

AMMOCHHU

Urban Design

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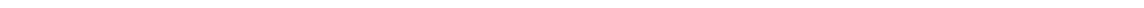


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Royal Government of Bhutan
Phuentsholing Thromde

CONSULTANTS:



WHITE CYPRESS
ASSOCIATES



Urban Design Guidelines

Built Environment Values for Guiding Design

Fostering a sense of community

As community living remains a deeply rooted value system of Bhutanese living, the urban design guidelines enforce this concept by promoting clustering, enforcing neighbourhood character and creation of shared spaces within the LAP area. This can be seen at varying scales within the LAP.

Ensuring free and easy movement for the pedestrian

The guidelines stated further ensure enhanced walkability within the Lap area at different scales. At the LAP level, the regulations substantiate the proposed pedestrian spine (the Central Avenue) by harmonizing relationships between buildings, streets and open spaces within each Character Zone. The building level and Plot level regulations ensure a pedestrian friendly environment by dictating active building edges, built form orientation, ground floor use of buildings and suggestive use of setbacks.

Creating a Vibrant and Liveable Environment

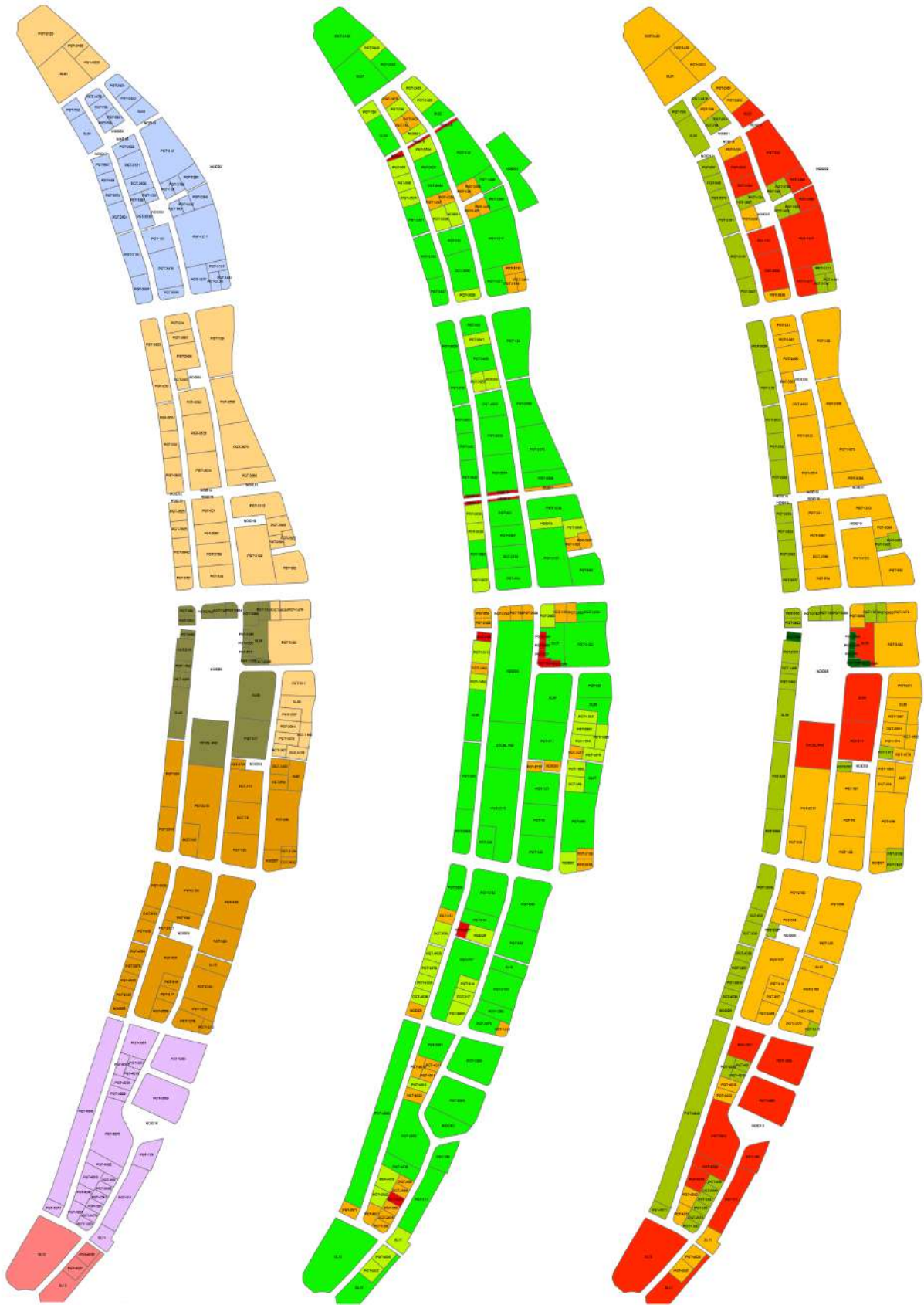
Urban Design guidelines promote a mix of uses within each Character Zone enhancing vibrancy. Detailed guidelines illustrate a vertical as well as horizontal mix of uses in different character areas. The organization of uses have been done to compliment the Public Environment.

Offering visual and morphological variety

The guidelines stated further have been formulated to ensure variation and play in urban form in order to break down visual monotony within the linear stretch of LAP area. This shall be achieved by adhering to building form regulations regarding FAR, setbacks, permissible building heights as well as building level guidelines which ensure variation in building typology, architectural style and features as well as building color variation. The guidelines encourage the urban form to recognize and respond to urban patterns.

Design with Nature

As the designed hierarchical greens within the LAP area respect and exhibit natural systems and features, the guidelines enforce the blend of built environment with the natural setting. Regulations dictate the blend of common open spaces and Landscape with Architecture. Regulations regarding varied hierarchical greens and plantations ensure a robust green network within the LAP area. Also, the regulations ensure design of open and built spaces with respect to the undulating terrain of the area.



CHARACTER ZONES

- Character Zone 1
- Character Zone 2
- Character Zone 3
- Character Zone 4
- Character Zone 5
- Character Zone 6

PLOT AREA (decimal)

- less than 9.1
- 9.1 to 15
- 15 to 25
- more than 25

NO. OF FLOORS

- G + 3
- G + 5
- G + 7
- G + 9

Offering 'Third Places/ Recreational spaces' for social Interaction

The Urban design Guidelines ensure design of public open spaces to connect with and complement the streetscape. They maximise physical comfort and visual access and support public transportation. The guidelines encourage public open spaces to encourage social activity, play and rest. Also, the neighborhood character can be seen to be expressed in open space designs.

Guideline Structuring

For ease of comprehension, the urban design guidelines have been structured based on their applicability at different scales, as listed below:

- Guidelines applicable at LAP level
- Guidelines applicable at Character Zone level
- Guidelines applicable at Plot Level (Site level)
- Guidelines applicable at Building Level
- Guidelines for Open Spaces
- Guidelines for Green Areas

Guidelines applicable at LAP level

Applicable throughout the LAP area shall ensure the desired morphological character of the LAP area. They guide the proportion of builtform with respect to plot sizes.

- Plots with area less than 9.1 decimal shall be allowed upto 4 floors with a minimum of 2m setback on all sides.
- Plots with area between 9.1 and 15 decimal shall be allowed upto 6 floors with a minimum of 2m setback on all sides.
- Plots with area between 15 and 25 decimal shall be allowed upto 8 floors with a minimum of 3m setback on all sides.
- Plots with area more than 25 decimal shall be allowed upto 10 floors with a minimum of 3m setback on all sides.
- A special condition with an intent to break the monotony in response to the highway. Where, the plots flanking the PCR highway with an area more than 15 decimal would be allowed a maximum of 6 floors except for character zone 1 & 5.
- The plots along the central avenue shall have built-to-edge condition along the avenue after a minimum of 1.5m setback.

Small plot guidelines:

Further, in addition to the above stated regulations, the set-backs and the maximum permissible building height as per 'Guidelines for Development on Small Plots, 2022' for plots with area less than 9.1 decimal is as follows:

Plot Size	Isolated Plots	Contiguous Plots	Max. permissible height
2- 4.499 decimal	1.2 m on all sides.	<ul style="list-style-type: none">1.2 m on front and rear sides.Zero setback in between the plots.Plots at both the ends shall maintain 1.2 m setback on one side.	2 Floors
4.5 – 6.999 decimal	1.5 m on all sides.	<ul style="list-style-type: none">1.5 m on front and rear sides.Zero setback in between the plots.Plots at both the ends shall maintain 1.5 m setback on one side.	3 Floors
7 decimal and above	As per the prevailing DCR in the planned area and BBR_2018 in unplanned area.		

Development shall not be permitted on plots less than 2 decimals.

Sub-division:

- Division of plots less than 15 decimal is discouraged.
- For sub-division of plots larger than 15 decimal, the smallest side of the sub divided plot shall be more than given in the table as per character zone.
- Additionally for central avenue, subdivision shall be allowed with subdivision line running perpendicular to the central avenue.

CHARACTER ZONE	MIN. LENGTH (meters)
1	-na-
2	30
3	28
4	28
5	28
6	32

Floor Area Ratio (FAR):

The floor area ratio is the relationship between the total amount of usable floor area that a building has, or has been permitted to have, and the total area of the lot on which the building stands. A higher ratio likely would indicate a dense or urban construction.

$$\text{Floor Area Ratio} = \frac{\text{Total builtup area}}{\text{Gross plot area}}$$

The floor area ratio accounts for the entire floor area of a building, not simply the building's footprint. Excluded from the calculation are unoccupied areas such as basements, parking garages, stairs, and elevator shafts. Buildings with different numbers of stories may have the same floor-area-ratio value.

Stilted parking and Jamtho, if used, shall be included in the FAR calculation.

Guidelines applicable at Character Zone Level

As the formulation of Character Zones has been done to define areas with predominant characters, the following guidelines enforce the same characteristics by suggesting appropriate building use and building form for each zone.

Character Zone	Primary Uses	Plot Area (decimal)	Maximum number of floors	Setback (Meters)	FAR	Built to Edge	Special Condition		
1	Primary Uses allowed includes commercial, offices, public/ government institutes and any recreational use	< 9.1	4	2	3	-	-		
		9.1 - 15	6	2					
		15 - 25	8	3					
		> 25	10	3					
2	Primary Uses allowed include residential, commercial, offices, public institution, hotels, parks and transport	< 9.1	4	2	3	Along the central avenue with a minimum setback of 1.5 meters	Plots flanking the PCR highway with an area more than 15 decimal would be allowed a maximum of 6 floors		
		9.1 - 15	6	2					
		15 - 25	8	3					
		> 25	10	3					
3	Primary Uses allowed majorly includes high density residential along with commercial, offices, educational institute, public institute and parks	< 9.1	4	2	3				
		9.1 - 15	6	2					
		15 - 25	8	3					
		> 25	8	3					
4	Primary Uses allowed in this character zone include residential, commercial, offices, educational institute,public institution, hotels, parks and transport	< 9.1	4	2	3				
		9.1 - 15	6	2					
		15 - 25	8	3					
		> 25	8	3					
5	Primary Uses allowed majorly includes low density residential along with commercial, offices, educational institute, public institute and parks.	< 9.1	4	2	3				
		9.1 - 15	6	2					
		15 - 25	8	3					
		> 25	10	3					
6	Identified primarily as a hospitality and recreational zone and may include special uses such as small and large scale hotels, resorts, convention centers, recreational facilities supported by some residential and basic commercial facilities.	< 9.1	4	2	3			Plots flanking the PCR highway with an area more than 15 decimal would be allowed a maximum of 6 floors	
		9.1 - 15	6	2					
		15 - 25	8	3					
		> 25	10	3					

Note: The uses prescribed above are not binding and are suggestive predominant uses to create identifiable character districts. And the setbacks for plots less than 15 decimal has been reduced in order to achieve an appropriate and habitable floor area.

