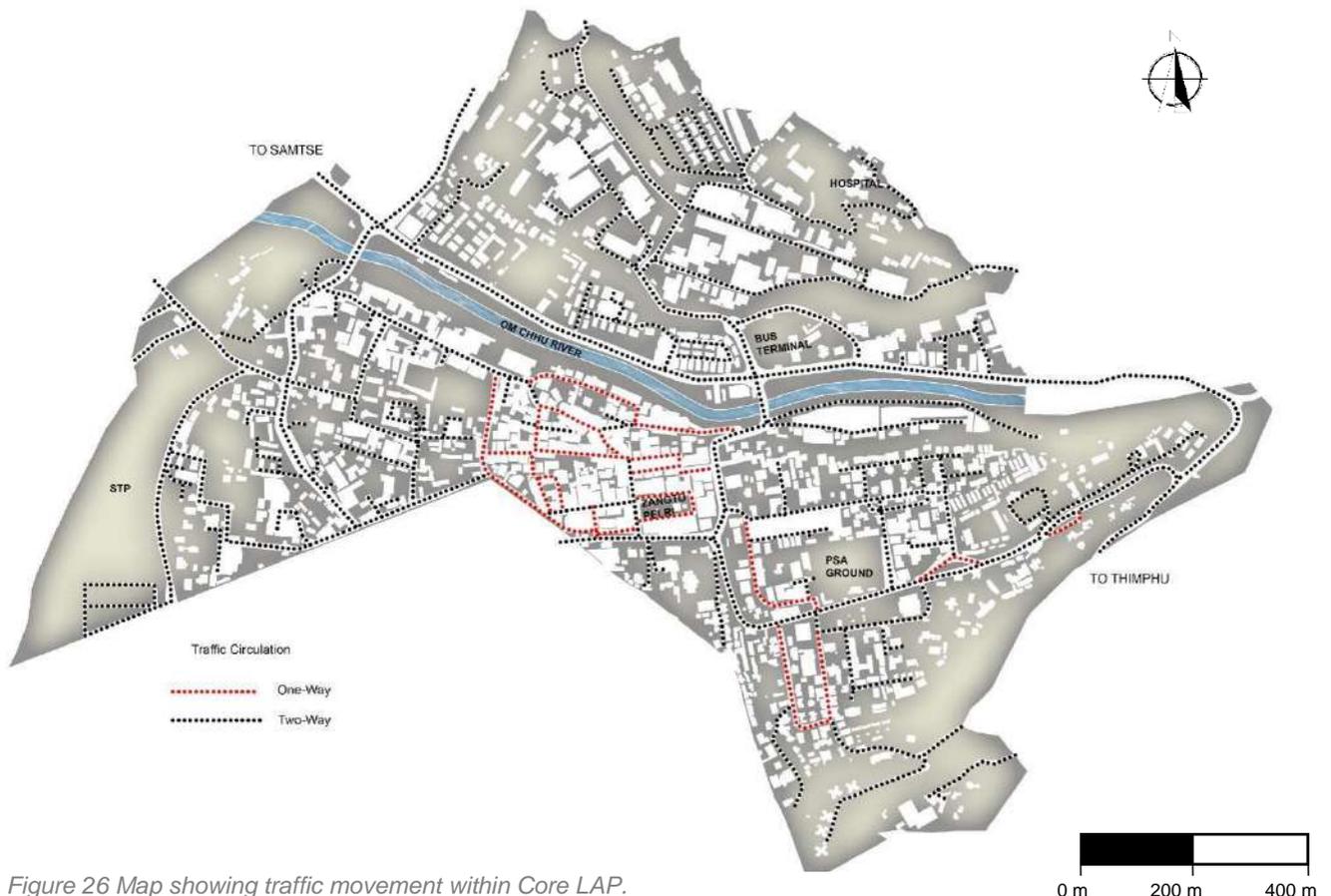
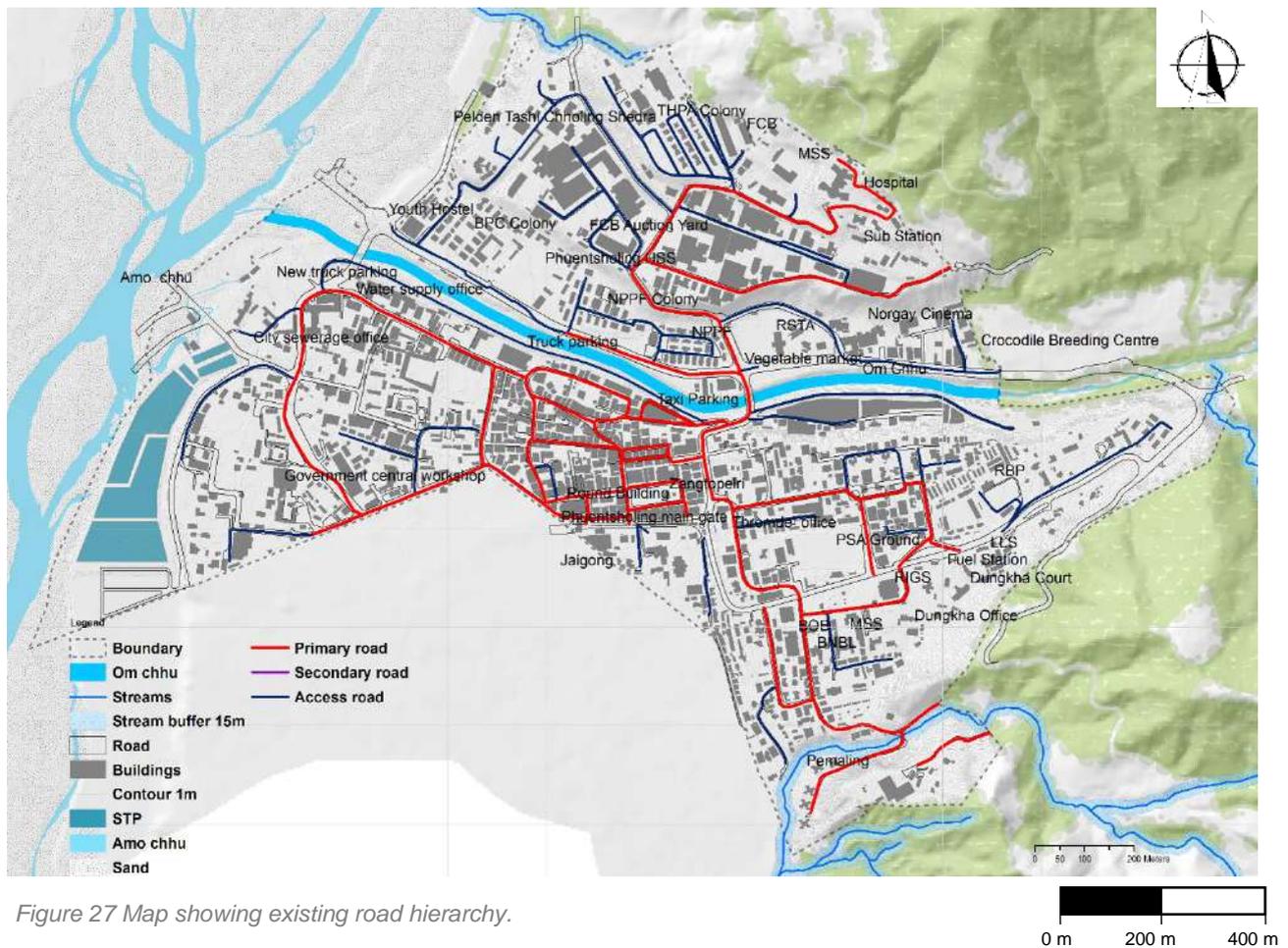


Figure 26 Map showing traffic movement within Core LAP.

#### 4.2.2 Road hierarchy

In most of the planned cities, the roads have a hierarchy, generally classified into primary roads, secondary roads and tertiary road depending on its function. Nevertheless, in Phuentsholing Core Local Area Plan the roads are of inconsistent width and have no proper hierarchy in place. The roads dubbed as the primary road in the urban core do not meet the standards of a “Primary Road”, given its Right of way (ROW). The roads are narrow and not up to par with the primary roads of other cities.

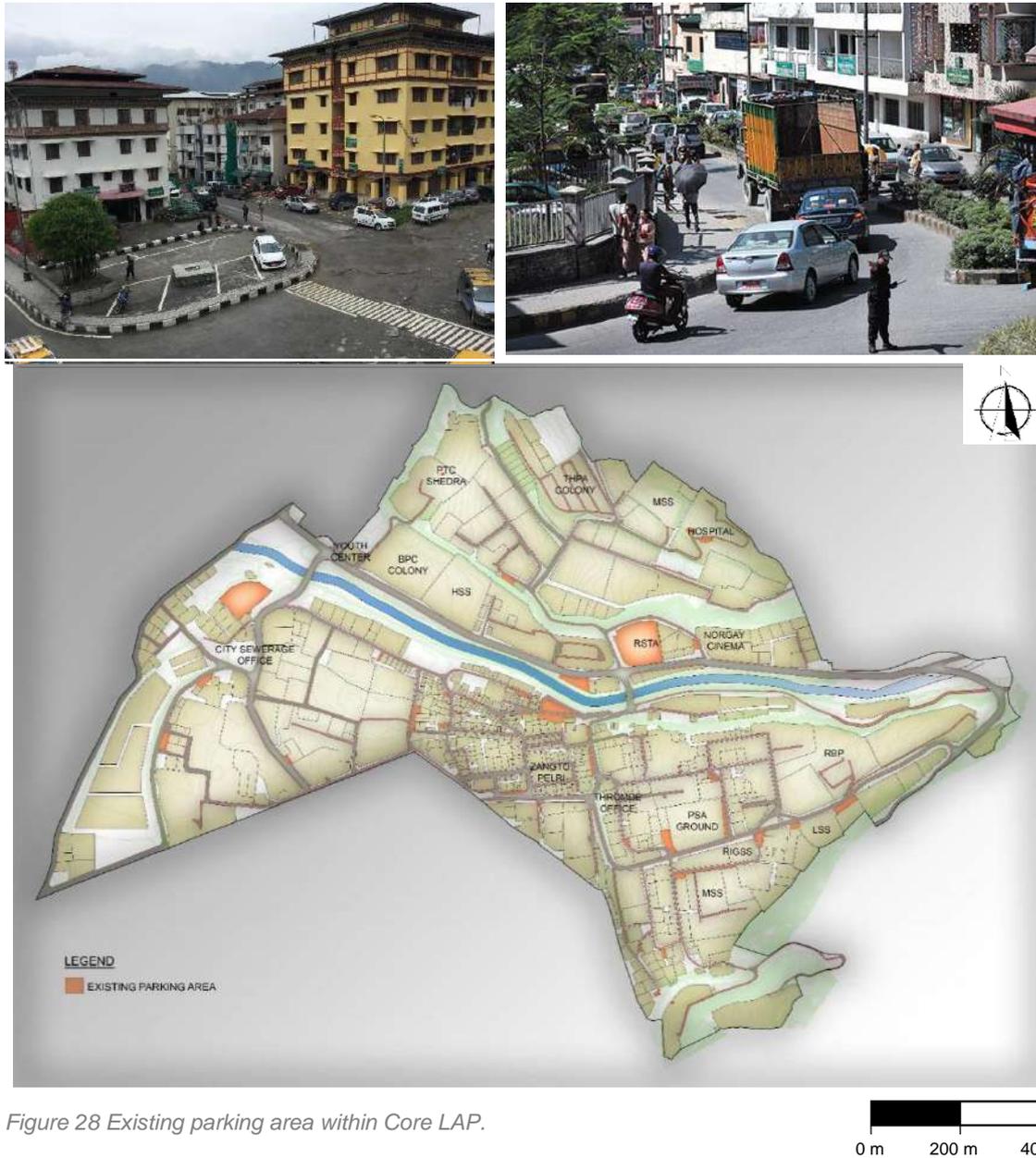


#### 4.2.3 Public transport

Public transport in urban areas has gained greater attention in recent years for improving sustainability and the quality of urban life. There is a dire need for improving public transportation systems in Phuentsholing not only for accelerating the economic growth but also for bringing down the vehicular emissions and thereby, contributing in a meaningful way in the context of urban climate change mitigation. Accessibility is one of the most important outcomes of the transportation system. Public transport can be more attractive by providing "door to door mobility" and development of transportation services is an important factor of social quality. In order to promote public transport and for them to function efficiently, it is important to increase the accessibility of the public transport to the residents. It is also crucial to designate public transport stops within the area.