PCR Highway

Western
Avenue

Central
Avenue

Eastern
Avenue

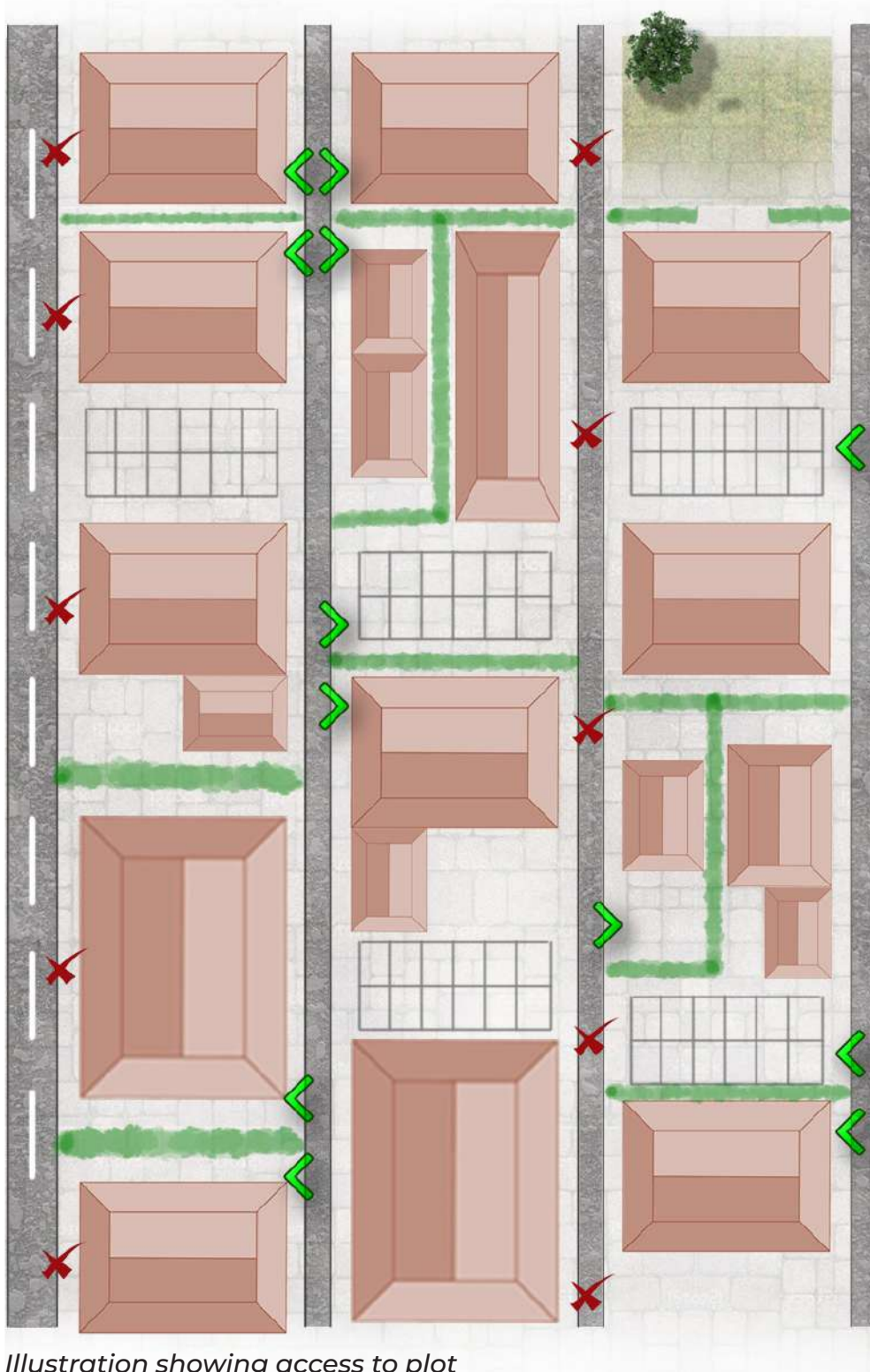


Illustration showing access to plot

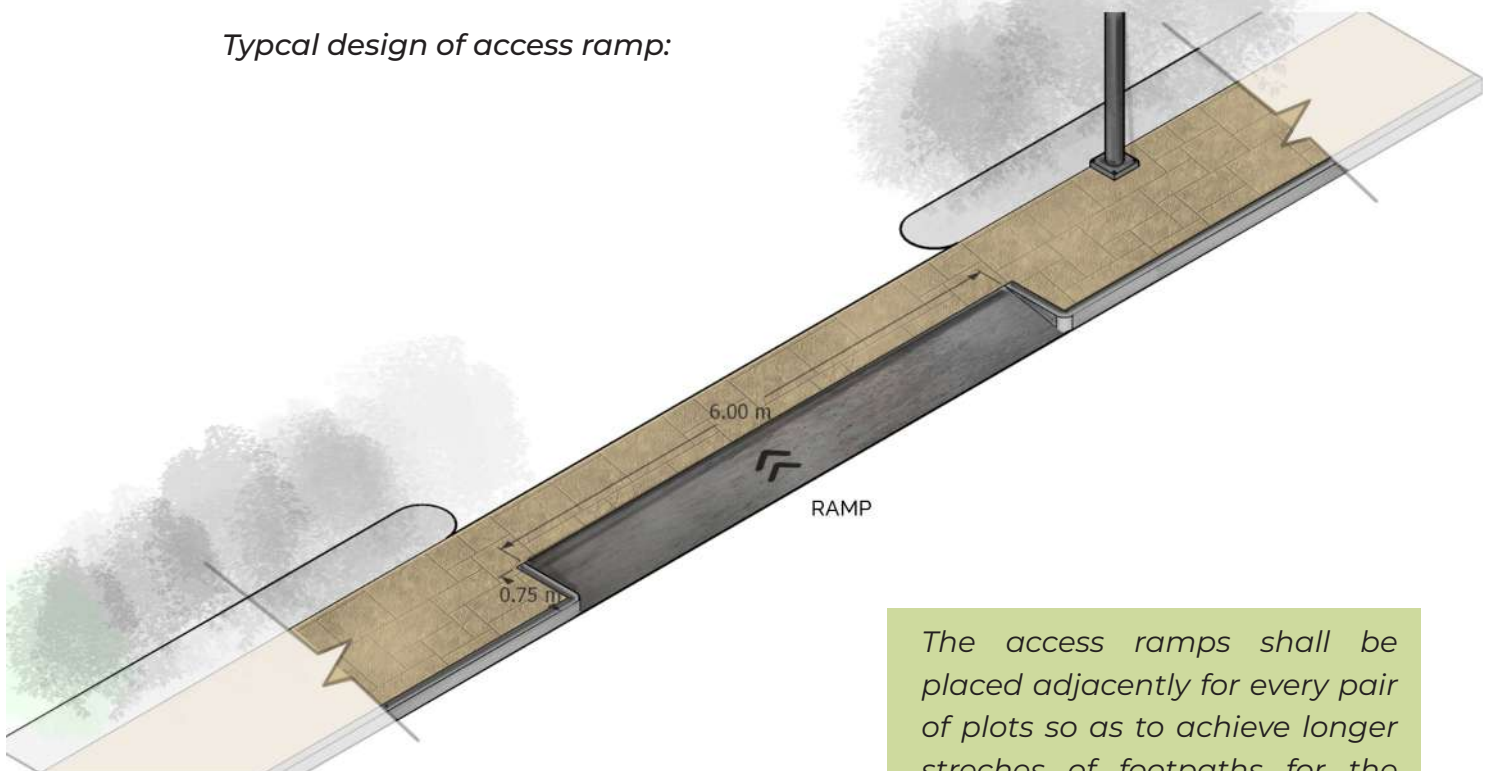
Guidelines applicable at Plot Level

Ensure maximum vehicular plot level accessibility while maintaining unhindered pedestrian movement networks.

Regulating Access to plots

- For all the plots, preference should be given to vehicular access from Eastern and Western Avenue only.
- A plot to have vehicular access from central avenue only if it does not have any common edge with Eastern or Western Avenue.
- Plots abutting the PCR highway are not permitted to draw access from the highway.
- Any plot being earmarked, formed, designated or transacted shall have a vehicular access to a road (eastern or western avenue only), footpath or walkway clearly marked, irrespective of the transaction.
- If the provision of vehicular access to a plot is not feasible, the plot shall be connected by a pedestrian access.
- Access to adjacent plots shall be taken towards their common edge, as indicated in the suggestive plan.

Typcal design of access ramp:

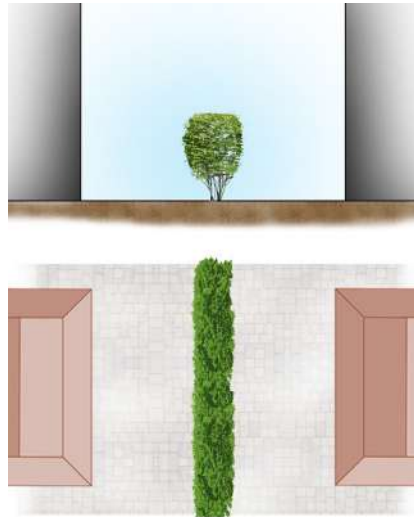


The access ramps shall be placed adjacently for every pair of plots so as to achieve longer stretches of footpaths for the convinience of pedestrians.

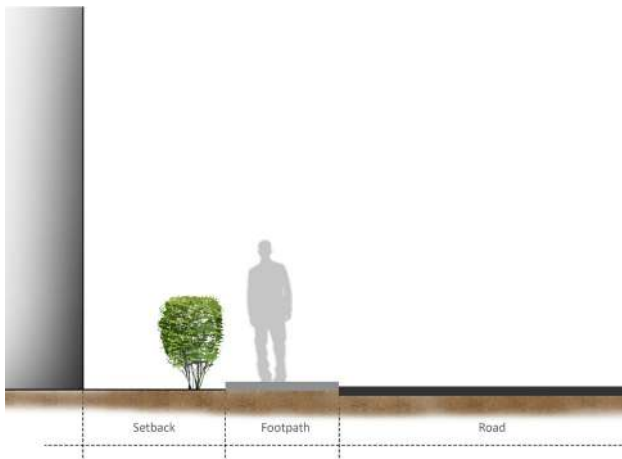


Plot Edge & Setbacks

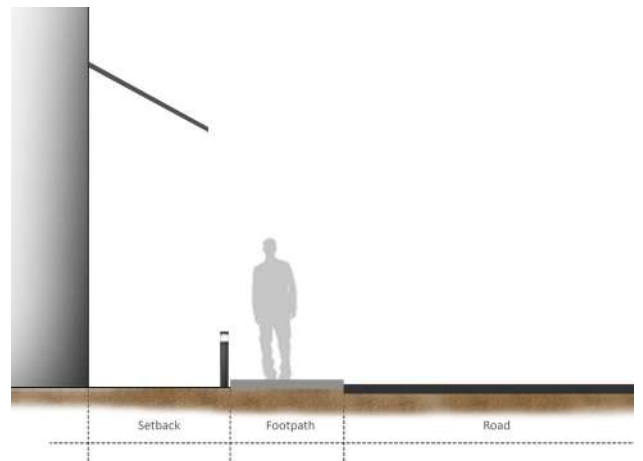
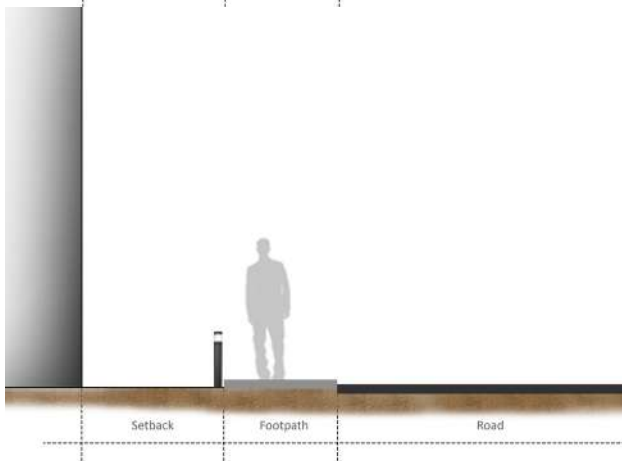
As per the general regulations, the plots shall have a minimum of 3m setback on all sides except the edge along central avenue. Where a minimum of 1.5m setback shall be applicable with built to edge condition.



Plots with common edge: Common edge between two plots may be marked with a hedge line (hedge type- S-16 and/ or S-19 as referred in schedule of trees and plants in annexure).

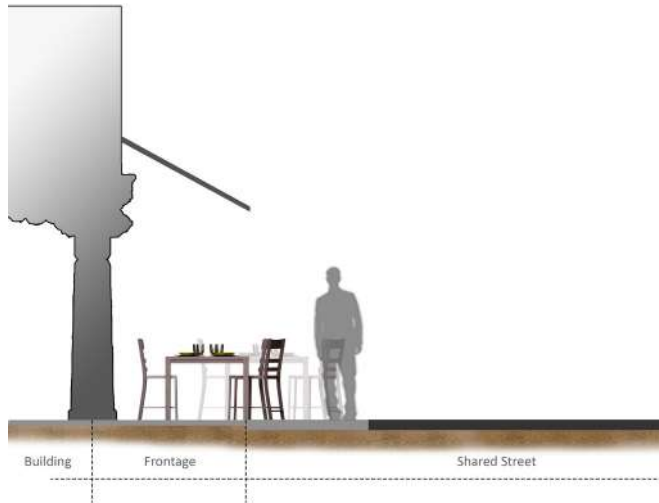


Edge along Eastern and Western Avenue: Plot edges towards the eastern and western avenue may be marked with hedges or bollards within the plot line. Awnings/ temporary projections shall also permissible extending up to the plot edge.

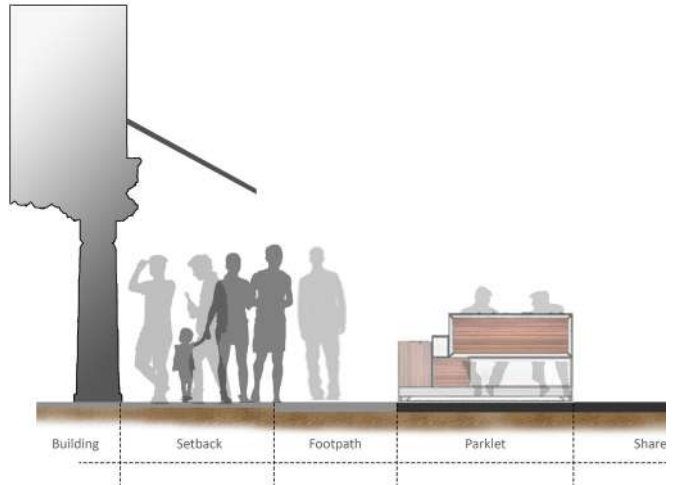


Edge along Central Avenue:

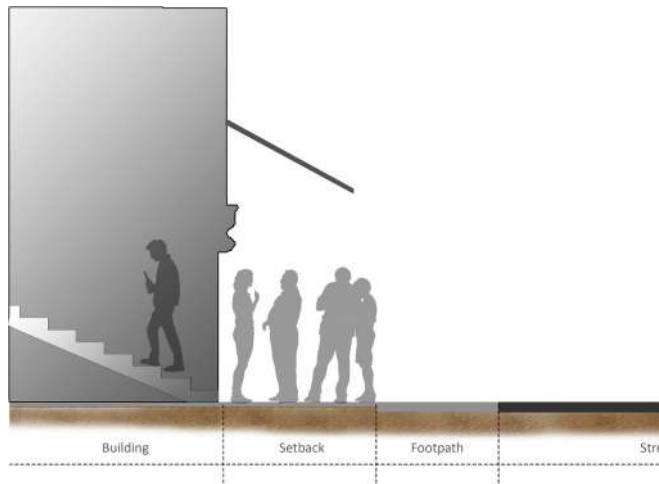
- For Commercial building frontage towards central Avenue, awnings/ temporary projections shall be encouraged within the set back



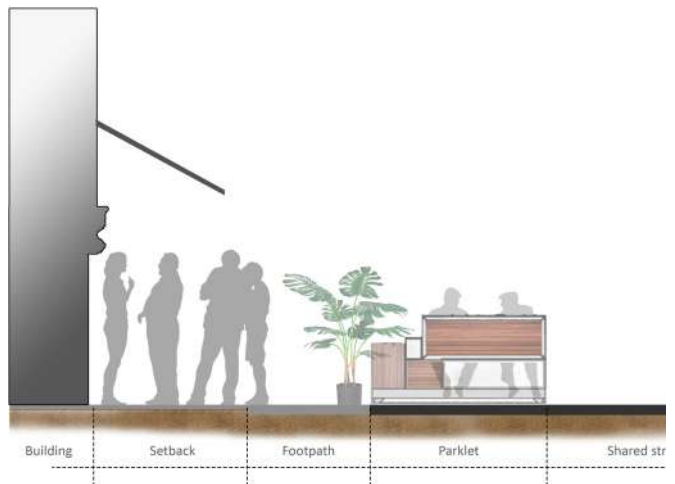
- Outdoor seating within the setback may be extended until the footpath in case the groundfloor use is commercial (cafes and eateries).



- The footpath may be considered as an extension of setback wherever parklets are being proposed.

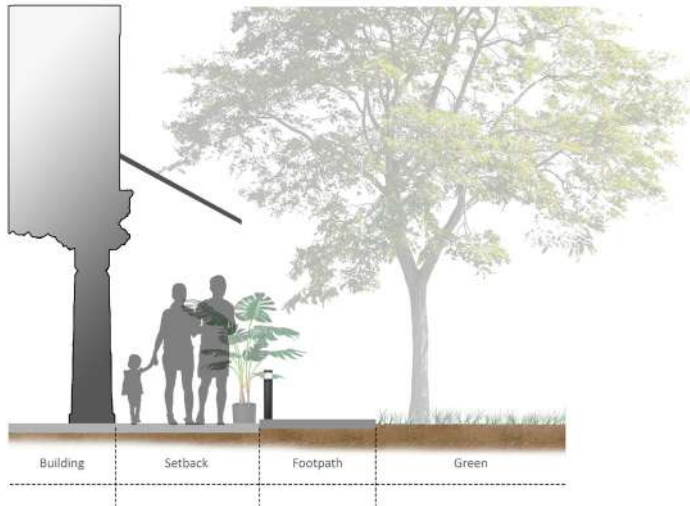


- For Residential frontage along Central Avenue, pedestrian access to such buildings i.e. the staircase shall open up towards central Avenue

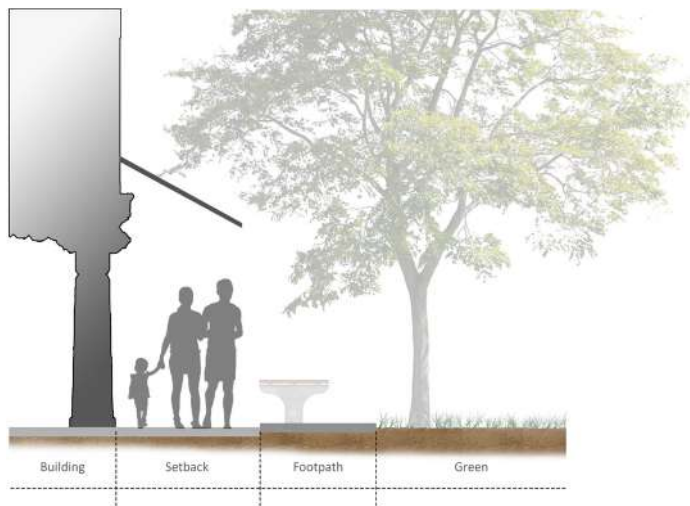


- Plot edges along this Avenue may be defined by potted plants / parklets.

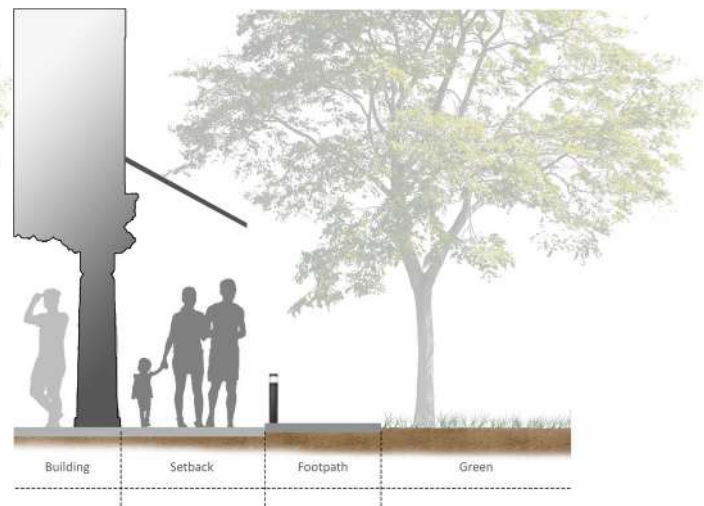
Edge along greens: The edge along the greens shall be kept permeable and interactive in order to promote flow of activities.



- Potted plants may be placed within the plot extent to define plot boundary



- Commercial / retail edges abutting greens may be defined by street furniture within the setback

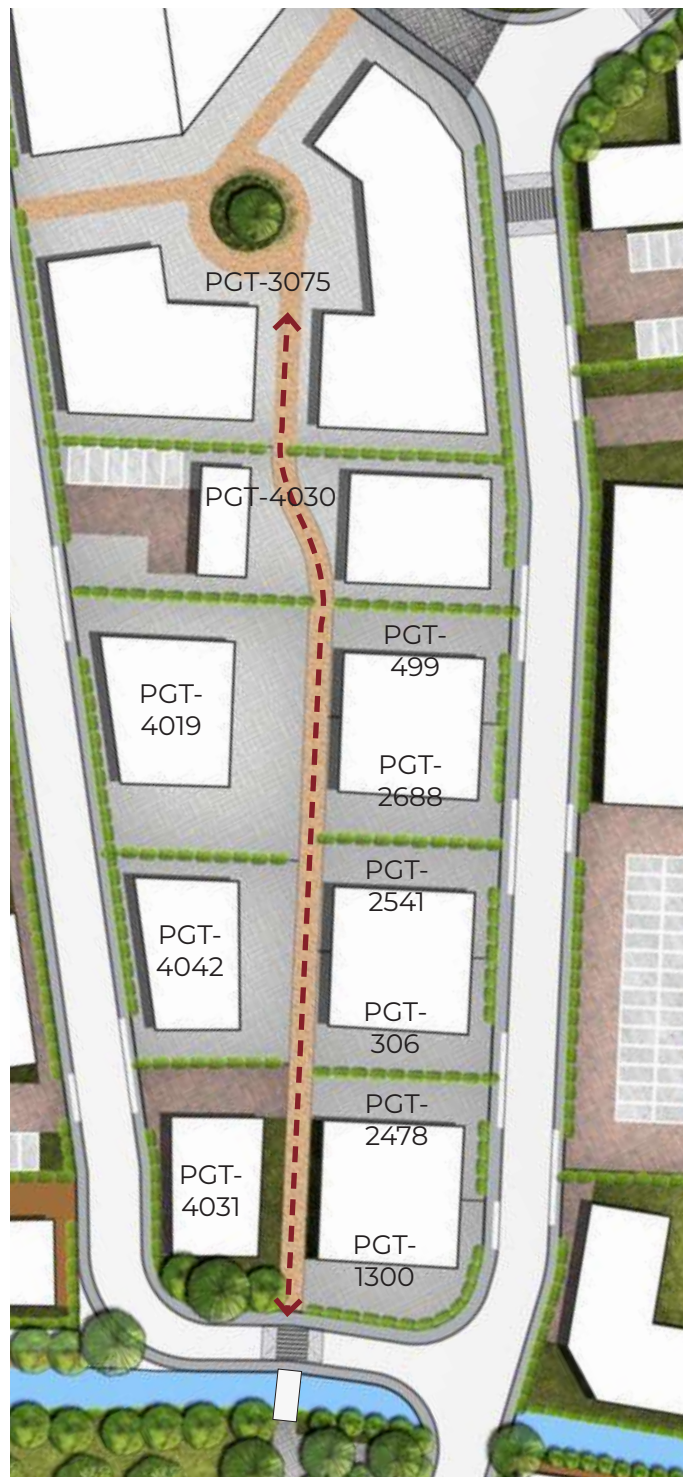


- Bollards shall be designed along the footpath within the public domain





The rear setbacks of plots- PGT- 1300, 2478, 306, 2541, 2688, 499, 4031, 4042 and 4019 to be kept clear for the purpose of 'Office common shared space'. The larger plot PGT- 4030 and 3075 shall have buildforms to allow thoroughfare of pedestrians to the proposed cluster level green in plot NOID 10.

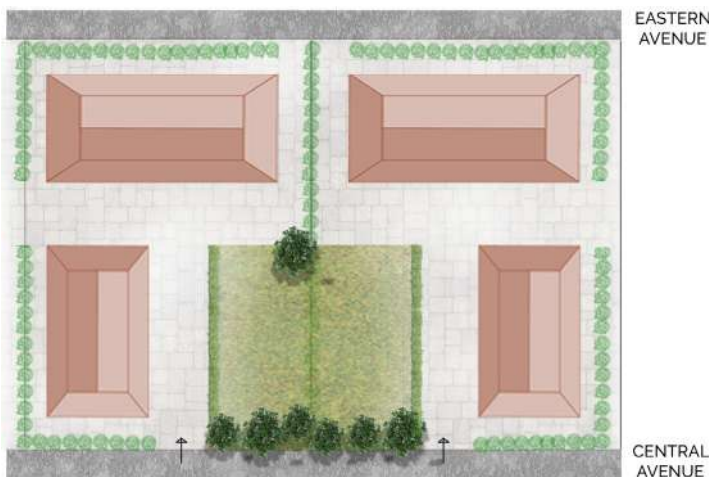


Placement of Green

With respect to site planning, guidelines for planning green areas within plots are based on achieving community cluster setting within varied plot sizes.



For large plot sizes, the greens shall be centrally placed with tree plantation towards the movement corridor in order to buffer the private green.



In case of medium size plots, greens of adjoining plots by be placed with a common edge (as indicated in the masterplan) to create an enclosure for a larger cluster setting.

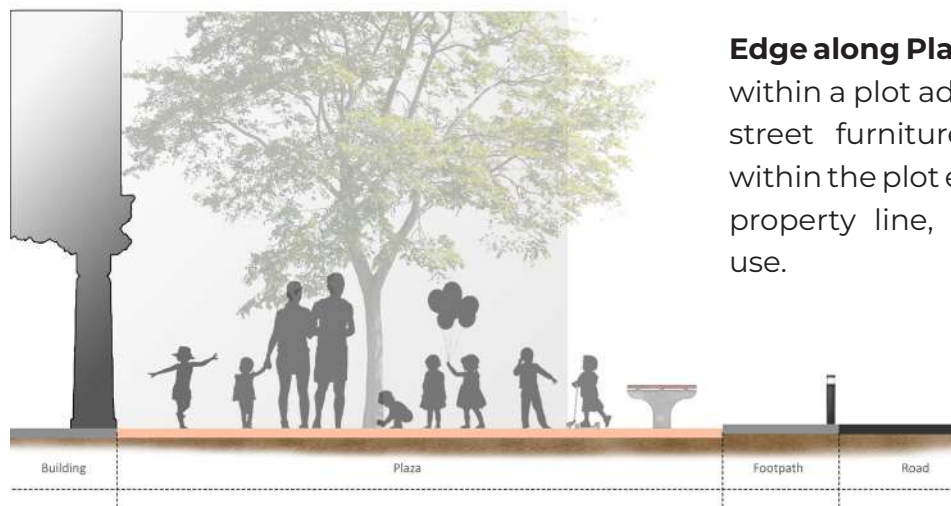
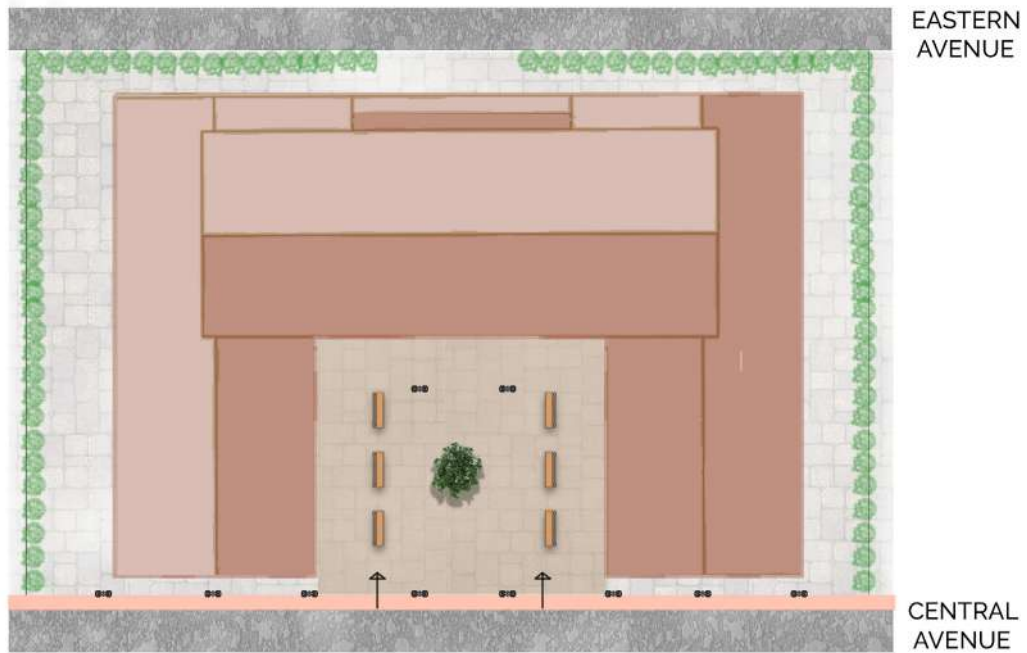
Owing to greater height of built blocks i.e. 8-10 floors, this setting would also facilitate an ideal enclosure quality.



For smaller plots, the private green can adjoin the edge of movement corridor. Potted plants may be placed to define the green edge.

Design of plazas

Plazas may be planned in larger plots surrounded by built form on three sides. It shall be defined by change in paving material and pattern as well as it shall extend up to the footpath.

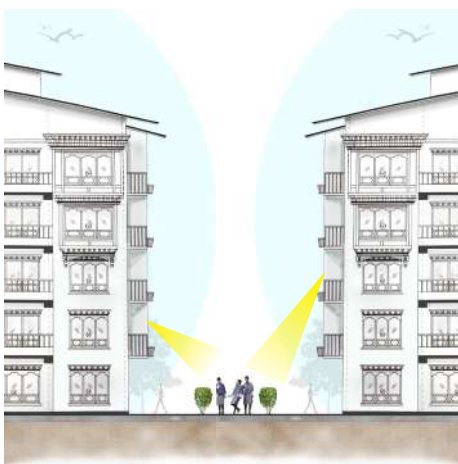


Edge along Plazas: In case a plaza within a plot adjoins the footpath, street furniture can be placed within the plot edge to demarcate property line, enhancing public use.

Building level regulations

Access to building

Given the site's topography and the proposed fill extent, most of the site is relatively flat except the plots along eastern avenue. The building in such areas shall draw access from lower as well as upper ground floor. The same has been depicted in the figure below:



Openings (Eyes on street)

Streets are usually safer for pedestrians. But in cases where the distance between the two buildings is less than 10m, the same edge shall incorporate windows in the building design in order to prevent dark alleys and negative spaces. Extensive visual connectivity between streets and residential units promotes natural surveillance and a sense of safety develops automatically.