#### 4.2.4 Parking

Parking is also a concern in the city as it attracts high volume of private and commercial goods vehicles, being the economic capital of the country. Phuentsholing Core Local Area Plan lacks defined parking areas. For instance, there is only one parking area (multi-level car parking located on the bank of Omchhu) within the Local Area Plan.



The practice of on-street parking is currently observed in Phuentsholing urban core, resulting in traffic congestion and intensifying pressure on the circulation network in the area.

## 4.3 Architecture

The Phuentsholing Structure Plan has adopted the Smart Growth Principles which strives to create attractive communities with a strong sense of place. Although, there are provisions outlined in the Structure Plan prompting the creation of an image for the city, even today, Phuentsholing lacks an architectural identity that has a distinctive Bhutanese character. In fact, the buildings and the streetscape have become a mere replica of the street and building in the adjacent border town of India, failing in its attempt to establish a character of its own.

### 4.3.1 Built environment

Well planned cities take care of the scale at which it is built, especially the public places, streets and the institutes. The balance between the open and built mass determines the quality of life an urban area offers to its residents. Presently, Phuentsholing Core Local Area Plan is characterized by a dense built mass and inadequate open space. The rate at which it is densifying is alarming, prompting the need for a proper assessment between the built form and the open spaces.



Figure 29 Instances of built mass within Core LAP.

### 4.3.2 Community vitality.

Phuentsholing core Local Area Plan lacks social spaces like community centre, parks, children's play area, etc. despite the place being the commercial centre of the country with high population density. With very limited social spaces in the area, the residents are deprived of communal space for interaction and other social activities. This has led to communities being less sociable and lively.

Although Phuentsholing is known as the commercial hub of Bhutan, many people opt to shop in Jaigaon. This in turn has huge repercussions on the economic growth of the community, and the vitality of the area.

### 4.3.3 Bhutanese architecture

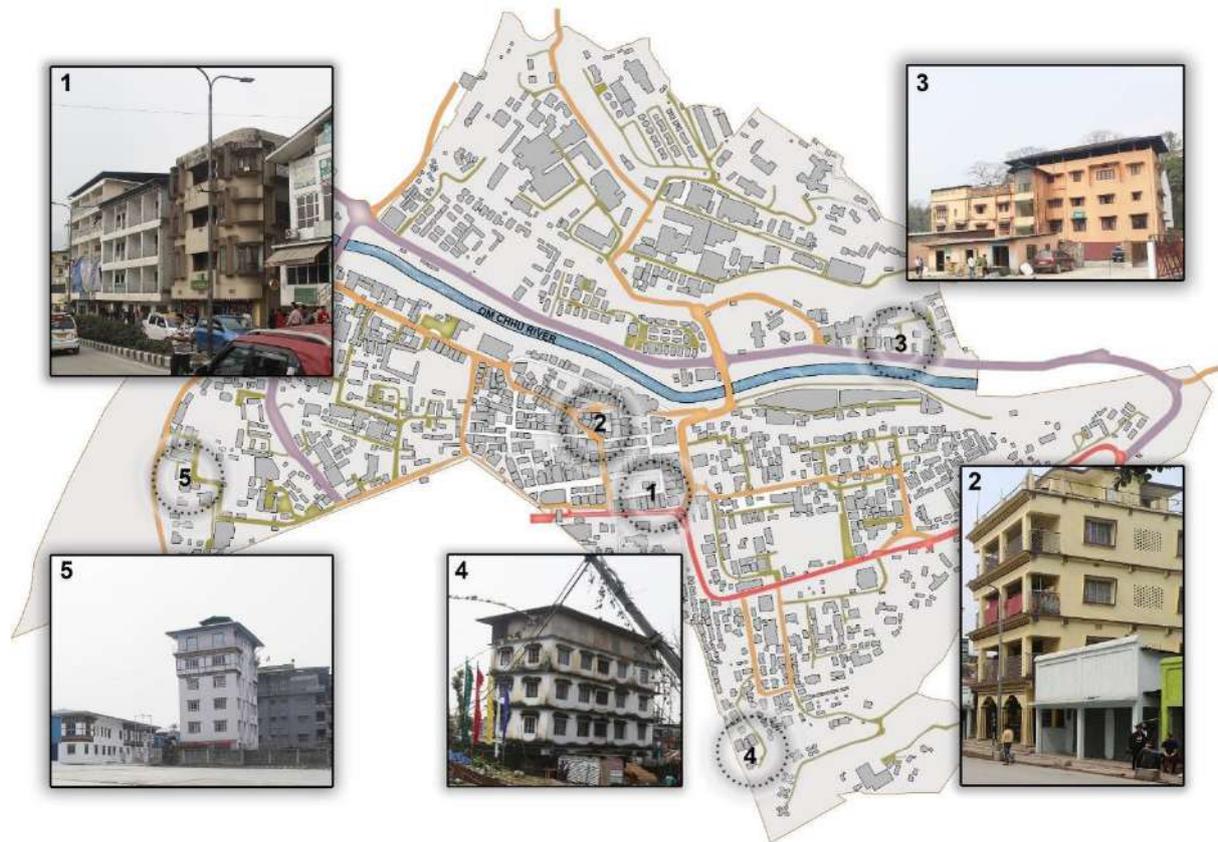


Figure 30 Prevailing architecture of the area.

The traditional architecture of Bhutan is one of the most beautiful expressions of the ancient culture of the people of Bhutan. Harmonious proportions and graceful designs with breath-taking landscapes of peaceful valleys and soaring mountains is a key nature of Bhutanese traditional architecture. Nevertheless, most of the buildings/structures in Phuentsholing have architectural elements similar to Indian style like Chhaja (sun shades), Jalis (perforated wall), flat roof etc. The introduction of such features that do not adhere to the traditional architecture of Bhutan poses a huge risk to the posterity of the traditional architecture of the country.

The buildings that are built in traditional Bhutanese style have not incorporated the traditional Bhutanese architectural elements properly. For instance, the hierarchy, the proportion and forms of architectural elements are inconsistent to the traditional proportions and hierarchy.

Sloping roof plays an extremely significant part in the characterization of traditional Bhutanese architecture and is therefore one of the most important elements in traditional Bhutanese architecture. However, structures are built so close to each other without adequate setbacks for the incorporation of roof overhangs.

#### 4.3.4 Colour code

As per Building colour code of Bhutan 2014, the Buildings within Phuentsholing Thromde are entitled to four different shades of colour (white, cream colour, light brown and exposed stone masonry texture). However, most of the existing buildings do not adhere to the colour code, resulting in an aesthetically unpleasing city.

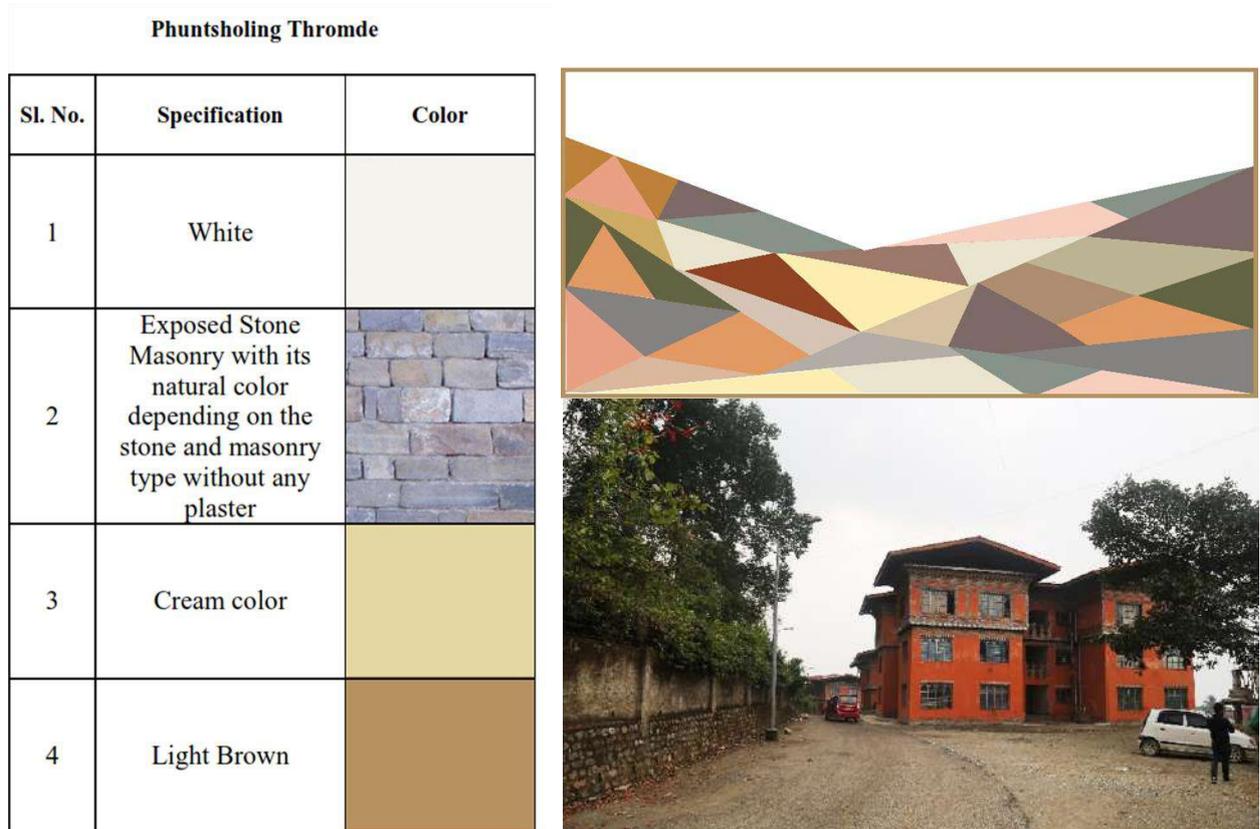


Figure 31 Building colour or texture entitled to Phuentsholing Thromde.

## 4.4 Utilities

Urban infrastructure like storm water drainage, sewerage networks, and solid waste management are among the basic essential services that are operated and maintained by the local authority in the city. However, there is a need for the up gradation of the services to suffice the increase in population, as well as to support economic growth.

### 4.4.1 Drainage



Phuentsholing has a hilly terrain which slopes gently towards Amochhu and Omchhu rivers. The annual precipitation is in the range 500mm to 1000mm, predominantly in the monsoon season.



The existing Phuentsholings' drainage system was constructed in the 1990's, which is a combined system with mostly open drains that convey both storm water runoff and household waste water. There was no comprehensive planning and engineering standards followed during the construction of the drainage system. There are instances where the sizes of the main collector drains do not meet the standard requirement. Currently, most of the drain on site are not continuous and at many points, improper drain section is noticed, denoting the absence of a holistic drainage master plan.

Figure 32 Existing drain condition.

One serious issues pertaining to the drainage system of Phuentsholing core area is the disposal of solid waste directly into the drains by the household. Such action not only results in the blockage of the drains but also pollutes the rivers.

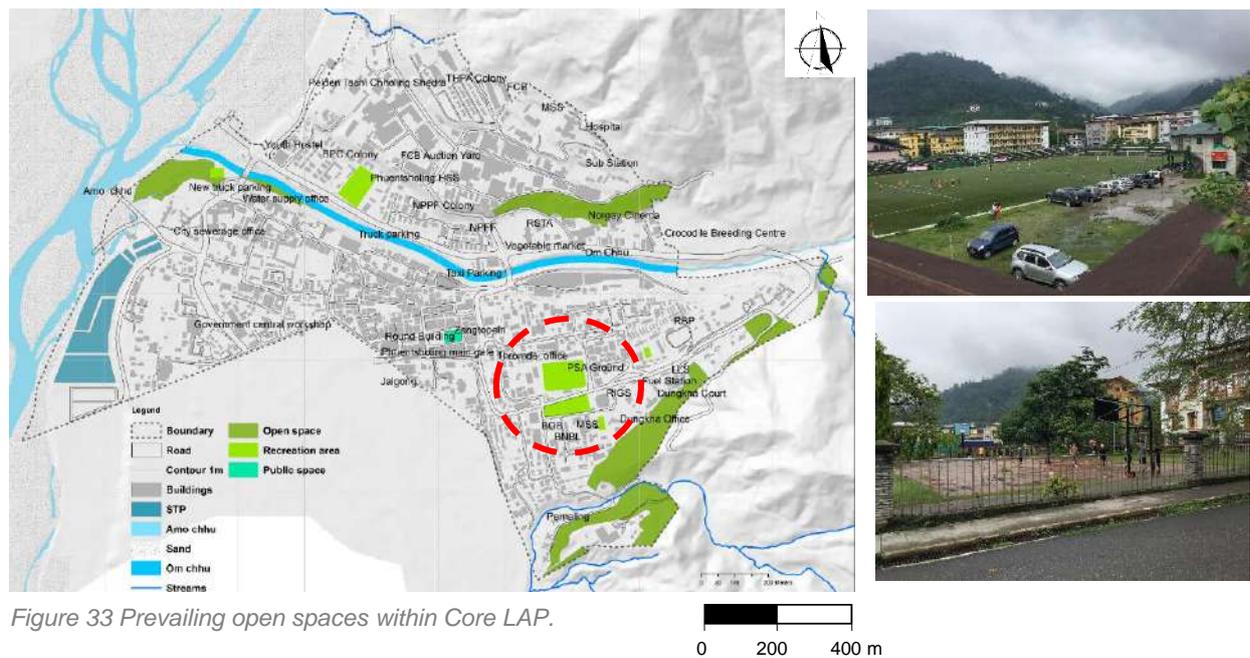
### 4.4.2 Sewage

An efficient sewerage and wastewater disposal system is important for maintaining high standards of health and hygiene in the town. The sewerage networks of Phuentsholing Thromde is more than 15 years old due to which new settlements in and around the hospital area are not connected. The workshops/industrial area are also not connected, hence, the effluents such as grease, oil, etc. are discharged directly into storm water drains.

The Sewage Treatment Plant (conventional type) is located on the bank of Amochhu, occupying approximately about 13 acres of land. Adopting a more mechanised system would free the huge area of land that is currently being used for the conventional system, meaning we could efficiently use the rest of the area for other services given the issue of land scarcity that we face in the country.

## 4.5 Open Space

Open spaces play a vital role in controlling and managing the urban environment, health, and climate. It acts like a breathing space for the dense urban fabric or a place for recreation and retreat for the urban population. Due to the minimal setbacks in the core Local Area Plan, Phuentsholing core area has very less defined open spaces. Also the existing open spaces are not well connected with one another.



Recreational spaces like parks, out-door sport facilities and training ground are concentrated in one area. There are no recreational/ open spaces in the western and northern parts of the city.

## 5. Proposals:

### 5.1 Proposed Precinct

The team proposes the following three action proposals to deal with the issue pertaining to the Precincts:

1. Reverting the precincts back to the ones stipulated in the Structure Plan
2. Rationalizing the nomenclature of the precincts.
3. Altering the precinct based on the existing situation and its analysis.

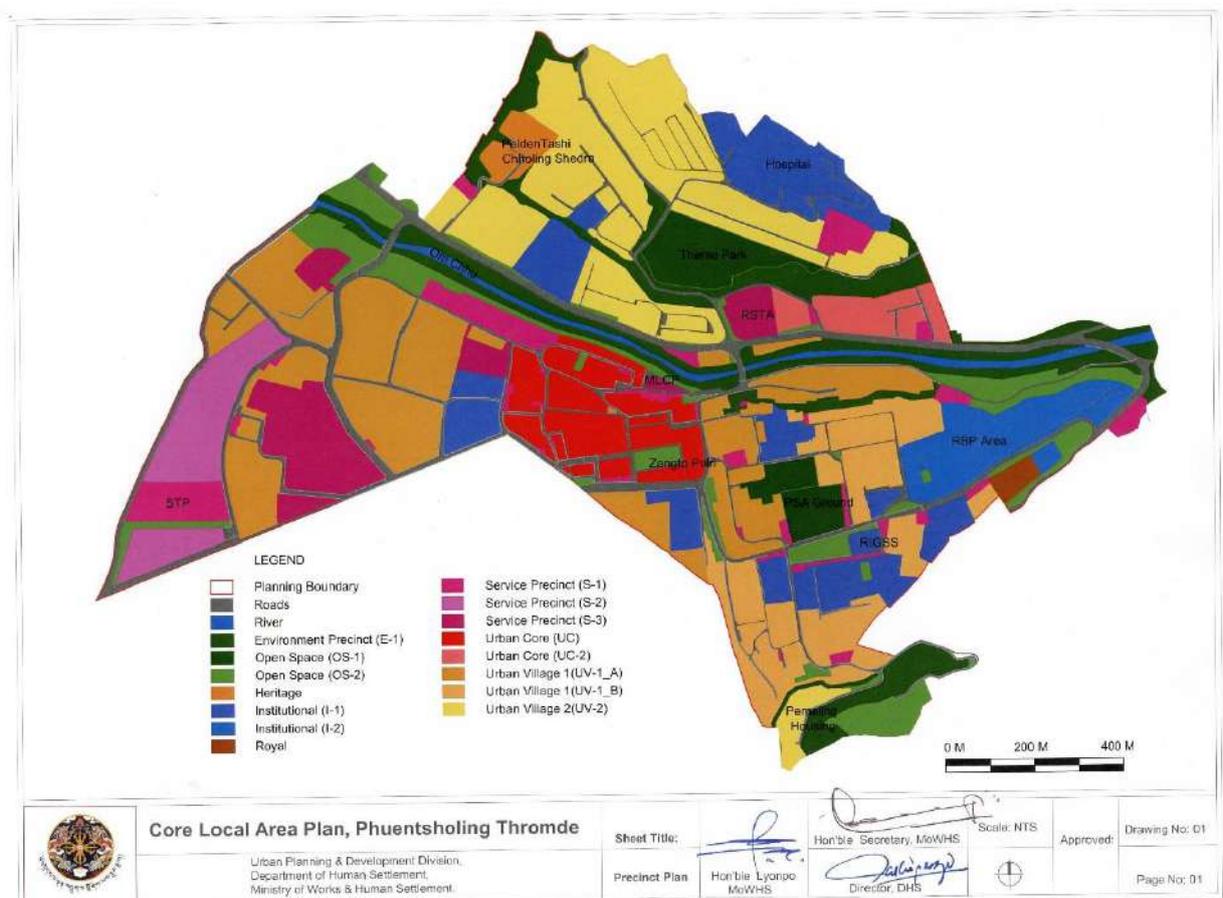


Figure 34 Proposed Precinct Plan.

#### 5.1.1 Reverting the precincts back to the ones stipulated in the Structure Plan

**Precinct below the Hospital:** The precinct below the hospital was designated as UV 2 (HD) in the Structure Plan, whereas on site it is being used as an industrial state. Given that the surrounding land uses are institutions and residential, having an industrial agglomerations in the area not only promotes incompatible uses in close proximity, but it also hinders the LAP from accommodating the projected population as forecasted. Therefore, the plan recommends the precinct to be reverted back to UV 2 (HD) as outlined in the Structure plan.

**Precinct next to Pelden Tashi Chholing Shedra:** The precinct near the Pelden Tashi Chholing Shedra is also recommended to be reverted back to the UV-2 (HD), as designated in the structure plan. It is currently used for industries and warehouses, denoting incompatible uses which is undesirable and unsustainable.

#### 5.1.2 Rationalizing the nomenclature of the Precincts

- ✓ The service precinct proposed in the Structure Plan was designated as SE-2: Multi Modal Transit hub, SE-3: Dry Port, SE-4: Service Centers and Industries. Given the broad classifications of the aforementioned service precincts, it is advisable to group precincts that promotes similar uses. Moreover, with the current practice of standardizing the precinct nomenclature, the team, as such, proposes for the rationalization of such precincts. The new proposed Service-1 (S-1) precinct allows for non- polluting, small scale cottage industries and public utilities. Whereas, service -2 (S-2) allows for polluting, medium to large scale industries such as workshops. Service-3 (S-3) allows for dry port and transport terminal.
- ✓ The open spaces in the Structure Plan are designated as G 1: National Importance Open Spaces and G 2: Local Green Space System. However, the Review proposes for the G1 as OS-1 (Regional/National importance Open Spaces) and G2 as OS-2 (Local Open Spaces). These changes in the nomenclature is in pursuit of rationalizing and standardizing the nomenclature of the Precincts.
- ✓ The area housing the defense oriented institutions are designated as UV 2 (HD) precinct in the Structure Plan, whereas in some plans it has been reflected as military precinct. Therefore, based on the nomenclature used in recent plans, the area is proposed as I-2(Institutional 2) for the defense oriented uses. This change would help in streamlining the nomenclature of precincts.

#### 5.1.3 Change in the precinct based on the existing situation and its analysis.

**UC to UC-2:** The review proposes for the change in the designated precinct of UC: Urban Core to UC-2 for the area behind the Road Safety and Transport Authority (RSTA). Omchhu, a prominent physical feature divides the two cores of different characteristics. Currently, the proposed UC-2 is less dense with larger plots, due to which the opportunity for the provision of adequate setback for the individual plots is feasible. This in turn would allow for adequate space for the projection of eaves, and also enough space for the urban greening.

In comparison to the urban core on the other side of the river that was already built up before such measures could be proposed, this core has the potential to create a sense of place, and to vigorously strive towards creating a built form that truly manifests the Bhutanese character.

**G2 to UV-1:** The area above the road leading to the RSTA, before the bridge has been designated as G2: Local Green Space System in the Structure Plan. Since, the area is under private ownership and developable, the precinct has to be altered. After in depth study of the surrounding precincts and existing use of that area, it was necessary to accommodate the change in the precinct to the nearest use in its vicinity. Accordingly, the area has been proposed as UV-1 precinct.

**UV2 to OS-1:** The precinct below the hospital was designated as UV 2(HD) in the Structure Plan, whereas on the site it is being used as an industrial state. Therefore, a certain portion of the area has been proposed to revert back to the designated precinct, whilst approximately around 7.5 acres of land has been designated as OS- 1, which proposes for a theme park to encourage the influx of the regional tourist and to cater to the needs of open space for the local residents.