Split of uses

It is proposed to have vertical split of uses, meaning lower ground floors of the building can have a certain building use as per the character zone and rest of the floors can be residential. This would create distinct character districts. The proposed uses as per the character zones are as follows:



Character Zone	Primary Uses
1	Commercial, offices, public/ government institutes and any recreational use
2	Residential, commercial, offices, public institution, hotels, parks and transport
3	High density residential along with commercial, offices, educational institute, public institute and parks
4	Residential, commercial, offices, educational institute, public institution, hotels, parks and transport
5	Low density residential along with commercial, offices, educational institute, public institute and parks.
6	Small and large scale hotels, resorts, convention centers, recreational facilities supported by some residential and basic commercial facilities.

Note: These are predominant uses proposed to build character districts and are not madatory. The DCR as per Structure plan and Local Area Plan prevails.

Building elements

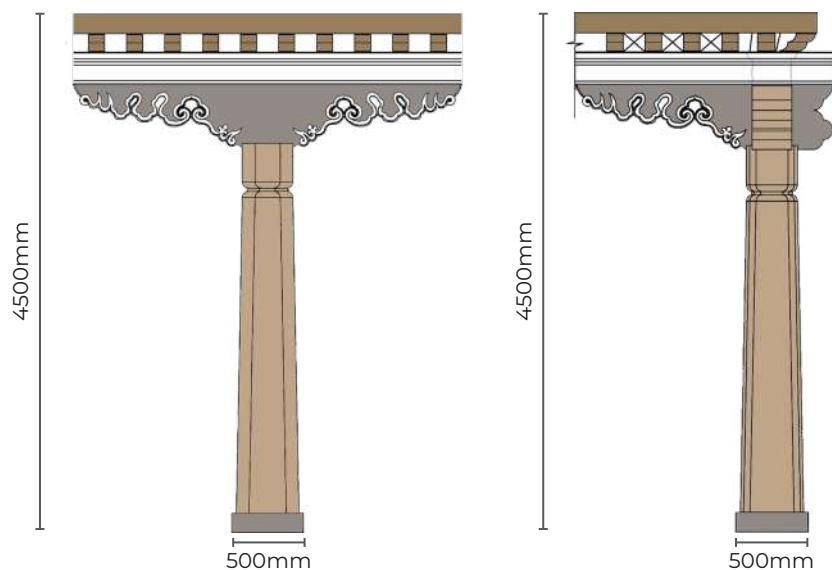
The various traditional Architectural elements/components covered in this section are:

1. Kachens
2. Payab windows
3. Rabsel windows
4. Cornices (Bogh, Cham, Phana, etc)
5. Roofs

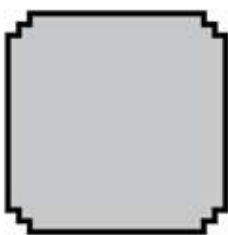
Kachens

Though the Kachen size in RCC buildings is governed by the structural requirements, the recommended sizes for RCC Kachen proportionate to the heights shall be as follows:

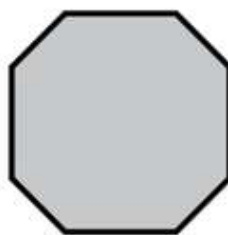
- For height 3.5 – 4 m; recommended size 400 – 500 mm
- For heights greater than 4 m; minimum size 500 mm as illustrated



The different shapes of Kachens which may be used are as illustrated below. However, other shapes which can be used are not limited to the ones illustrated.



Twelve cornered Kachen



Octagonal Kachen

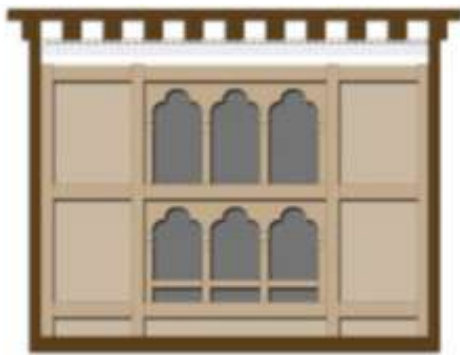


Square Kachen

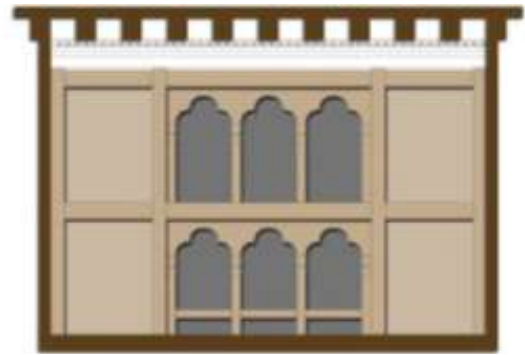
Payab Windows

- Minimum required elements of a Payab window are Pem, Zumchu, Bogh and Zangshing/Salen. Dhung shall be optional for commercial and residential buildings.
- If Pem-Choetse is used all around the Payab, Zumchu shall be provided instead of Dhung.
- All types of Rabsel window can be used as Payab either with or without Shamig.
- Payab windows shall never project out of the wall.

The recommended Payab hierarchy in descending order of appearance in facades is as follows:



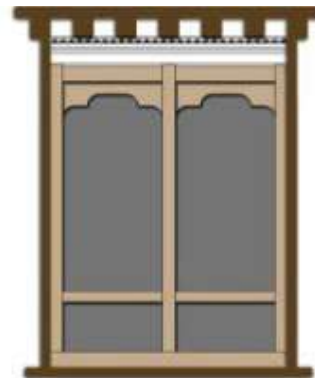
Payab with Shamig and Thrangcho



Payab with Shamig without Thrangcho



Payab with Thrangcho



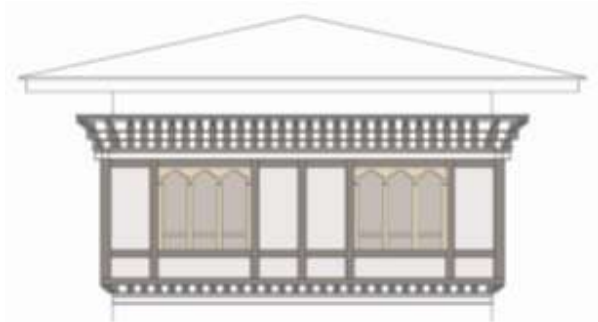
Payab without Thrangcho



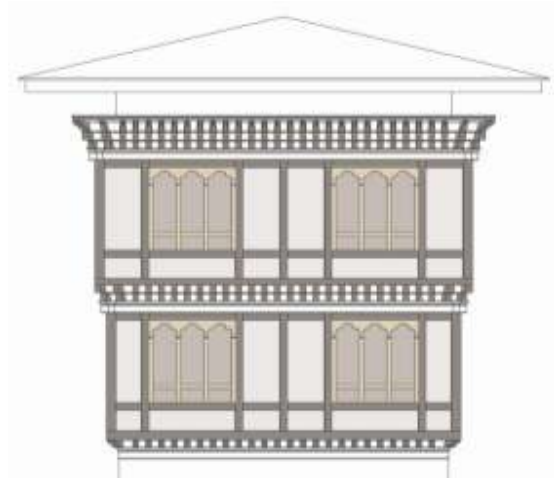
Gedkar Payab is usually the lowest in hierarchy

Rabsel Window

- Rabsel projections and Thobthang of cornices shall depend on whether it is single, double or triple tiered.
- When a Rabsel is provided either on the whole facade (Go-Cham Rabsel) or partial (Lobur Rabsel) of the building, the cornice on the top should be turned and continued till the face of the masonry wall. The top cornice of the Rabsel should not be terminated abruptly. Side elevation of Rabsel should also be treated properly.
- It is recommended to have a Rabsel with all the elements for the topmost floor of all commercial and institutional multi storey buildings.
- The Go-cham Rabsel for multi storied buildings may be single or double ONLY.

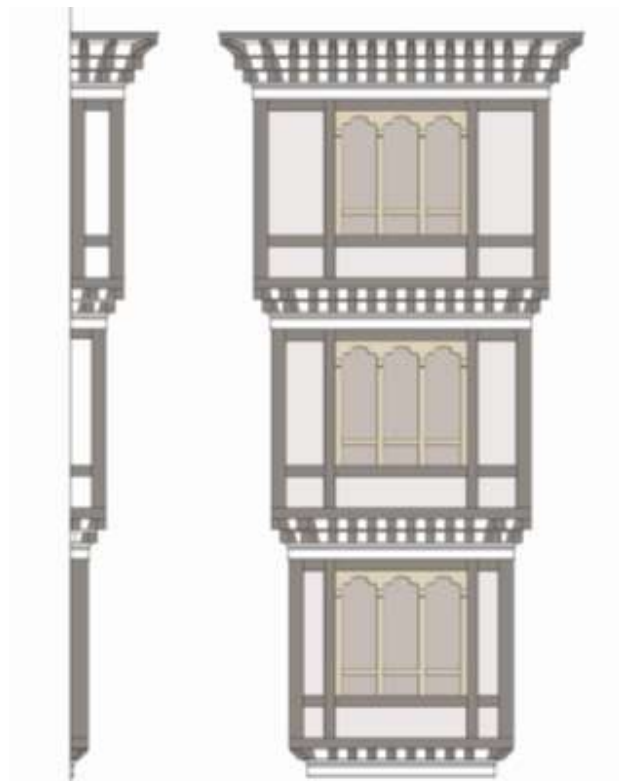


Single tiered Go-cham
Rabsel



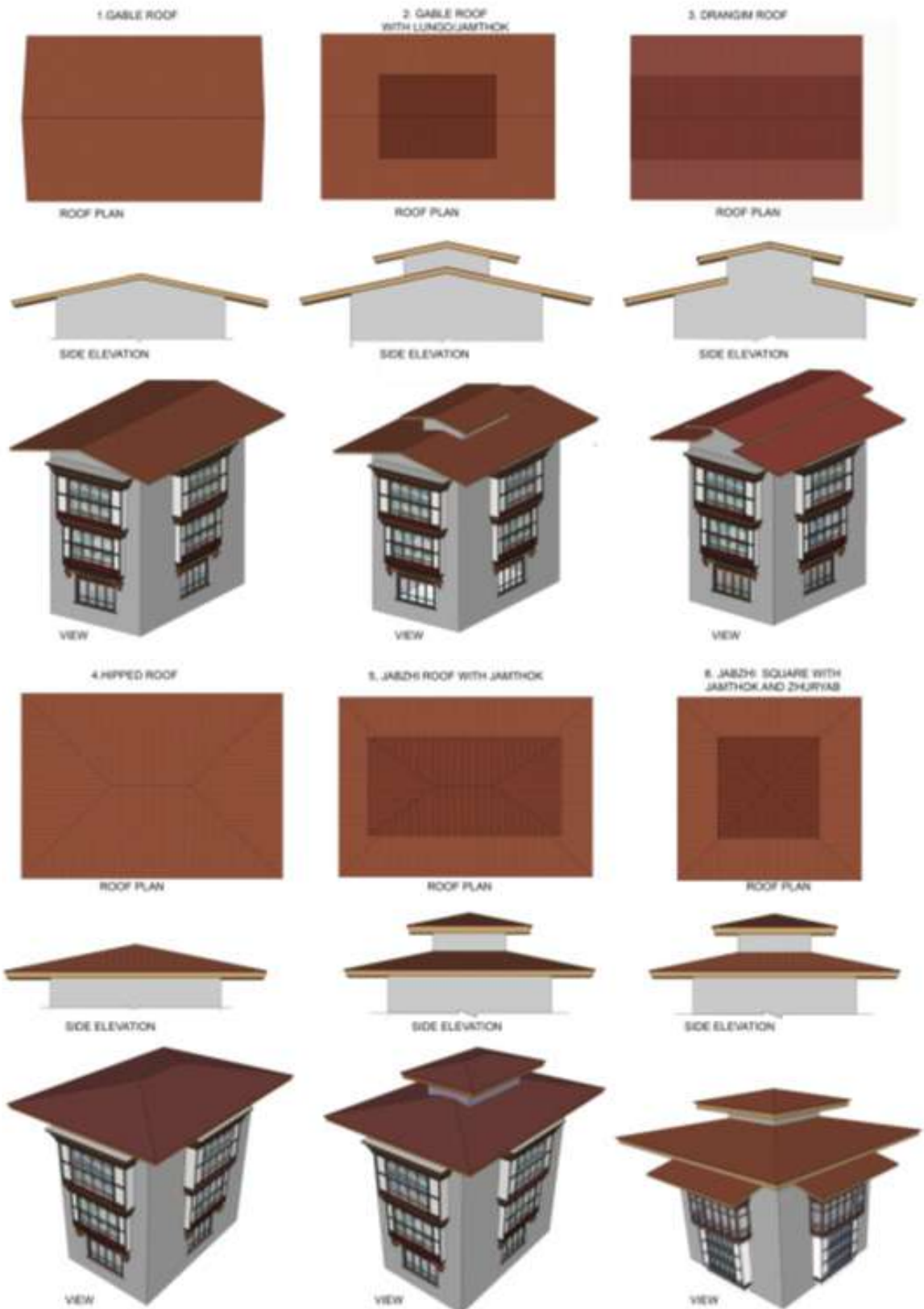
Double tiered Go-cham
Rabsel

The Lobur Rabsel for multi-storeyed buildings shall not be more than 3 tiers



Roofs

The roof is one the most predominant structures of any building in Bhutan. The profile, slope, overhang and height are important aspects of roof design. The most common types of roofs used for institutional, commercial and residential buildings only, are shown below. Jamthog, if used as a usable floor, should be considered as a built up space and calculated under FAR



The Architect of record to propose overhang in proportion to the number of floors and as per the allowable setbacks.

The overhang dimensions recommended are:

- Minimum 1200 mm from wall for single storey buildings.
- Minimum of 1500mm from face of the Rabtsel wall for two storey buildings.
- Minimum of 1800 mm from face of topmost Rabtsel wall for buildings more than 2 storeys.

Recommendations of minimum architectural elements:

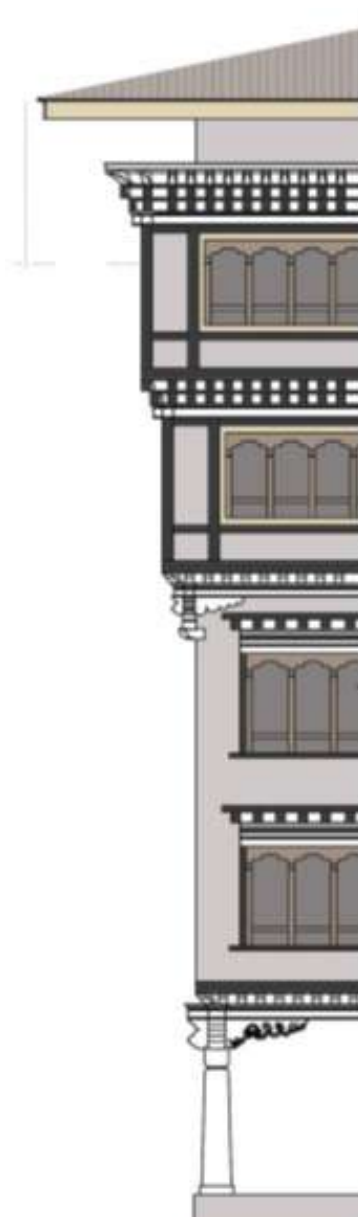
1. For one storey structures:

- Roofing: Gable or Hip
- Openings: Payab; Payab Gedkar;
- Kachen if incorporated must be with all necessary elements/Thobthang;

2. For Two or more storey structures:

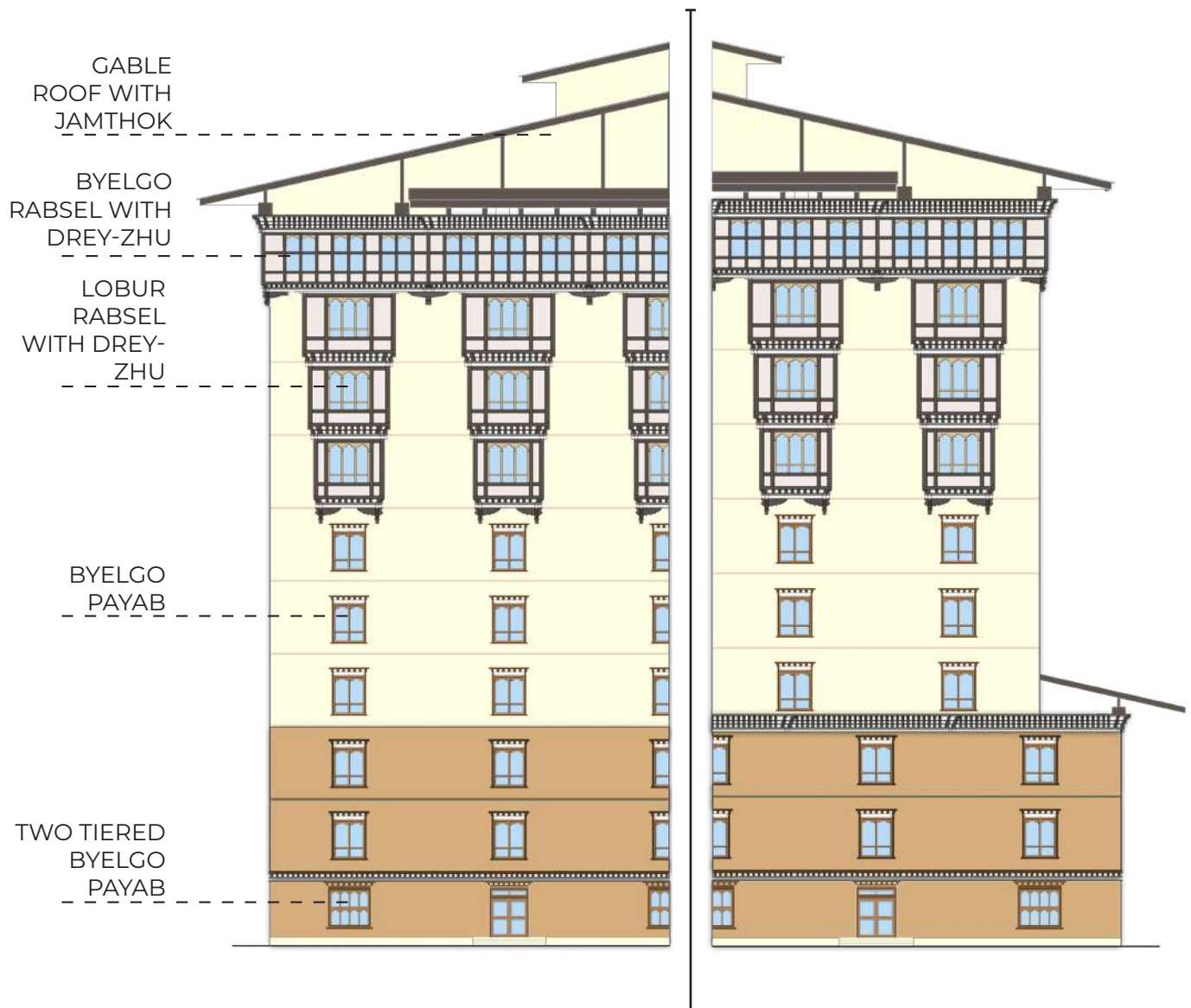
- Roofing: Gable, Hip, Jamthok, Lungo
- Openings: Rabtsel on top floor; Payab windows on lower floors; Gedkar windows can be used;
- Kachen if incorporated must be with all necessary elements/Thobthang.

The above recommended architectural elements should be there on the facades facing road or community/public spaces. If the clients/designers desire more appropriate details (Rab & Ding) could be incorporated. However traditional architectural elements which has religious connotation such as Keymar, Gyeltshen and Sertog are discouraged.



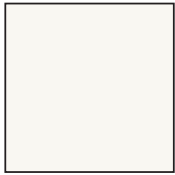
Highrise buildings

With growing demand for development and lack of area, it is envisioned that the town will grow vertically resulting in increased number of floors. Keeping that into consideration, the following illustration describes the architectural elements for buildings with 7 and more floors to maintain the sanctity of the unique and celebrated Bhutanese architecture.

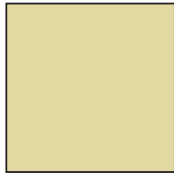


Building Colour

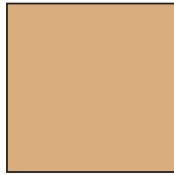
Colour plays a vital role in Bhutanese landscape as it generates a specific visual quality, forming the valley's image and rendering it an identity. As wetlands comprise a large part of the landscape, variation in colour in landscape due paddy harvest as well as seasonal change in colour alters the perceivable image of towns.



White



Cream Color

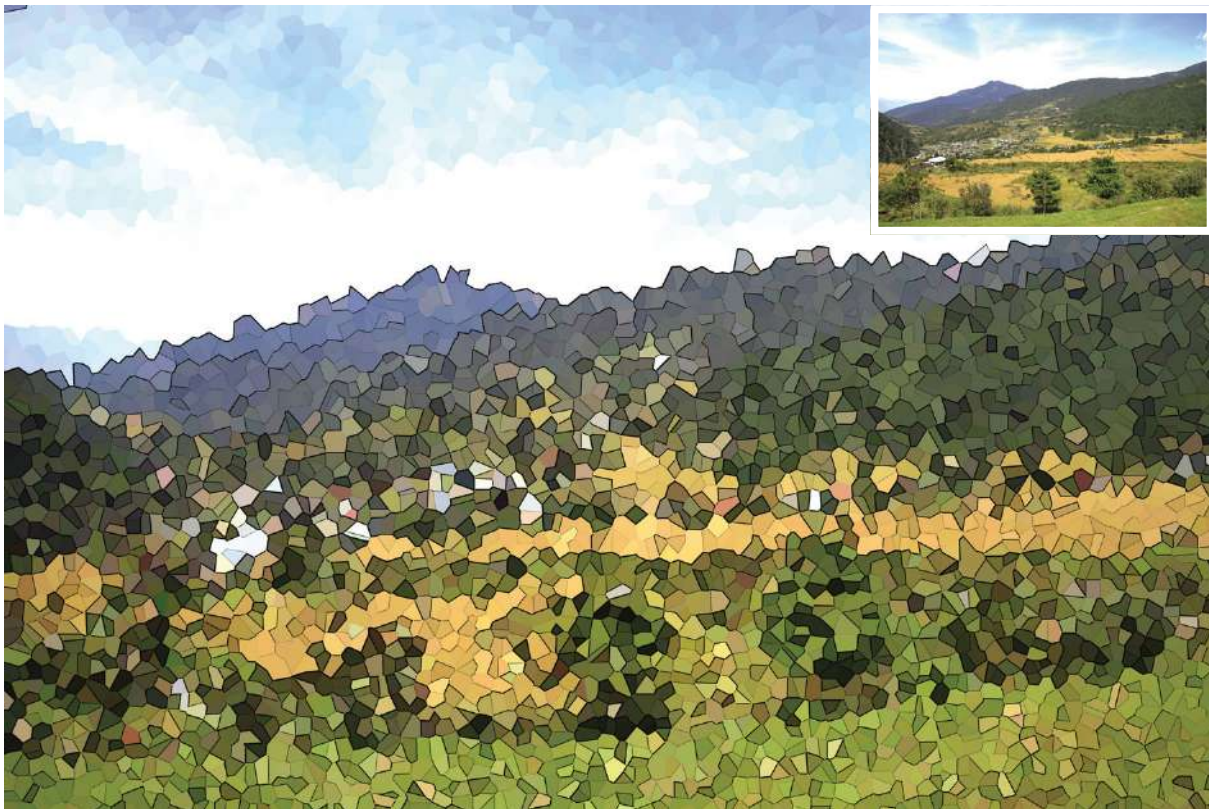


Mud Color



Exposed stone masonry with its natural color depending on the stone and masonry type without any plaster

Building colors as prescribed by the Building Color Code of Bhutan 2014.

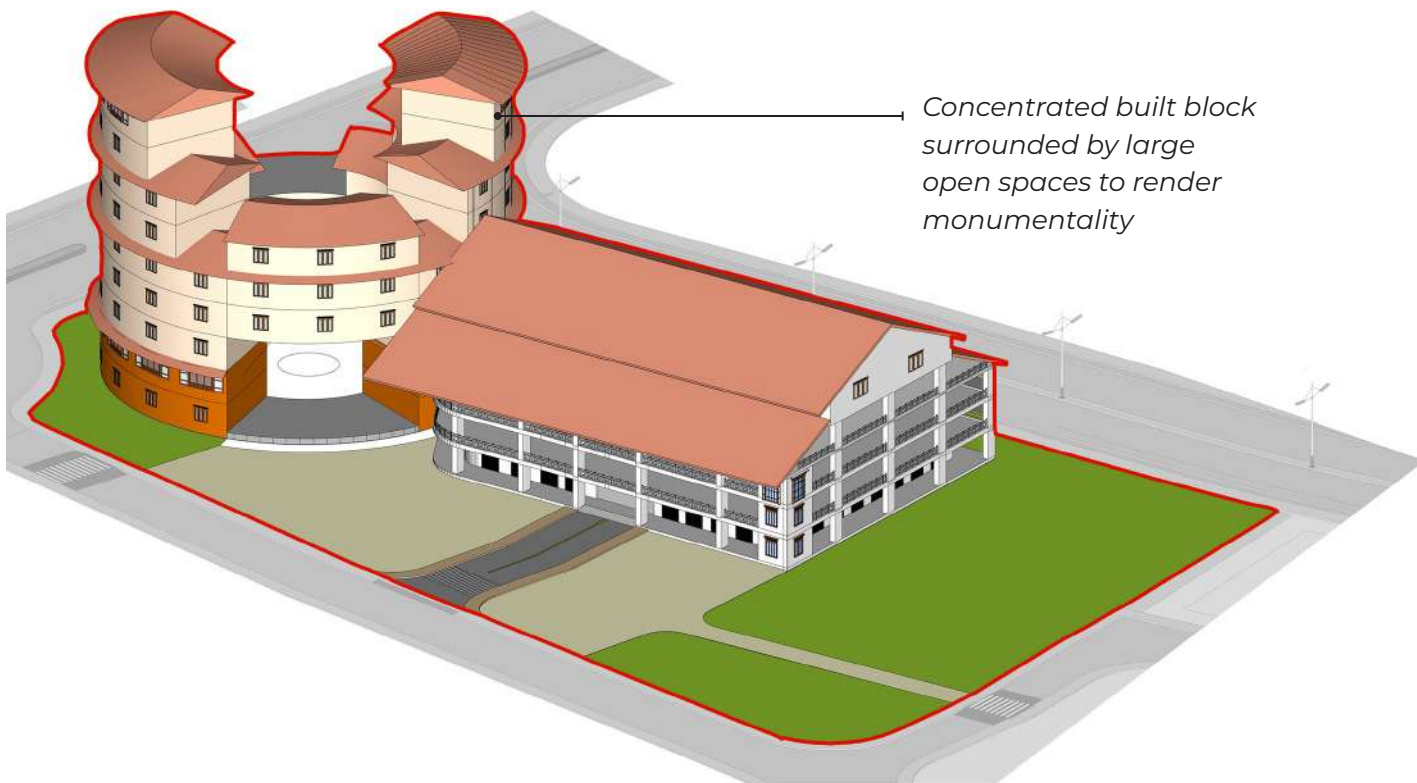


Color palette deriving inspiration from the immediate environment, harmoniously blends the building with the landscape.