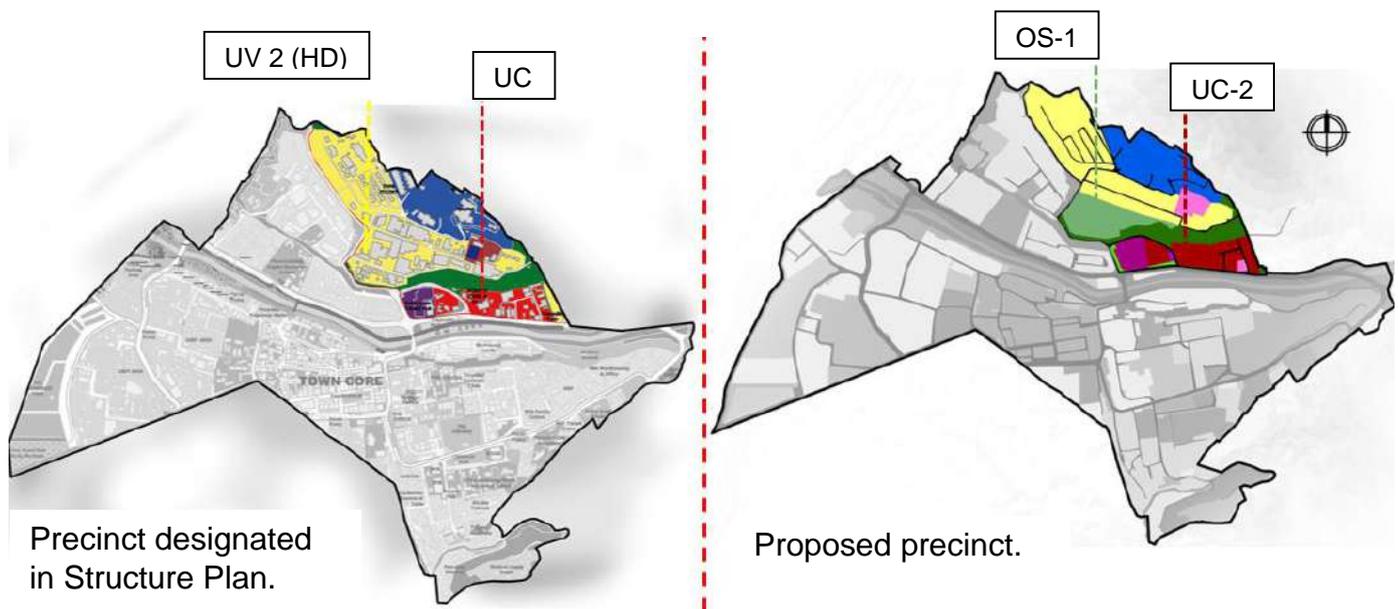


Figure 35 Change in precinct 1

**Service Precinct to OS- 2:** The Medical depot above the Pemaling Housing was designated as a service precinct in the Structure Plan. However, the land is registered under the Ministry of health, which should have been designated as an institution precinct (I-1). Given its strategic location for the open space and the requirement of additional open spaces for the core LAP, the plan recommends relocation of the depot to Local Area Plan of Pasakha Industrial state and proposes the designation of the area as an Open Space (OS-2). This relocation is proposed since the depot and the industrial states have similar nature of uses. Given the strategic view of a hilltop and the vista it offers, the proposed OS-2 could attract people as a picnic destination or for other recreational activities.

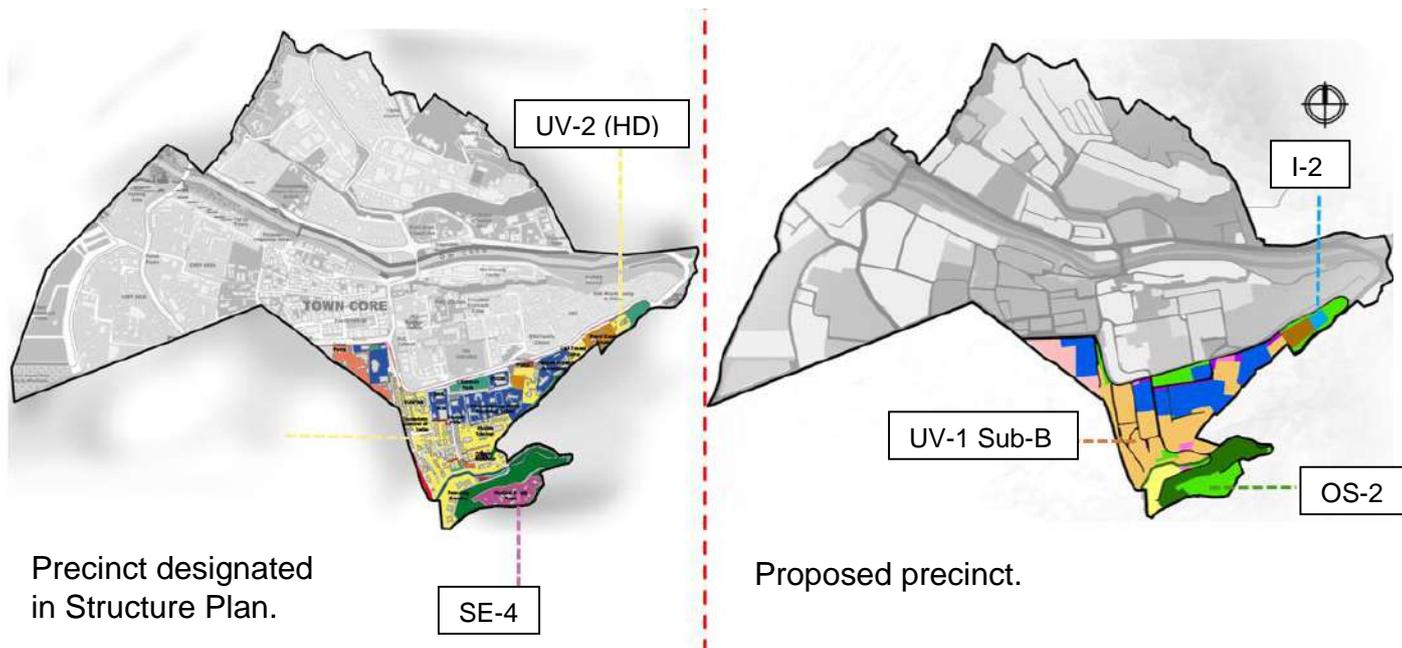


Figure 36 Change in precinct 2.

**UV2 to UV-1 (B):** The area around the Royal Institute for Governance and Strategic Studies (RIGSS) was designated as UV 2 (HD). However, given its nearness to the urban core and the need for more commercial spaces, a mixed use precinct similar to that of UV-1 is advised. The percentage distribution for the commercial uses designated is comparatively lesser to the current demand. Therefore, the review proposes the area as UV -1 sub category B with the provision to change the uses similar to that of UV-1. However, all other provisions in the DCR including the height and the coverage would be retained to that of UV-2 precinct. This change would restrict the density of the area but still support the LAP to meet the commercial requirements.

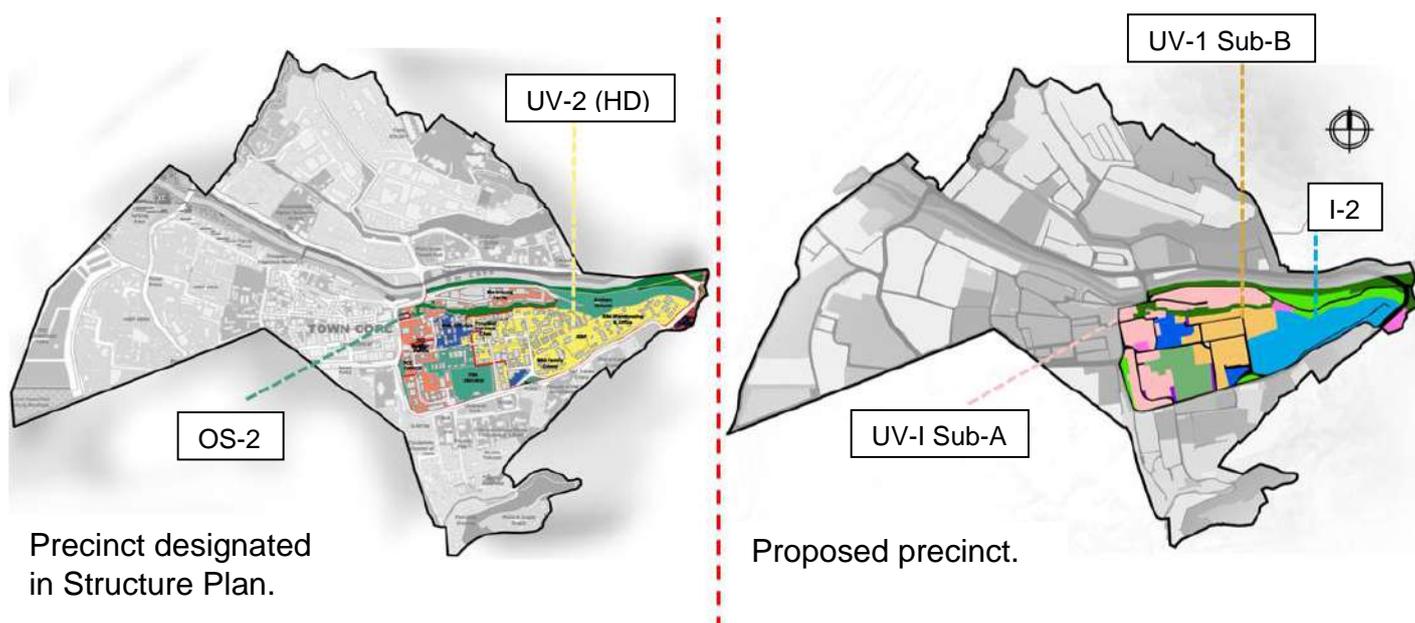


Figure 37 Change in precinct 3.

**I to S-1:** The area situated on the western part of the existing Core, currently designated as an Institutional precinct in the Structure Plan is proposed as a service precinct to suffice the need of parking within the Urban Core. The Proposed S-1 would be used for the Multi-Level Car Parking (MLCP). This proposed MLCP would supplement the existing MLCP and is located at the other end of the Town and would assist in pedestrianization of the core area. This change in the precinct and the implementation of the MLCP would assist in realizing the vision of walkability and would also reduce the traffic congestion at the Core.

**UV-1 to OS-2:** In the Structure plan, state lands along the Omchhu was designated as UV-1 precinct whereas at the actual site, it has been used as a service precinct. However, after thorough study and analysis of the area the review recognizes the need of the open space for the local residents and subsequently, proposed for the designation of OS-2 in the area. This open space is intended for active open space, enhancing the value of Omchhu buffer space.

**Parking to UV-1:** The old vegetable market near RSTA area was designated as a parking space in the Structure Plan although the area belongs to a private owner. Taking that into consideration, it has been proposed as UV-1 precinct based on surrounding precinct.

**Heritage to OS-2/ Nearby Precinct:** The structure plan earmarked a small patch where a chorten stood as a Heritage precinct, although the land belonged to a private individual. Therefore, the review proposes for the change of precinct of the chorten area under private ownership to the nearest precinct meanwhile the portion of the heritage precinct under state lands to be altered to OS-2.

### **Relocation of Fuel Station and designating the fuel station as Service precinct.**

Currently the Core area has four fuel stations as marked on the map below. There is one located near the main gate, one next to the RIGSS, one near vegetable market area and the one near city sewerage office.

The existing fuel station in the core town, situated next to the main gate has issues both aesthetically as well as functionally. With the fuel station located right at the entrance of the core town when you enter from India, not only does it visually impact on the impression that the town projects with the fuel station being the first sight, but it also poses great risk to the nearby residential neighborhoods. The existing fuel station and the surrounding uses are incompatible, thereby warranting the need to further re-assess the location of the existing fuel station to another location. Thus the structure plan had proposed for the relocation of it along the Amochhu with additional facilities such as firefighting facilities and automobile workshop.