Building Typology

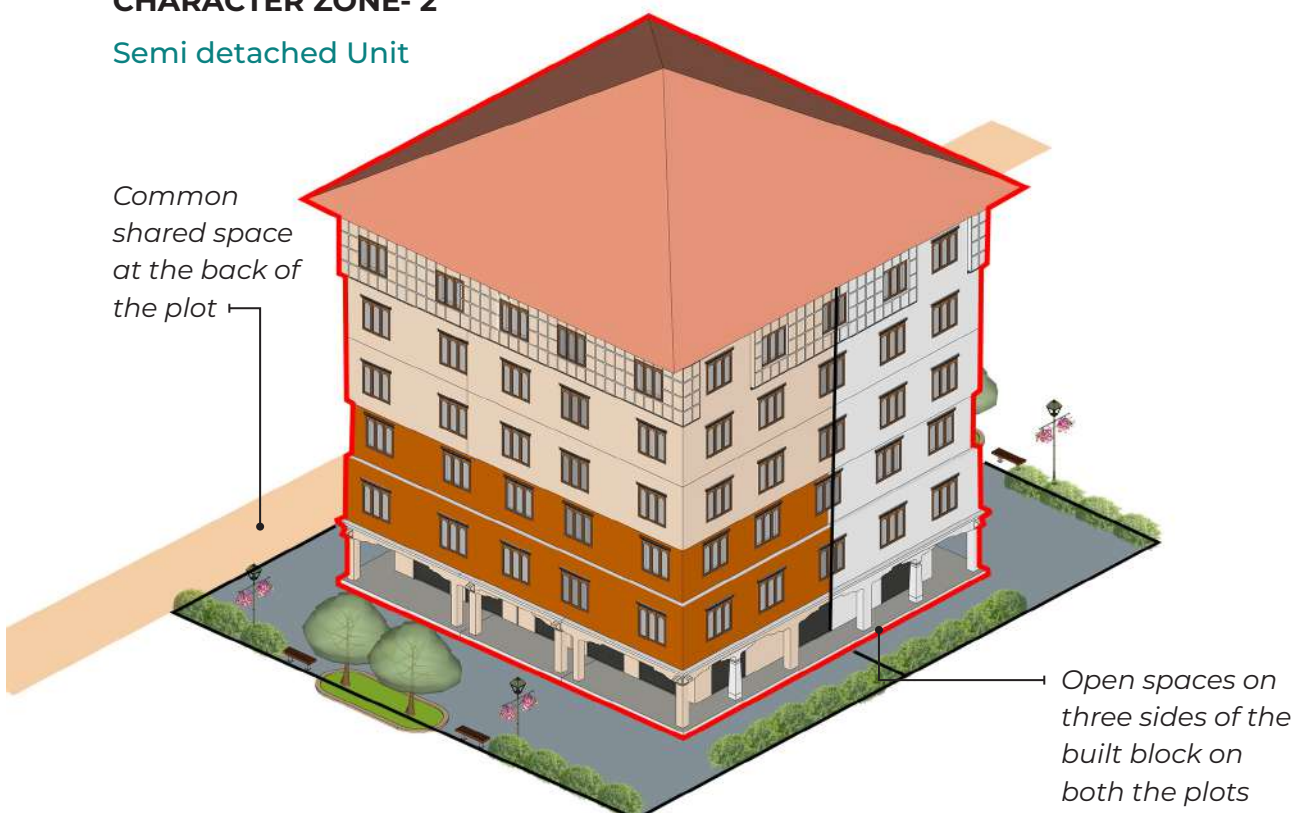
CHARACTER ZONE- 1

Public building – monumental built form



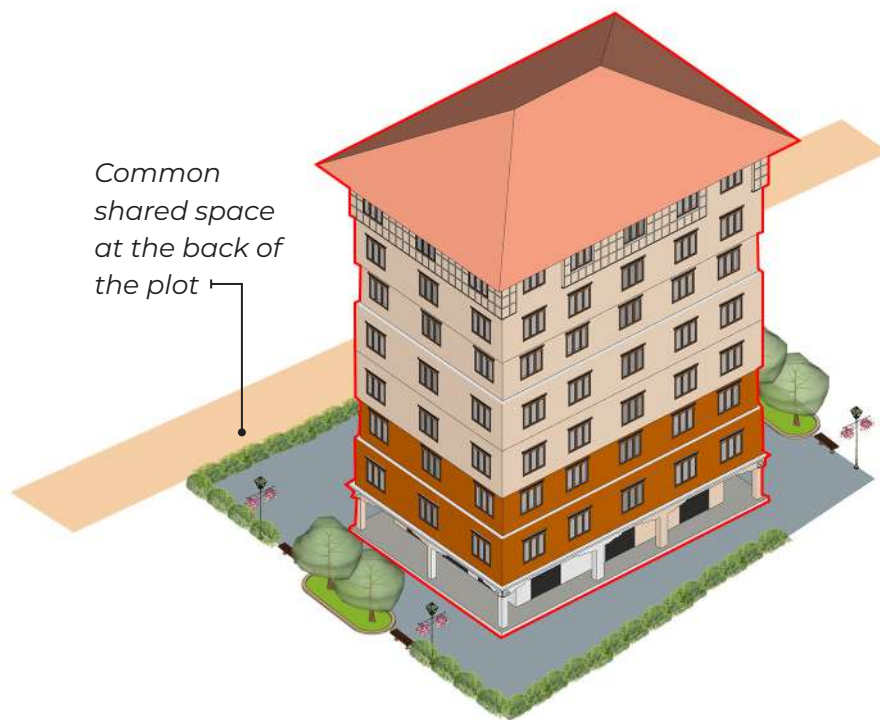
CHARACTER ZONE- 2

Semi detached Unit



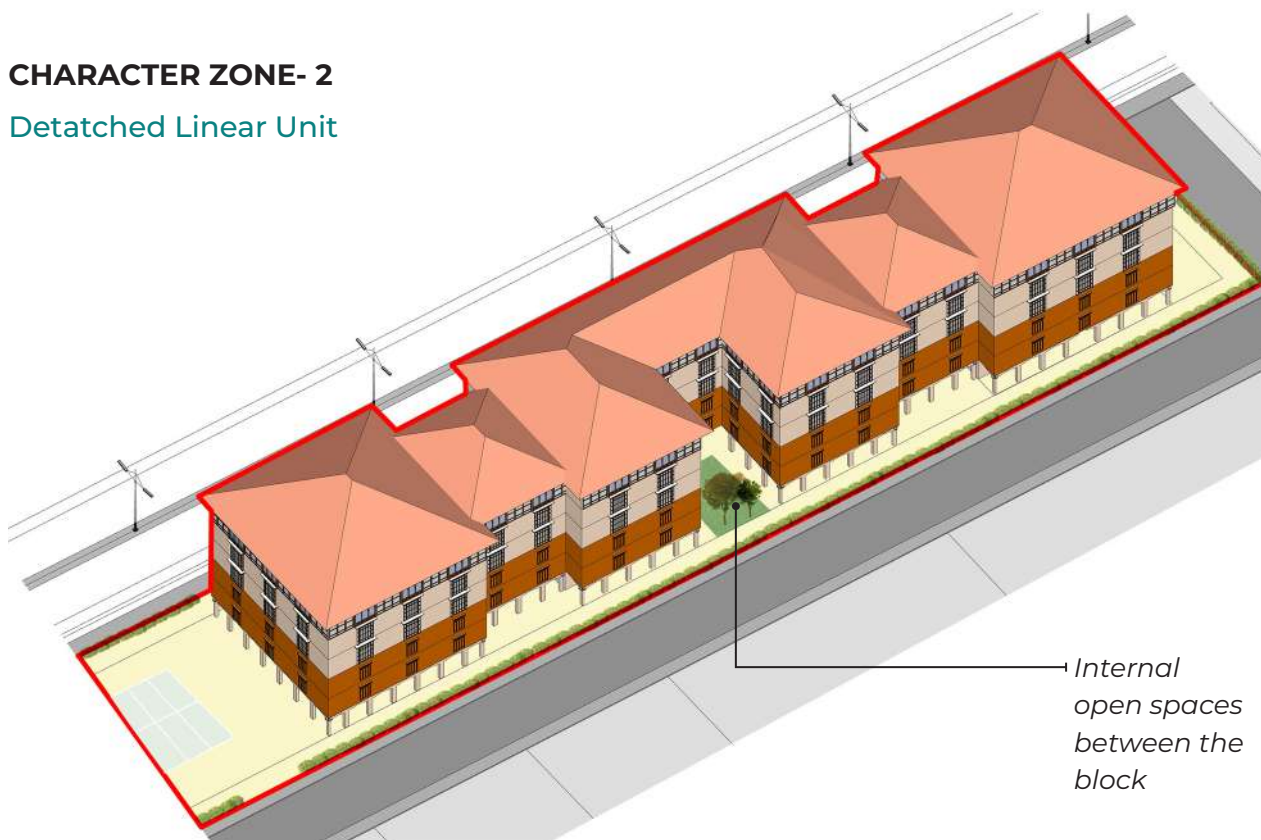
CHARACTER ZONE- 2

Detached Unit



CHARACTER ZONE- 2

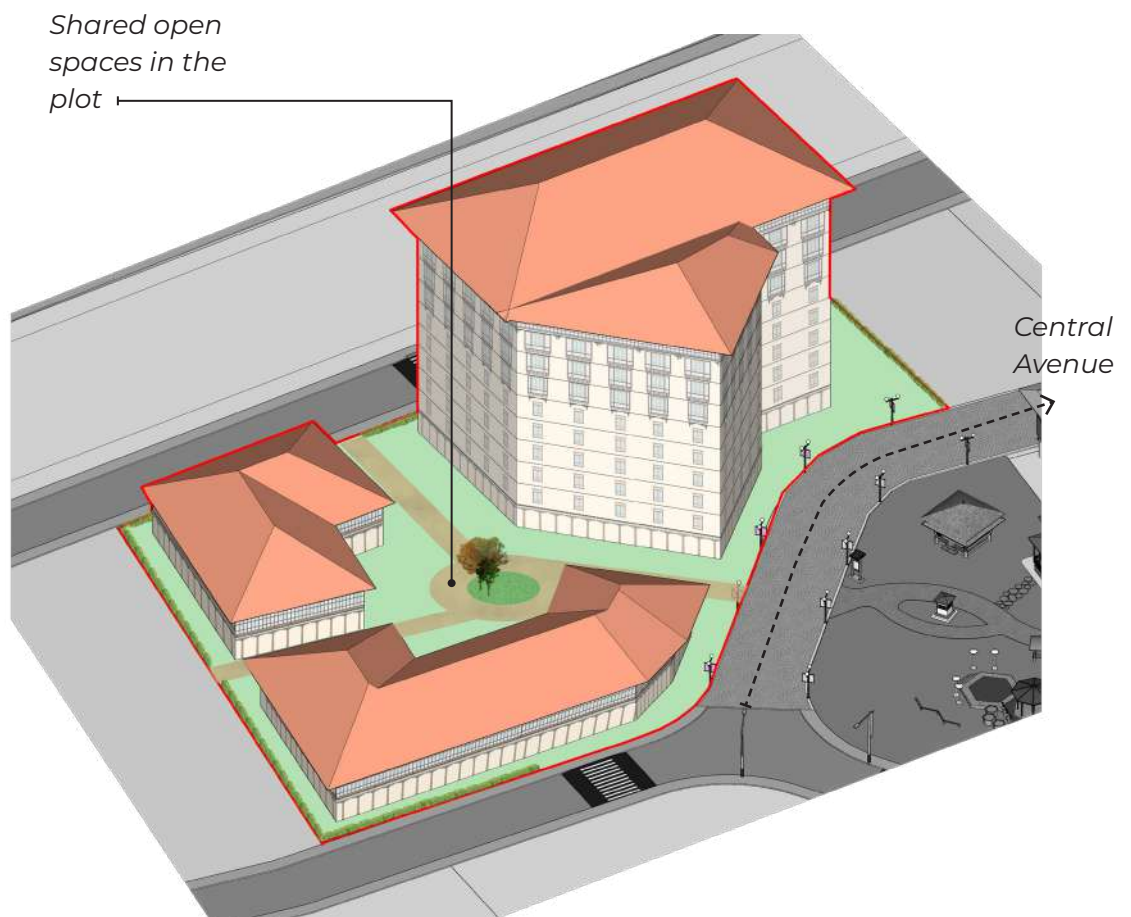
Detached Linear Unit



CHARACTER ZONE- 2

Special Plaza Plot

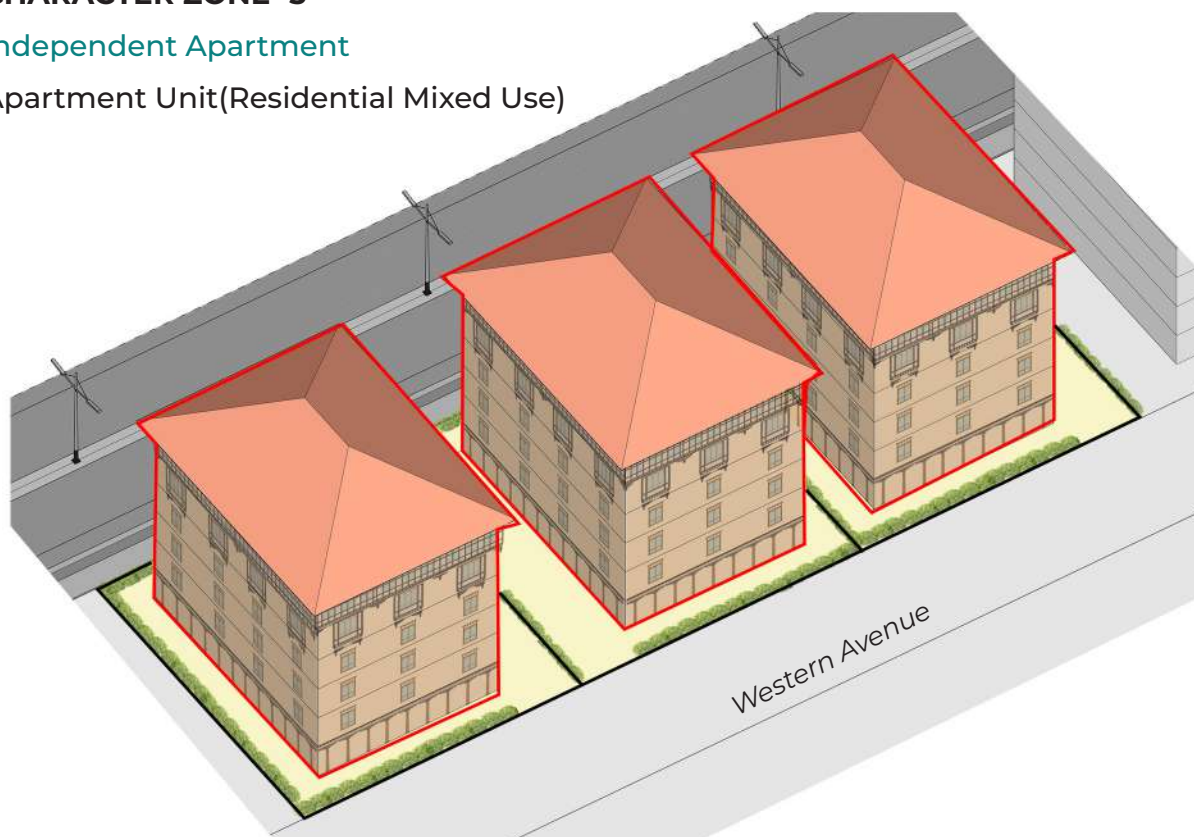
Plot number PGT-3075 Has been treated as special Plaza Plot where the built-up may be planned in a manner to concentrate mass within the northern parcel within the plot, whereas the remaining built up may form a G+1 structure surrounding the plaza space as suggestive in the illustration. The planned plaza may link pedestrian route in three directions.