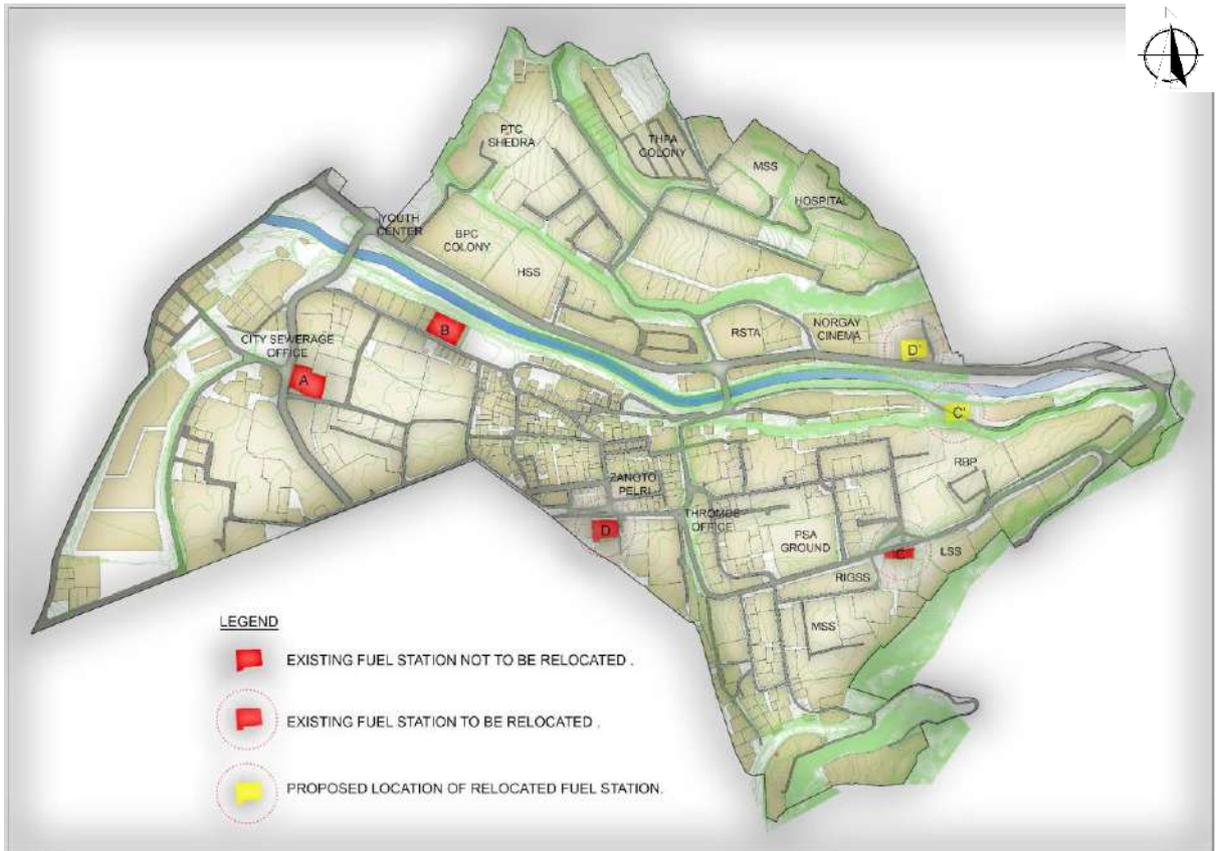


Figure 38 Map showing the location of existing and proposed fuel station.

0 m 200 m 400 m

The one near the premises of RIGSS is also a threat, as it is surrounded by institutions, particularly it being located between two schools with thousands of students. Moreover, the disposition of both the fuel and gas station in the same location poses a huge risk to the life of the people. Consequently, the fuel station has been proposed to be relocated at the existing crocodile farm area and the gas station near the existing Archery yard.

The other two fuel stations, located in the western part of the core (one near vegetable market and one near city sewerage office) is strategic for fuel stations, considering the factors such as location and the catchment radius as per the spatial planning standards. Therefore, it is retained in the same location.

## 5.2 Connectivity and Circulation

### 5.2.1 Traffic movement

The existing roads are inconsistent in its width, therefore consistent road width are proposed wherever possible, especially in terms of the carriage way if the Right of Way (RoW) is not feasible. This would help in achieving the fluidity of vehicular movement.

The plots that do not have access within Bhutan or the ones that are accessed via India have been rendered with roads, a loop road or a well-designed parking space has been proposed for the roads, which are abruptly ending and doesn't have parking. These proposals would provide access to inaccessible plots and it would ease and make the circulation more efficient.

### 5.2.2 Road Hierarchy

Understanding the current situation of the connectivity, and acknowledging the importance of the connectivity for the efficiency of the town, the urban core is proposed with the road hierarchy varying from the Primary to access road leading to the individual plots. Each road is classified into one of the road categories based on its existing function and the frequency of the traffic.

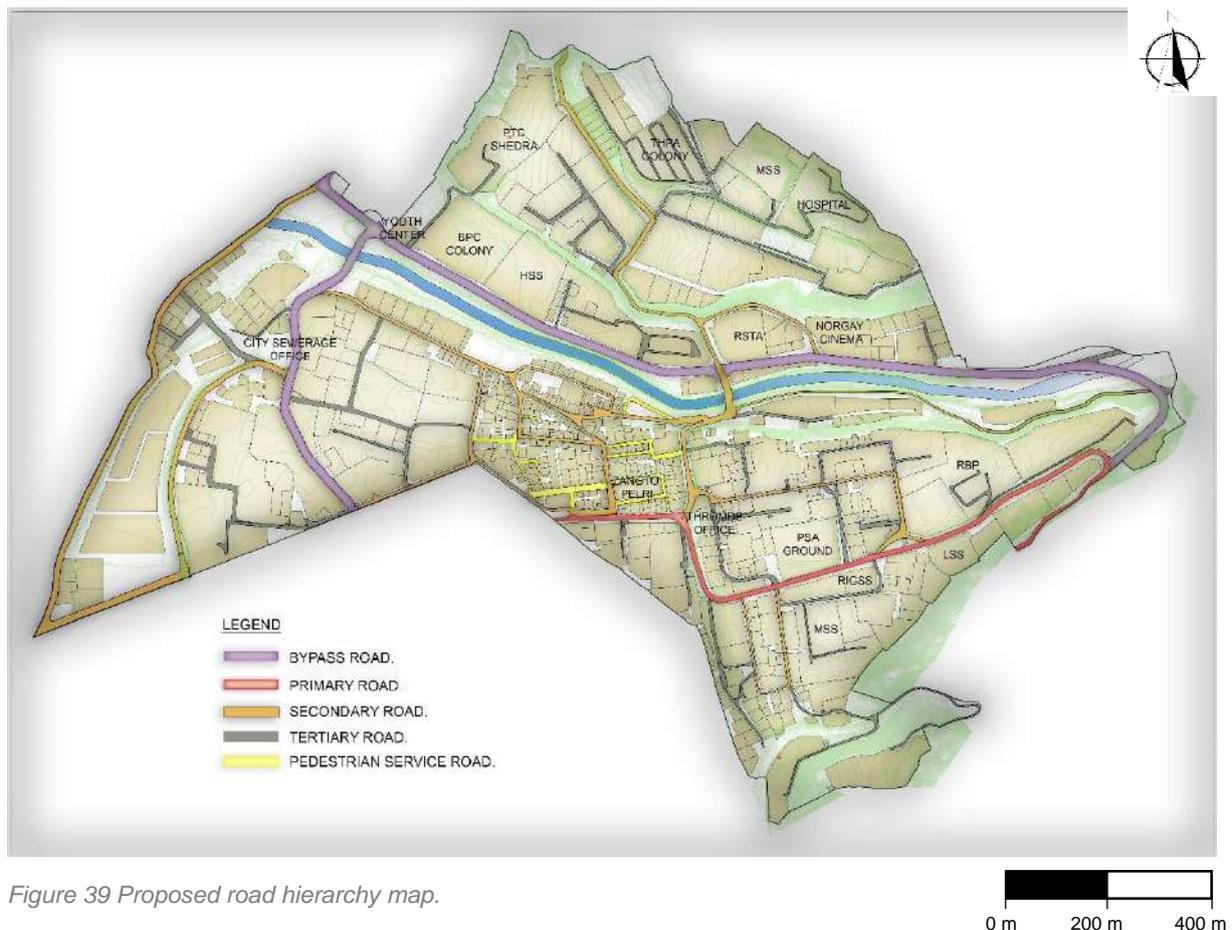


Figure 39 Proposed road hierarchy map.

The National highway is categorized as Primary road, which is the main trunk road and it connect the town with the other parts of Bhutan. The road which connects important areas within the LAP are classified as a secondary road and the one which primarily give access to individual plots are classified as an access road. The bypass road that is under implementation serves the very purpose of diverting heavy vehicles from the town core, ultimately helping in reducing the traffic pressure in the existing National Highway.

### 5.2.3 Pedestrianization of the Core Area

The existing core area is very vibrant with commercial activity serving as a magnet, however with an increase in the number of vehicles in the town and lack of pedestrian friendly infrastructure, everyone prefers to drive than walk , ultimately engendering traffic congestion ensued by the inability to find a parking space. Moreover, most of the roads in the core area are very narrow and only allow for one-way movement which further exacerbates the congestion problem.

In this regard, certain stretches of the core area (as seen in figure \_40\_) will be pedestrianized. The hours for pedestrianization will be regulated and the stretch will be further enhanced and rendered with improvised and well-designed pedestrian friendly infrastructure. To further complement and to encourage pedestrians, Phuensum Lam, a central spine between the BOD and the new Vegetable Market will be kept for vehicular movement. Pick and drop bays are proposed along the street.

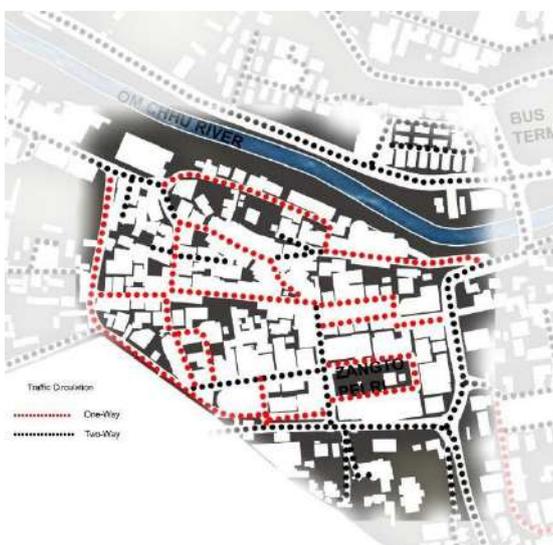
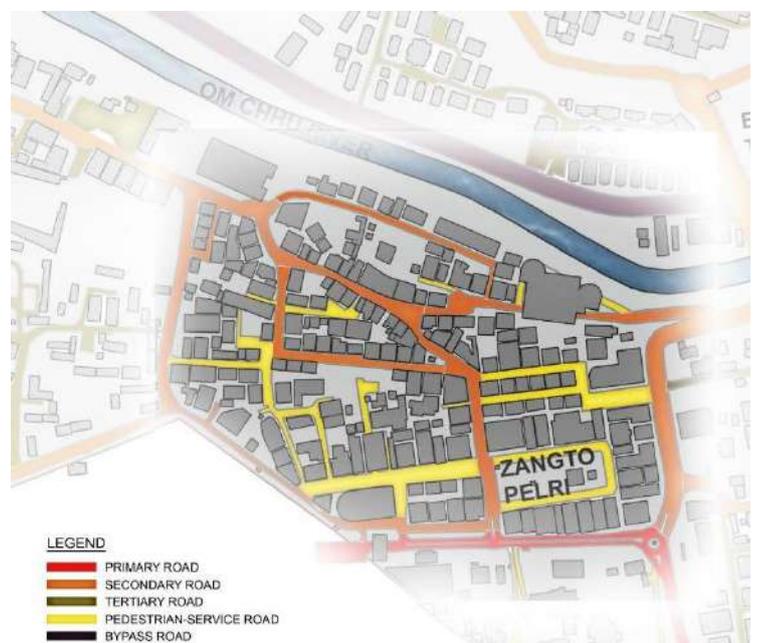


Figure 40 Pedestrianization of the Core Area.



## 5.2.4 Public Transport

Public transport is considered as one of the means to curb the traffic related issues which the Town is facing. Along with the public transport network, related infrastructures are proposed to encourage the pedestrian users. Moreover, the plan focuses on providing the bus and taxi stop within a quarter mile distance, which is within walkable distance of 10-15 minutes.

Bus stops and bays are proposed along the primary road and the bypass where the expected number of commuters are more and the RoW of the road would be able to accommodate its establishment. The taxi stand is proposed in various places to ease accessibility of such services to the general public and making public service delivery easier.

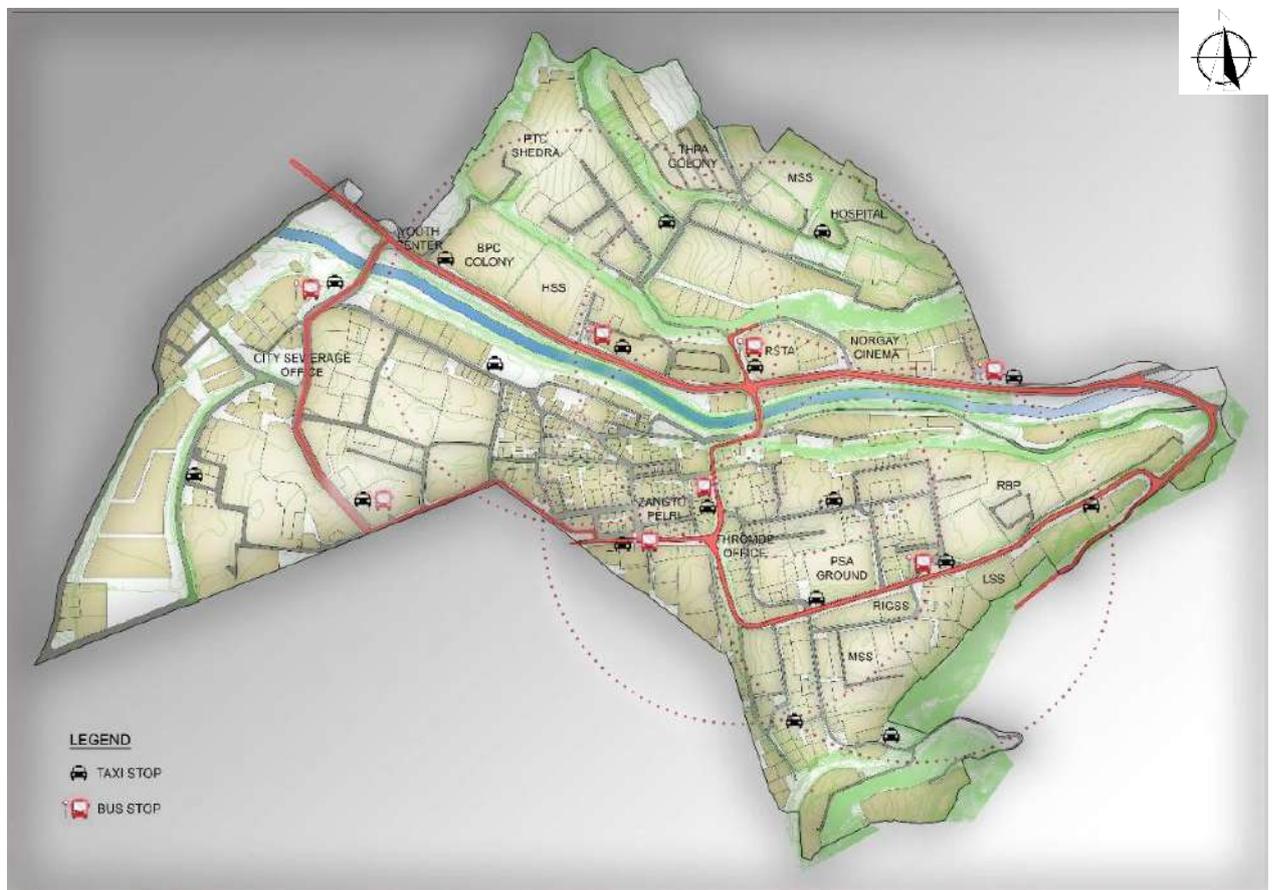


Figure 41 proposed public transport stops.

0 m 200 m 400 m

## 5.2.5 Parking

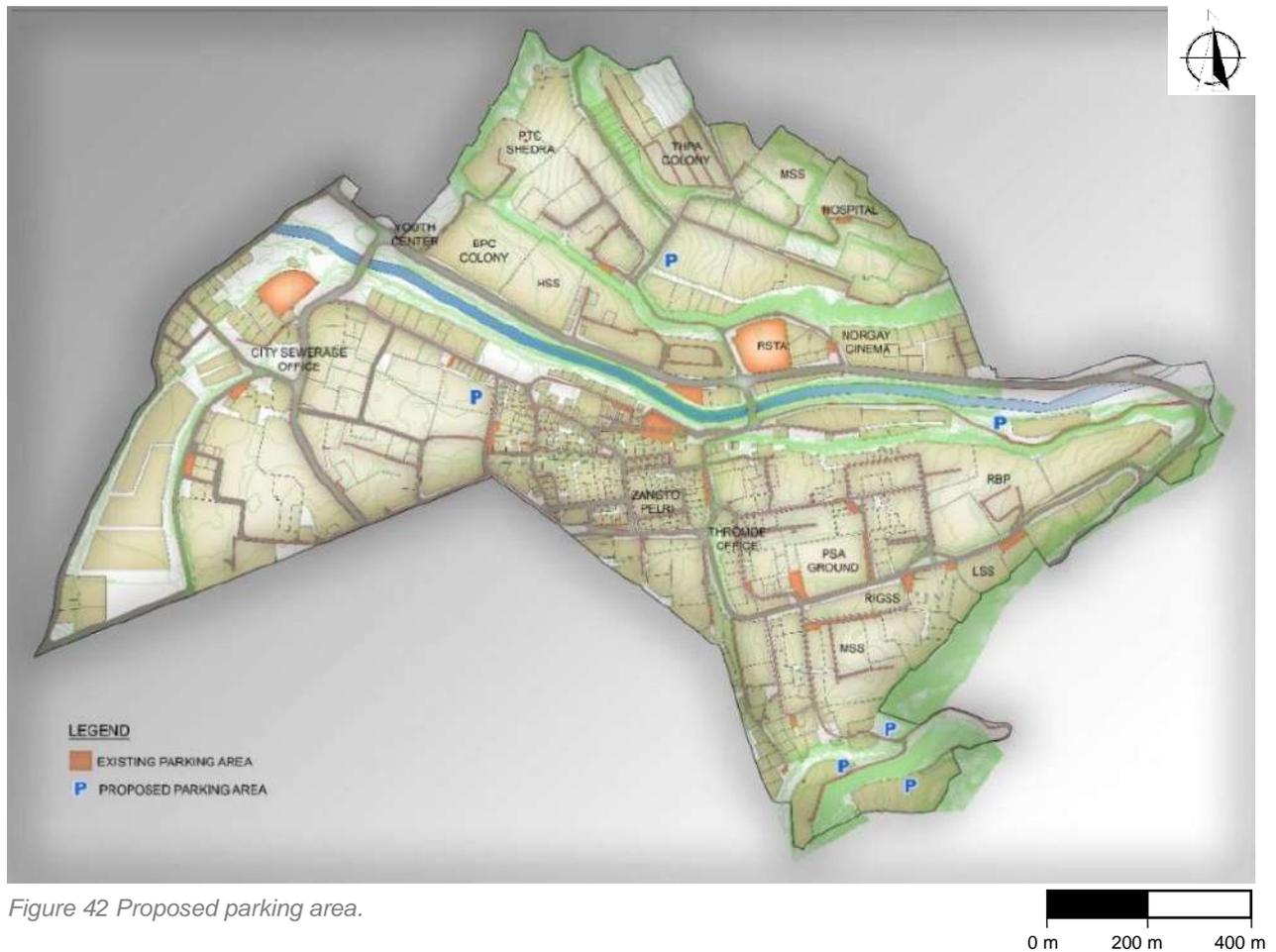


Figure 42 Proposed parking area.

Parking is one of the critical issues within the Core Area. We can see cars being parked everywhere without proper designation and planning. The narrow road also has provisions for on-street parking, thereby further leading to crowding on the roads. Currently the core area lacks adequate parking spaces and only comprises of one multi-level car parking (MLCP)

Understanding the current situation, the plan proposes for the removal of on-street parking in the roads with lesser RoW, while proposing for the second MLCP in the other end of the Core to increase the parking spaces in the core and also to complement the pedestrianization proposal.

## 5.3 Architecture

Phuentsholing, being a gateway town and a border to India, it should showcase an identity of Bhutanese town, however it doesn't have an image of Bhutanese town. Therefore, the review proposes for the creating a Bhutanese image of the town through following interventions based on short term and long term.

### 5.3.1 Built environment

The most of the areas within the LAP area are either built or are under the protected areas including steep slopes and river buffers. Moreover, built up in the urban core precinct is highly dense and it doesn't even have adequate setback for the roof overhang. Therefore, this review proposes for the change in precinct behind the RSTA office, where currently it has less built up and has the scope to make the area less dense than that of existing Urban Core and to accommodate the required setback for the roof overhang. The review also proposes for discontinuing the lease renewal of the industrial area so that the core area LAP could have enough green open space and recreational area for the residents and to the visitors. In addition, after completing the lease period the lease land could be used for something better and of compatible use with the residential use.

### 5.3.2 Community Vitality



Figure 43 Prevailing community spaces.

Community Vitality is one way of looking at and thinking about communities and is one of the nine domains of Gross National Happiness (GNH). A concept of Community is one of the most important determinants of Happiness, but with rapid urbanization, the limited land that we have is being maximised, thereby leaving very less area for open space where people can gather and spend their leisure time or carry out other community related activities. This hugely raises concerns for the quality of life for the local residents and reflects on the vitality of a community which is waning. In order to address these concerns and to enhance the community vitality, the review proposes to focus on open spaces, well equipped to serve a diverse and integrated population, which currently is lacking

within Core area. The review proposes for the OS-1 for regional gathering and OS-2 for the local communities. The proposed open spaces are evenly distributed within the area to provide similar opportunity to all the communities.

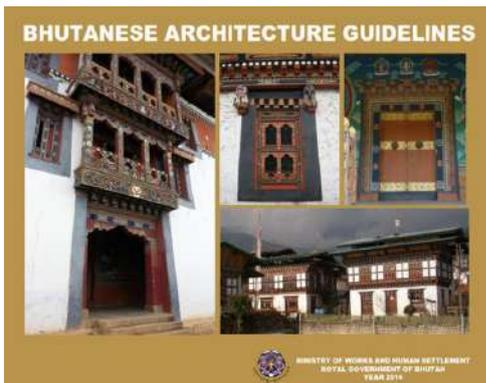
### 5.3.3 Bhutanese Architecture

Most of the existing building lack proper Bhutanese element, especially in terms of the facade. Currently, it has been strongly influenced by our neighboring Indian town, with most structures closely following their architectural elements comprising of facades with



Chhaja and Jali. Therefore, to create the essence of the place as a Bhutanese town, the existing building which are stable enough to withstand for more than 10 years has to carry out the treatment of the facade to create authentic Bhutanese architecture.