CHARACTER ZONE- 3

Independent Apartment

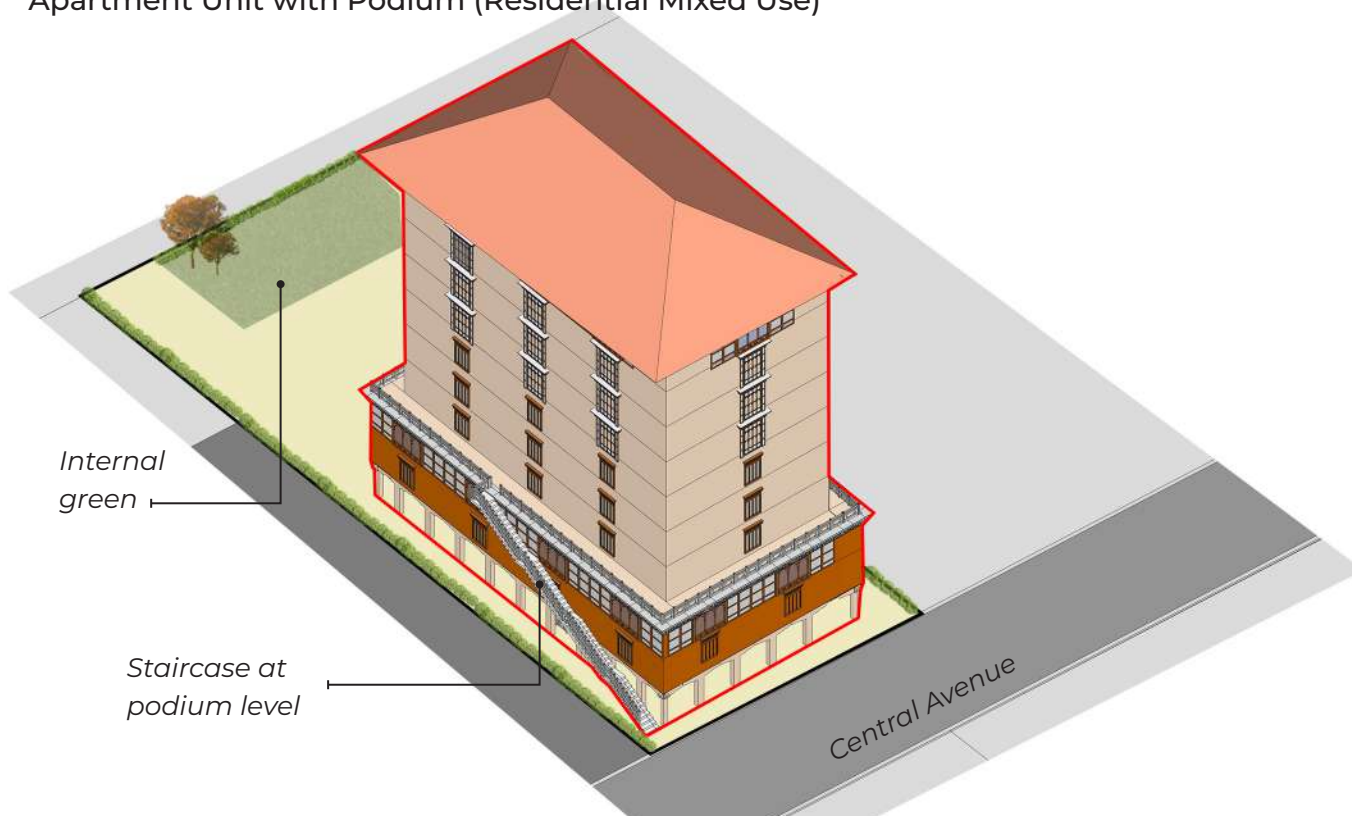
Apartment Unit(Residential Mixed Use)



CHARACTER ZONE- 3

Independent Apartment

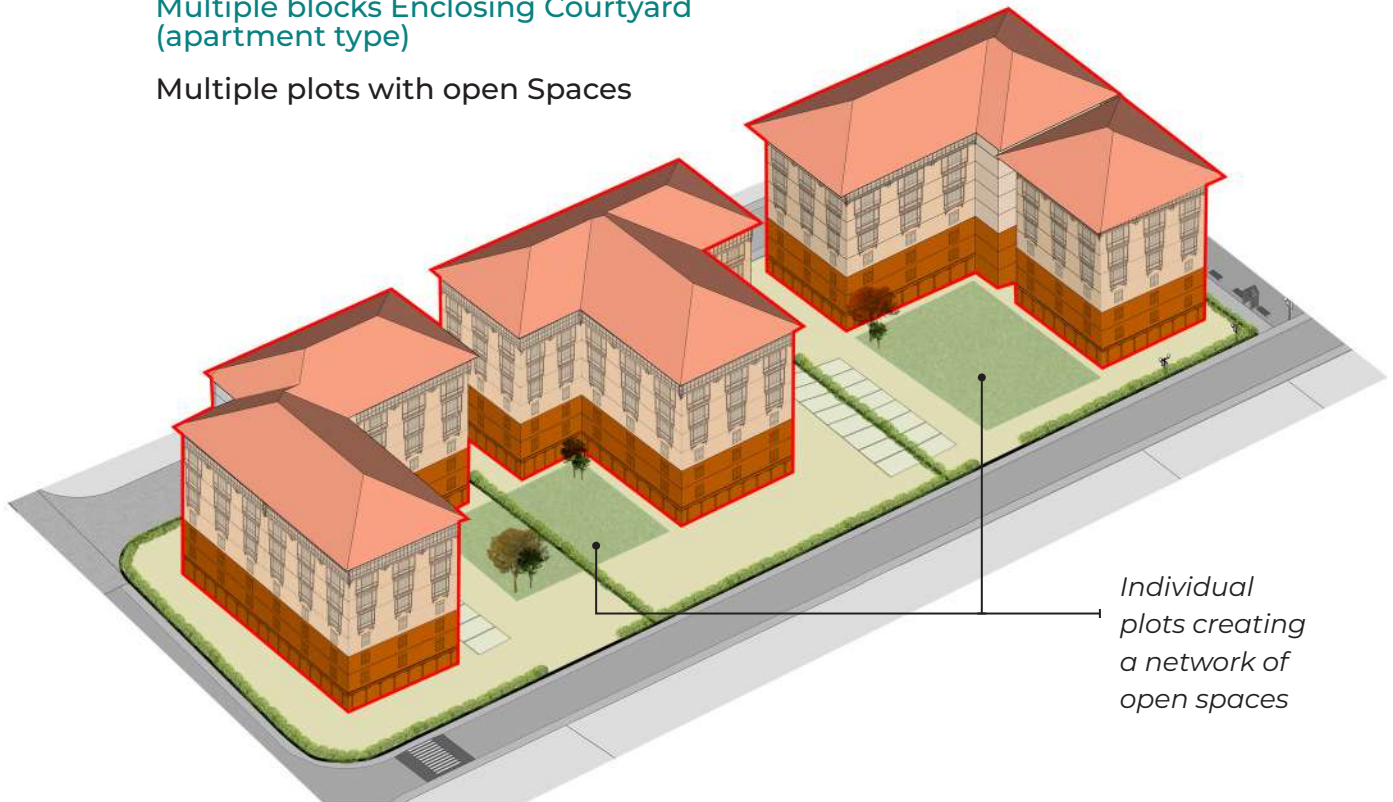
Apartment Unit with Podium (Residential Mixed Use)



CHARACTER ZONE- 3

Multiple blocks Enclosing Courtyard
(apartment type)

Multiple plots with open Spaces

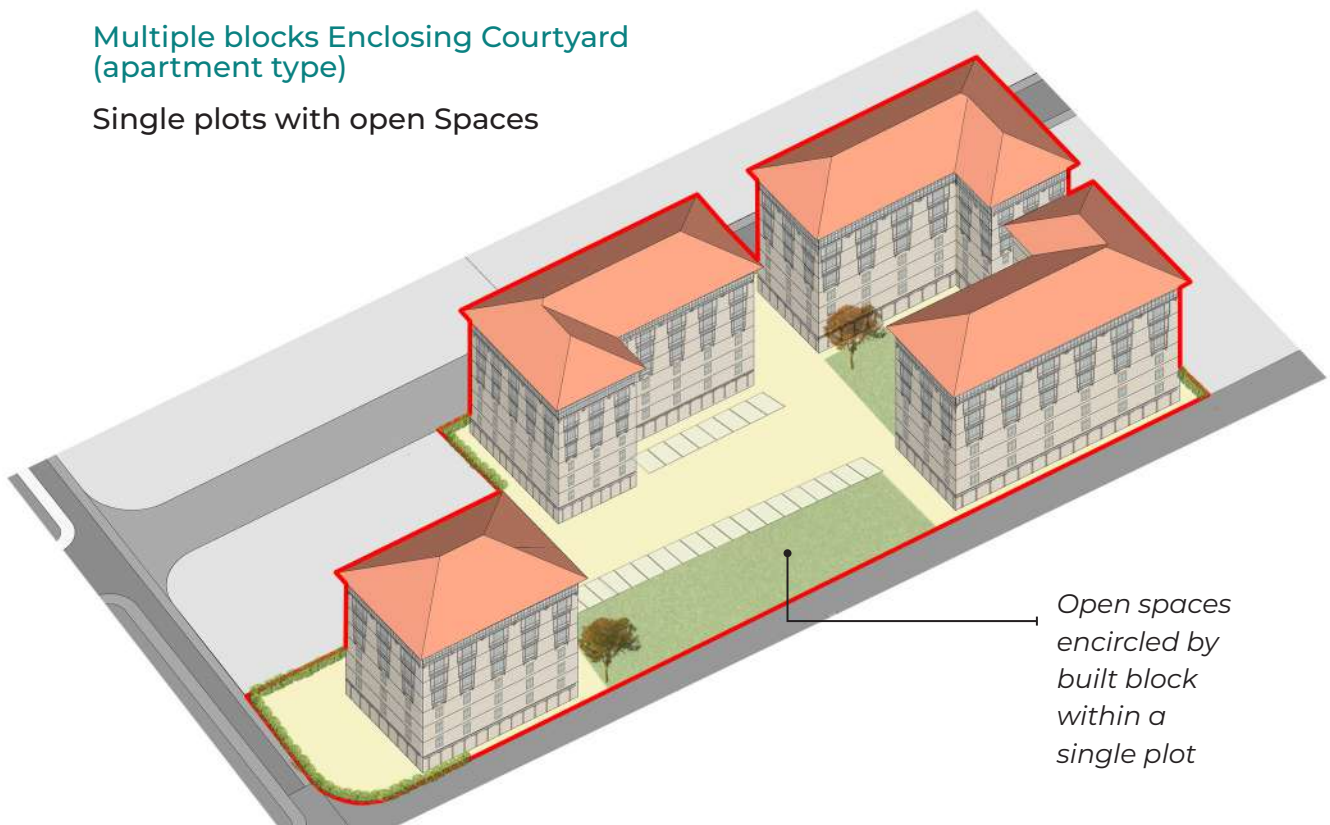


Individual plots creating a network of open spaces

CHARACTER ZONE- 3

Multiple blocks Enclosing Courtyard
(apartment type)