These alterations could be mainly on the openings, lintels and cornices on the intermediate slabs. With recent technologies and varieties of material in the market, those aforementioned alterations are very



much feasible. Therefore, it is recommended that the Thromde has to implement the much needed alterations to attain the Bhutanese character that is very lacking in the core town. For those new developments, strict DCR should be followed and while scrutinizing the architectural drawing, the Bhutanese Architectural Guidelines should be strictly adhered to.

Figure 44 Instances of traditional Bhutanese Architecture.

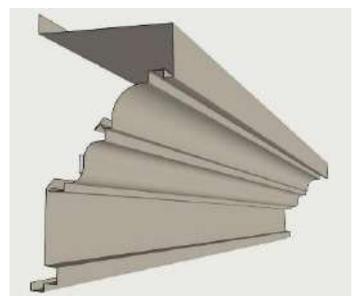


Figure 45 Surgical treatment of facade with the use of GRC cement.

**Phuntsholing Thromde**

Sl. No.	Specification	Color
1	White	
2	Exposed Stone Masonry with its natural color depending on the stone and masonry type without any plaster	
3	Cream color	
4	Light Brown	

Figure 46 Building colour and texture entitled to Phuentsholing Thromde.

### 5.3.4 Color Code

Since the residents and the people of the town had selected their choice of color as shown in the figure, it is utterly significant that the general public and the Thromde strictly comply with the colour codes, for the upcoming constructions. As for the existing buildings, the owner should stick to the aforementioned colors during the repainting/refurbishing without fail.

### 5.3.5 Setbacks

Setback is one of the important parameters that needs to be considered during the development. It gives flexibility in the construction of both substructure and superstructure. Currently, in the Core area the setbacks are very minimal, therefore the built up are very dense. With the existing less than standard setbacks, some of the buildings do not have enough area for the roof projections, which is one of the main underlying reasons why the structures fail to resemble Bhutanese architecture. This is because the roof plays a crucial part in manifesting Bhutanese architecture. Therefore, the review proposes for the change in the minimum standard setback wherever required and are possible.

## 5.4 Utilities

### 5.4.1 Drainage:

Drainage in hilly terrain plays an important role in planning. Currently, the drainage system in Phuentsholing lacks a comprehensive planning and engineering standards. The plan proposes for a well-connected and schematic drainage master plan. The Thromde has to initiate preparation of detailed design and drawings for drainage in consultation with Department of Engineering Services, MoWHS. Currently the drains are disjointed and are of shallow section which aren't able to take load during the monsoon season. Therefore, proper drain section and continuous drain along the roads are proposed. For drainage system to be more comprehensive, the institution and campuses must produce their drainage master plan during the approval stage. Presently, the storm water is being discharged directly to the stream, but the team proposes for the retention ponds at various locations before discharging stormwater to the stream and the river. These retention ponds would act as primary treatment and would reduce the storm water velocity during the peak season.

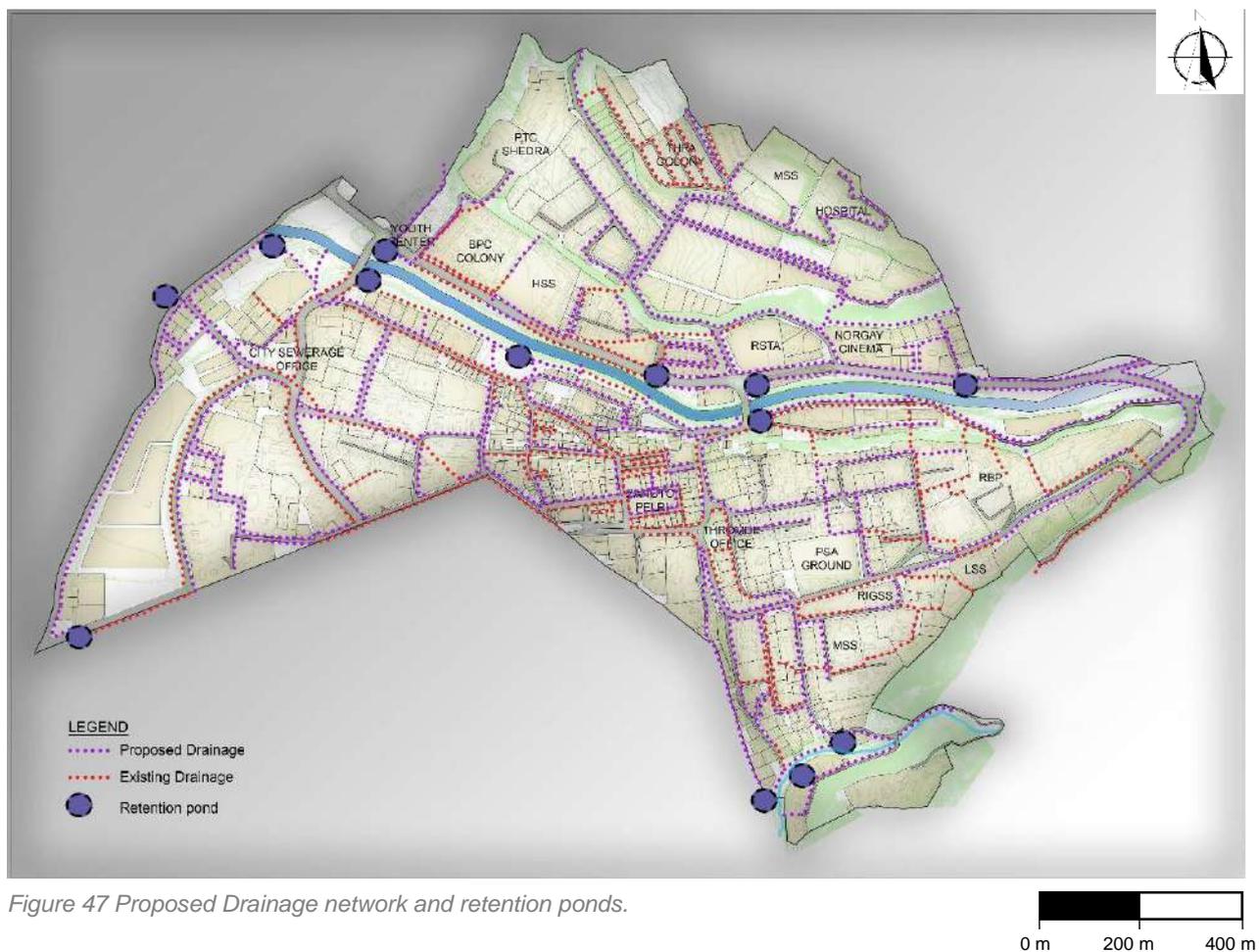


Figure 47 Proposed Drainage network and retention ponds.

## 5.4.2 Sewage

Since the sewer line is constructed before 15 years, some of the new development and the periphery of the core area are without the sewer connections. Therefore, it proposed a schematic layout for the new connection, which need to be detailed out for the implementation. It also further proposes for 100 % coverage in terms of network, the existing Sewage Treatment Plant (STP) has the capacity to hold for a few more years but being a conventional system it occupies a huge area, which could be released for some other important development activities. Therefore the review has proposed for the compact STP.

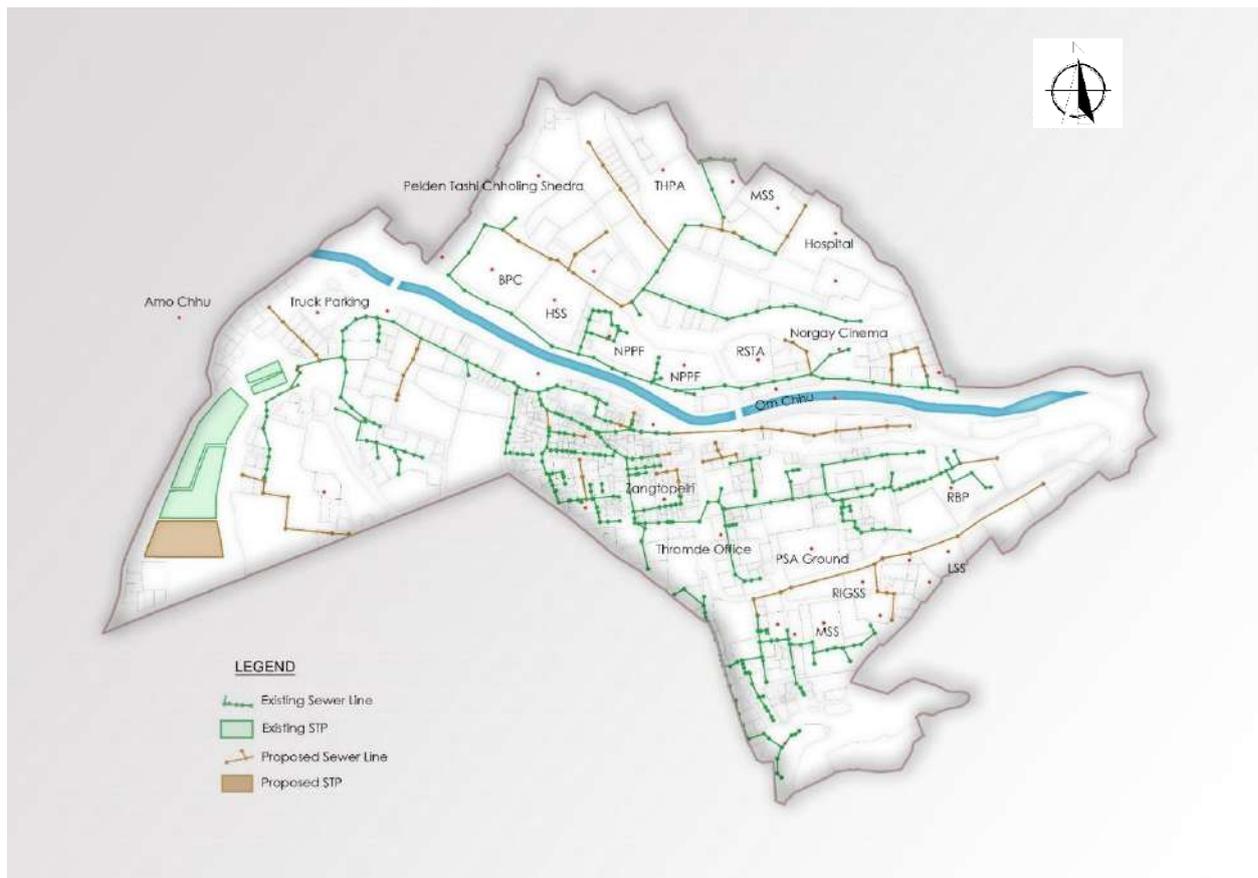


Figure 48 Proposed sewerage network.



## 5.5 Green and Open space

Open Space:

Open space plays a significant role in the life of the settlements. The green space can improve the micro climate, abate the urban heat-island effect and reduces environmental degradation. The open space within the settlement can help the residents in living a healthy lifestyle and determines the characteristics of the settlements.

On recognizing the importance of open spaces and green spaces, the plan focuses on preserving the river buffer and the Steep slopes as Environment Precinct (E-1). In addition to those conservation precincts, the plan has designated open space 1 and 2 with national and local importance respectively. These open spaces are allocated ensuring that it is accessible to all the residents. These passive and active open spaces were connected to one another through the green network such as greening and footpaths. The plan also proposes to manage and enhance the natural landscape to fulfil the recreational requirements.

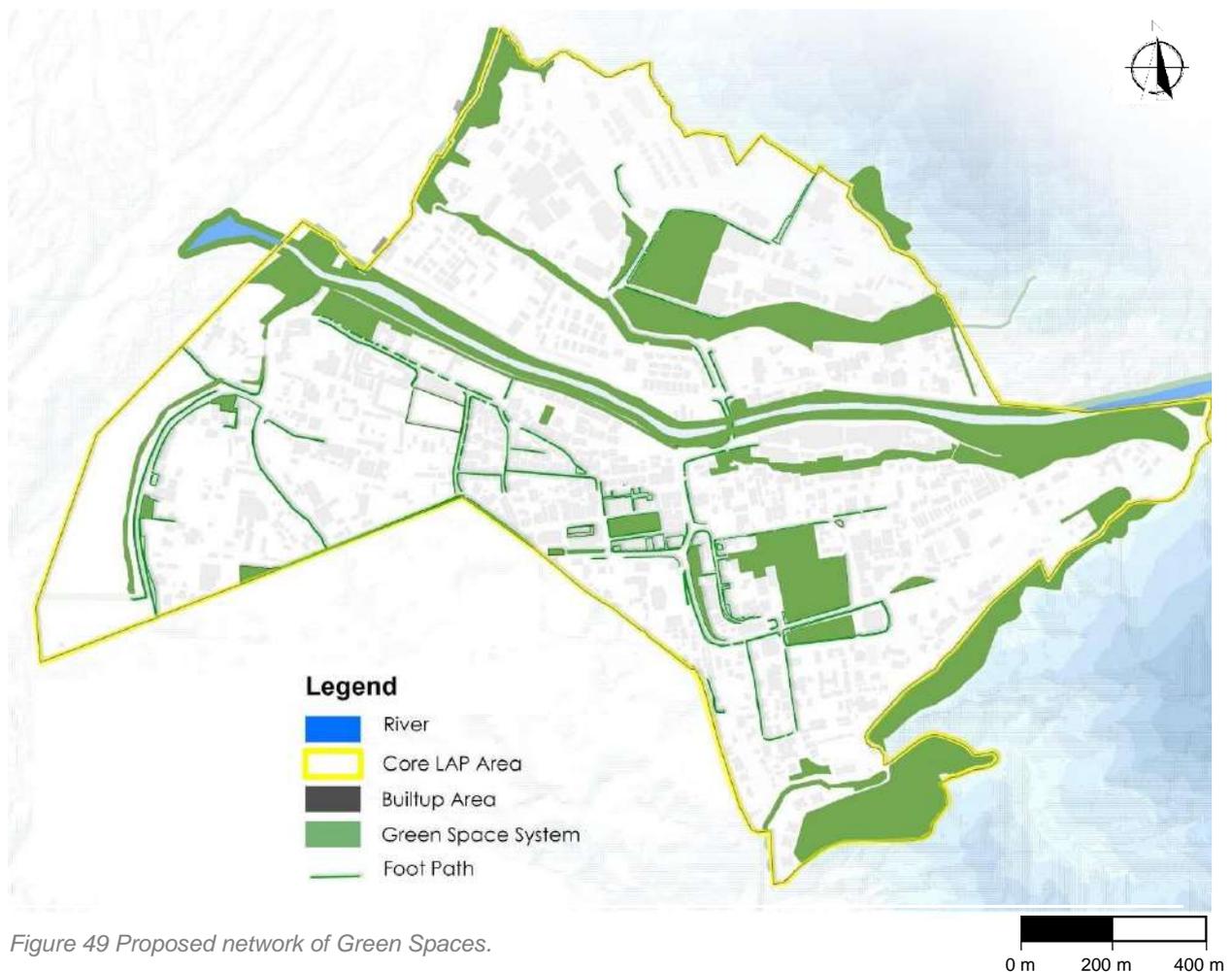


Figure 49 Proposed network of Green Spaces.

### Theme Park:

The Plan realized the need of a theme park in addition to the Phuentsholing Sport Association (PSA) ground for adding value to the town and for the means of entertainment to people from within and from the other regions. This could also act as subset of the visitors attraction to the town and make the town more economically, socially and environmentally vibrant.

With the warm subtropical to temperate climatic conditions, amusement water park would be the best theme park that features water play areas, such as swimming pools, water slides, splash pads, spray grounds (water playgrounds), lazy rivers, or other

recreational bathing, swimming, and barefooting environments, which would serve the function of recreational with other positive impacts.

The proposed water park is located in the existing leased industrial area and it comprises an area of 7.5 Acres. This water park would be first of its kind not only in the town but in the country as well. It is located on the top of the planning area from where the visitors could enjoy the activities of the park with a panoramic view of the town. This park would be inclusive in nature with the diverse activities to engage all kinds of people.



Figure 50 Proposed Theme Park.

## Omchhu Waterfront Development:

Omchhu also known as Dhuti Khola is one of the prominent physical features flowing in between the Planning boundary, dividing the planning area into two halves. As per the planning practice 15 m buffer on the bank of the perennial stream are mandatory and it is recommended that the Thromde administration has to implement the urban design work carried out on the Omchhu water front development.

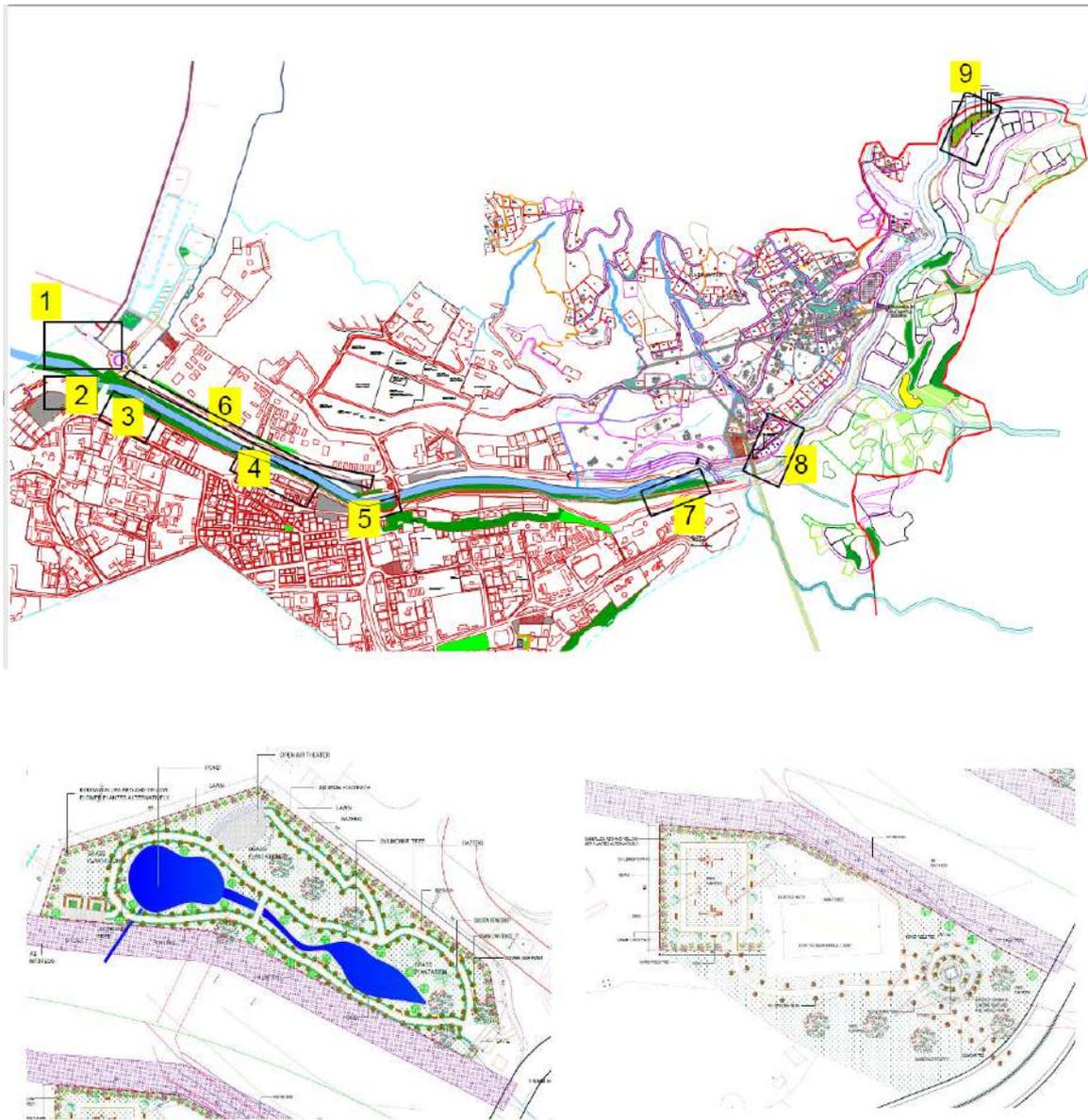


Figure 51 Proposed Omchhu waterfront development.

Omchhu water front development has identified nine locations to promote active recreational activities, which are connected through the cycle track and footpaths.

## 6 Implementation Plan

Planning and implementation should go hand in hand and for considering the Plan to be successful, the implementation should be planned accordingly. Thus this chapter would serve as a guide for the implementers to prioritize and allocate the resources accordingly. Most of the service oriented proposals are either conceptual or schematic design, which need to be further detail out through the help from the concern division in the Thromde or in the Ministry.

The implementation plan has been divided into two phases spanning over the time period of the Plan. These phases are indicative and are based on the priority and its implication. However, these activities are subject to change based on the availability of human and other resources within Thromde Administrations

### **Phase-1**

#### **Implementation of the Revised DCR**

The implementation body shall implement the revised DCR from the moment the plan is released for the implementation.

#### **Façade upliftment:**

Creating an image of the city with uplifting the façade using Traditional Architecture and regulated color on the façade are some of the proposals. Thromde Administration should initiate the implementation as soon as the plan is released to the Thromde for the implementation.

**Following activities under phase one are symbiotic to each other, therefore it should be implemented together for the smooth and effective implementation.**

#### **Enhancing the connectivity:**

With the aim of providing connectivity, the review proposes few new roads, which would provide access to inaccessible plots and some would ease and make the circulation more efficient.

**Bus bays and taxi stop:**

Along with the road connectivity the review has proposed for the bus bays and taxi stop considering the quarter mile concept for the walkability, the review would recommend to implement along with the enhancement of the connectivity.

**Utility:**

The utilities such as Drainage and Sewerage connectivity should be considered as a component of road and should implement along with the road. The schematic line drawings are shown in the map.

**Implementing the Footpath:**

To fulfill the vision of walkable city, few new footpaths are proposed which would complete the missing linkages and the review also proposes for the mending of the existing dilapidated footpaths.

**Pedestrianization of the Core Area:**

Pedestrianization of core area should be implemented phase-wise. For the phase one, the Thromde administration should implement the stretch proposed in the urban design proposal. Based on its experience, other parts of the proposed area should be implemented. However, before implementing second phase of the project, the Thromde administration should implement the second proposed multi-level car parking.

## **Phase-2**

### **Relocation of the fuel station:**

The site for relocating the fuel station is identified and is earmarked as service precinct in the map, the Thromde Administration should process with the operators and the relevant stakeholders and should implement accordingly.

### **STP:**

The review proposes for the compact STP over the existing conventional STP. This proposal would save a huge area, which could be utilized for other proposed important services and are earmarked as service precinct. Since the Existing STP is still underutilized and not yet reached its capacity, therefore the Thromde Administration may undertake the project in the second phase.

### **Parks and Open Space:**

Open spaces and parks are one of the important proposals, but considering the priority and other constraints, the review team proposes it under the second phase

On completion of the lease period around the industrial area. The Thromde should gear up towards the development of the area to enhance the conviviality and community vitality of the area.