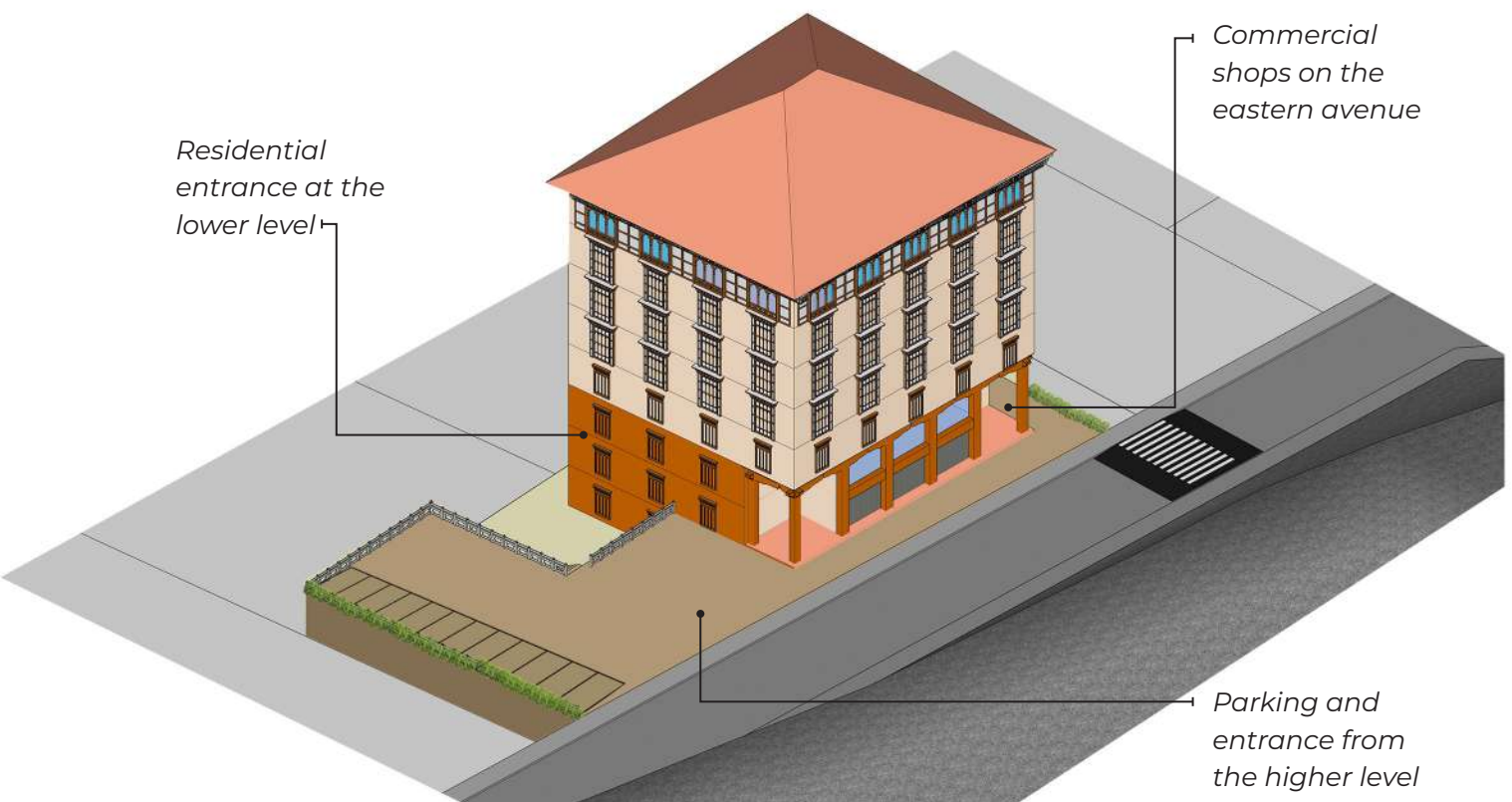
Single plots with open Spaces



Open spaces encircled by built block within a single plot

CHARACTER ZONE- 3

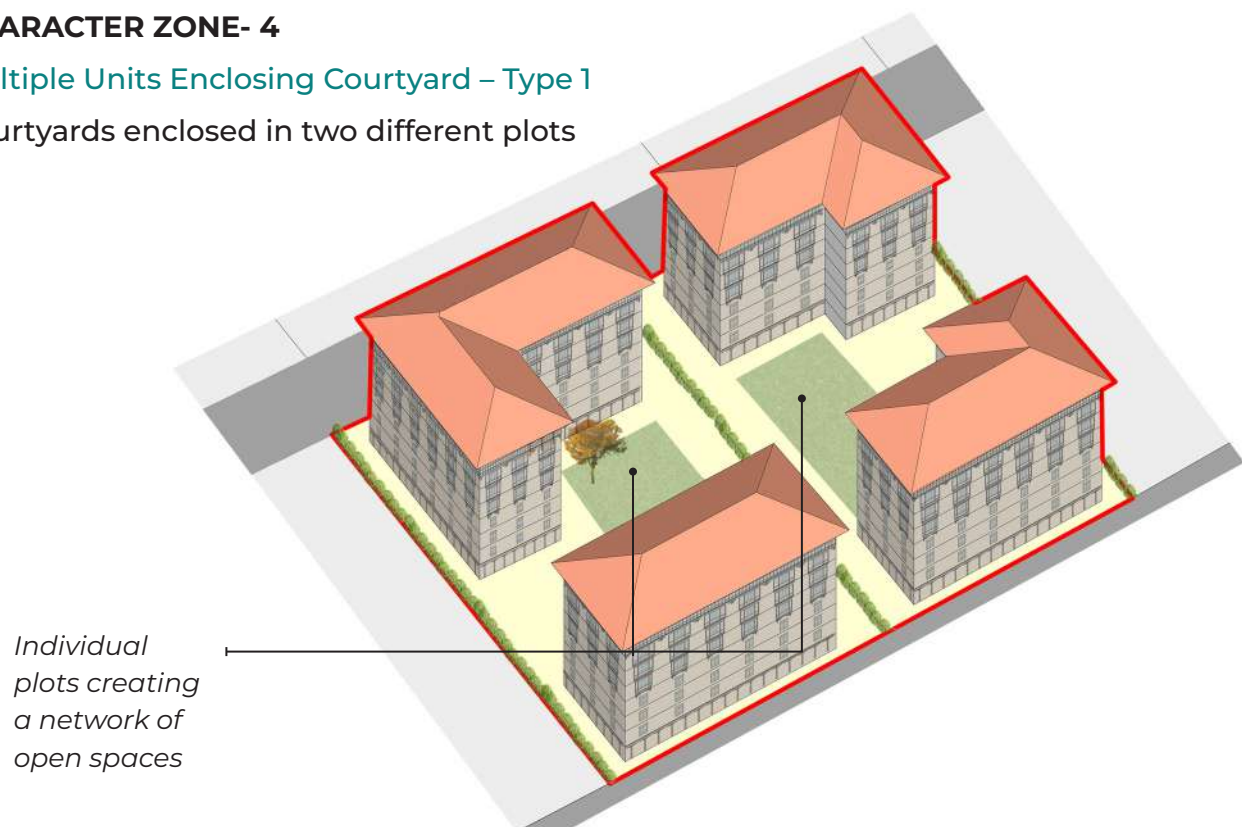
Single Unit with level difference (Vertical Mixed Use)



CHARACTER ZONE- 4

Multiple Units Enclosing Courtyard – Type 1

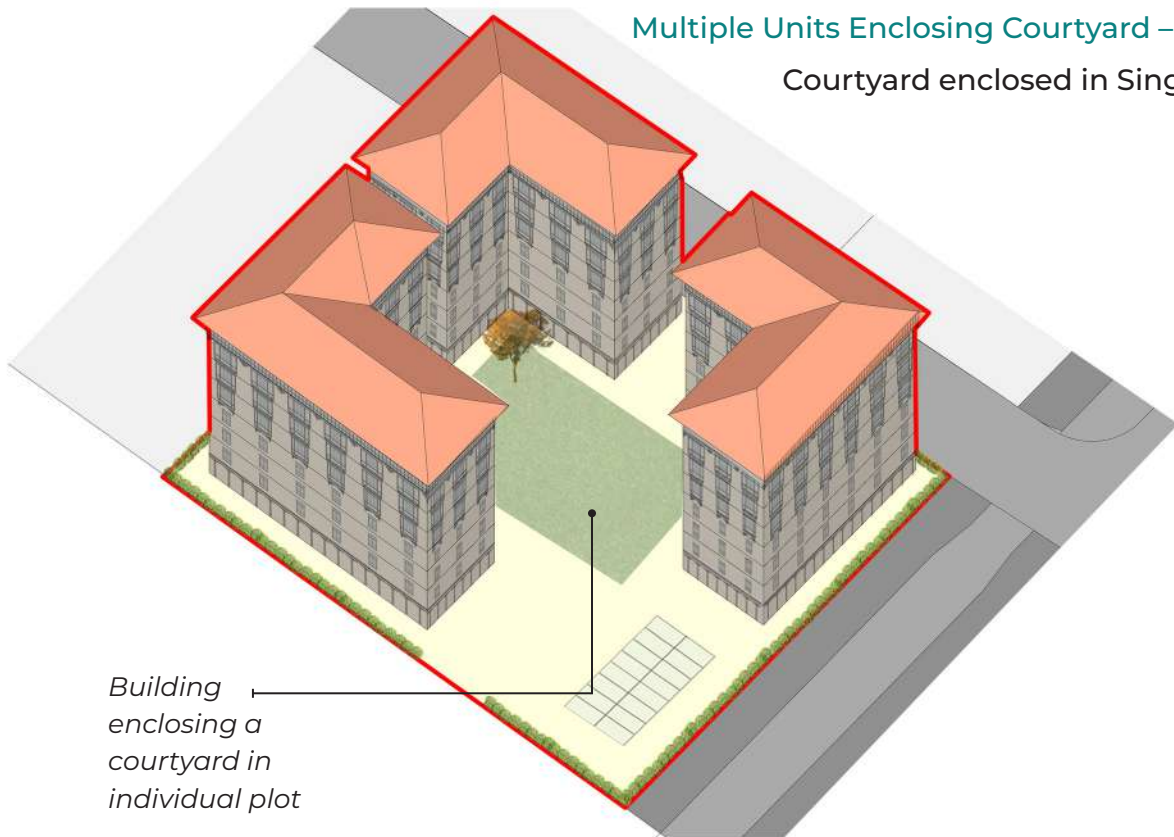
Courtyards enclosed in two different plots



CHARACTER ZONE- 4

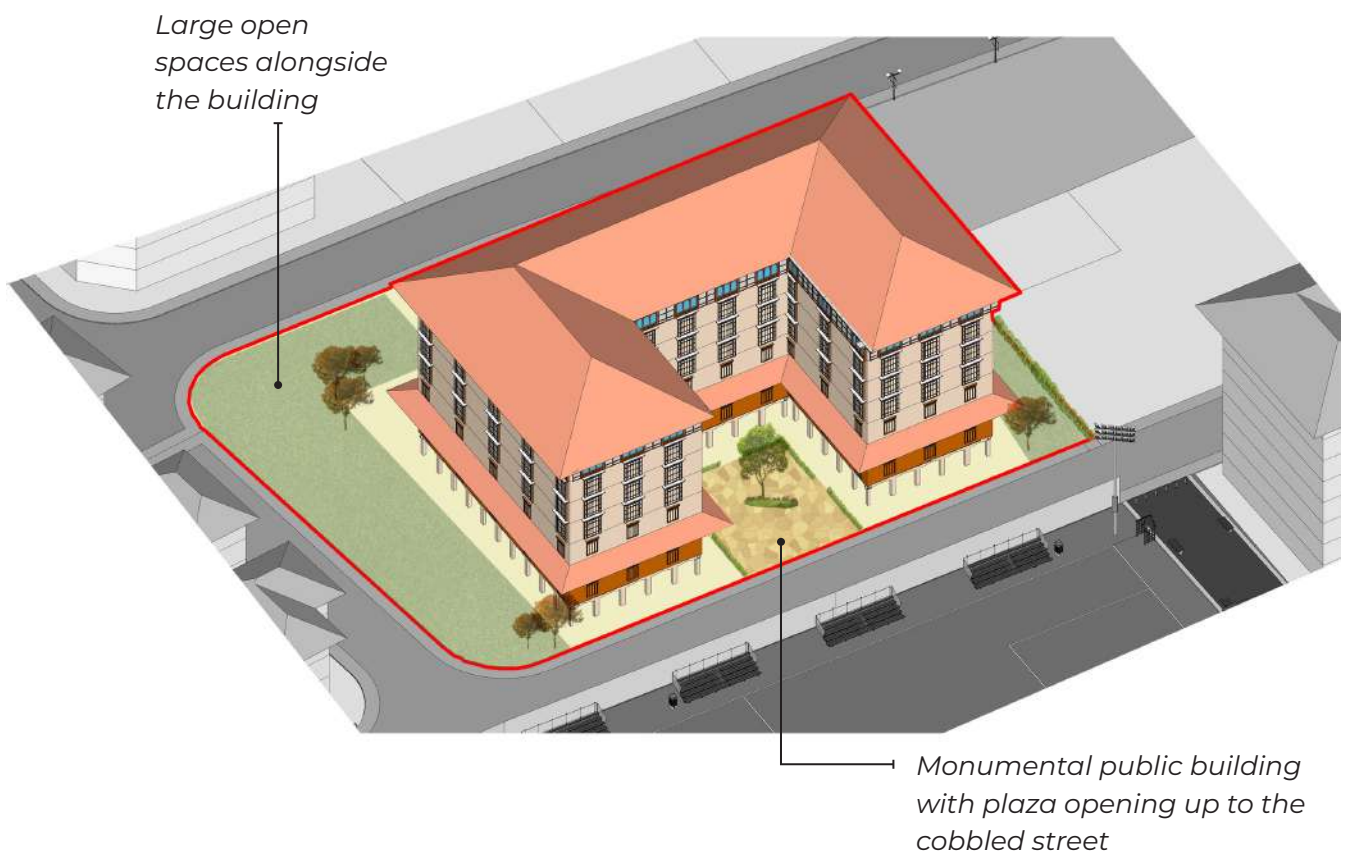
Multiple Units Enclosing Courtyard – Type 2

Courtyard enclosed in Single plot



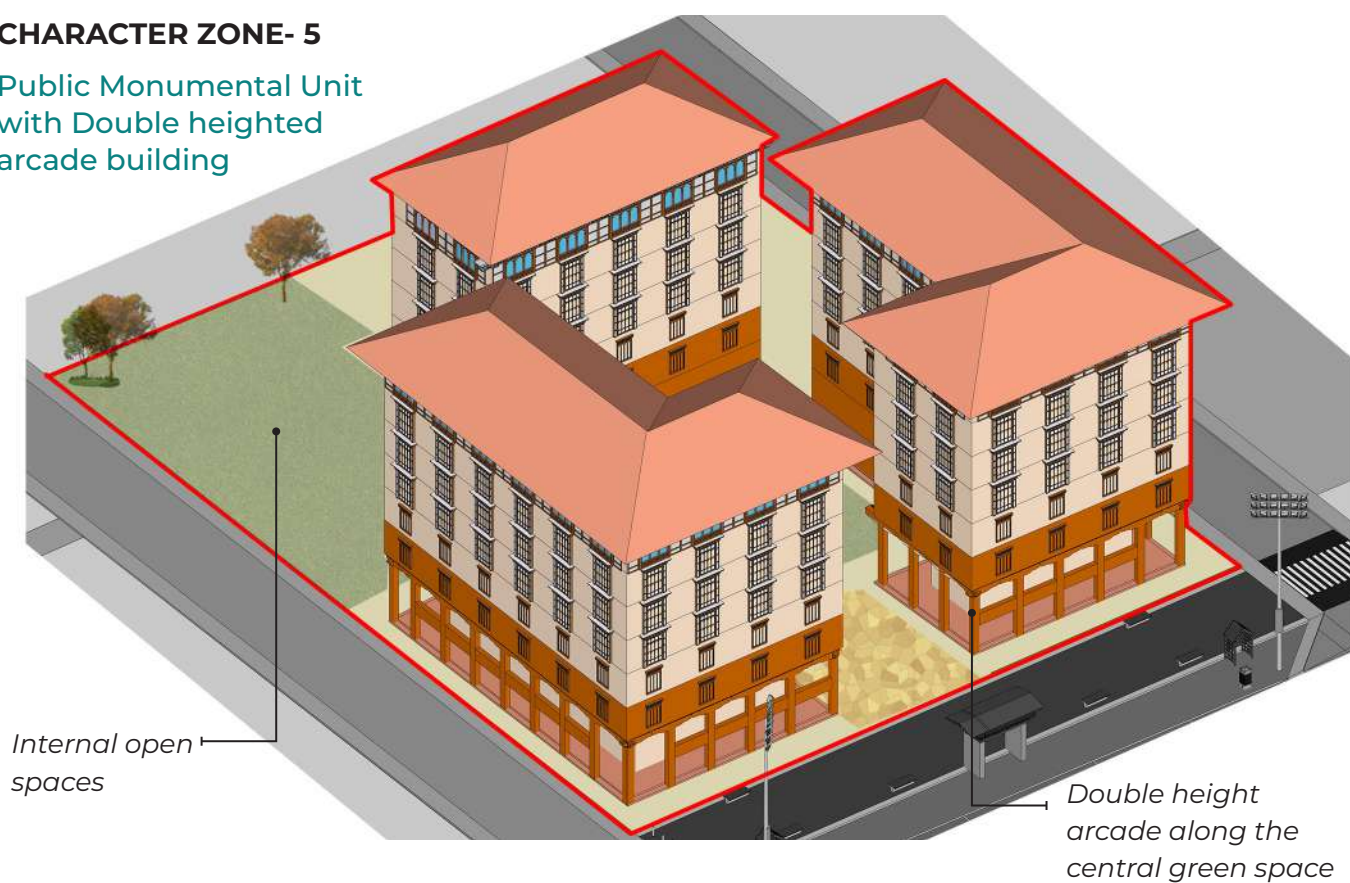
CHARACTER ZONE- 5

Public Monumental Building Unit



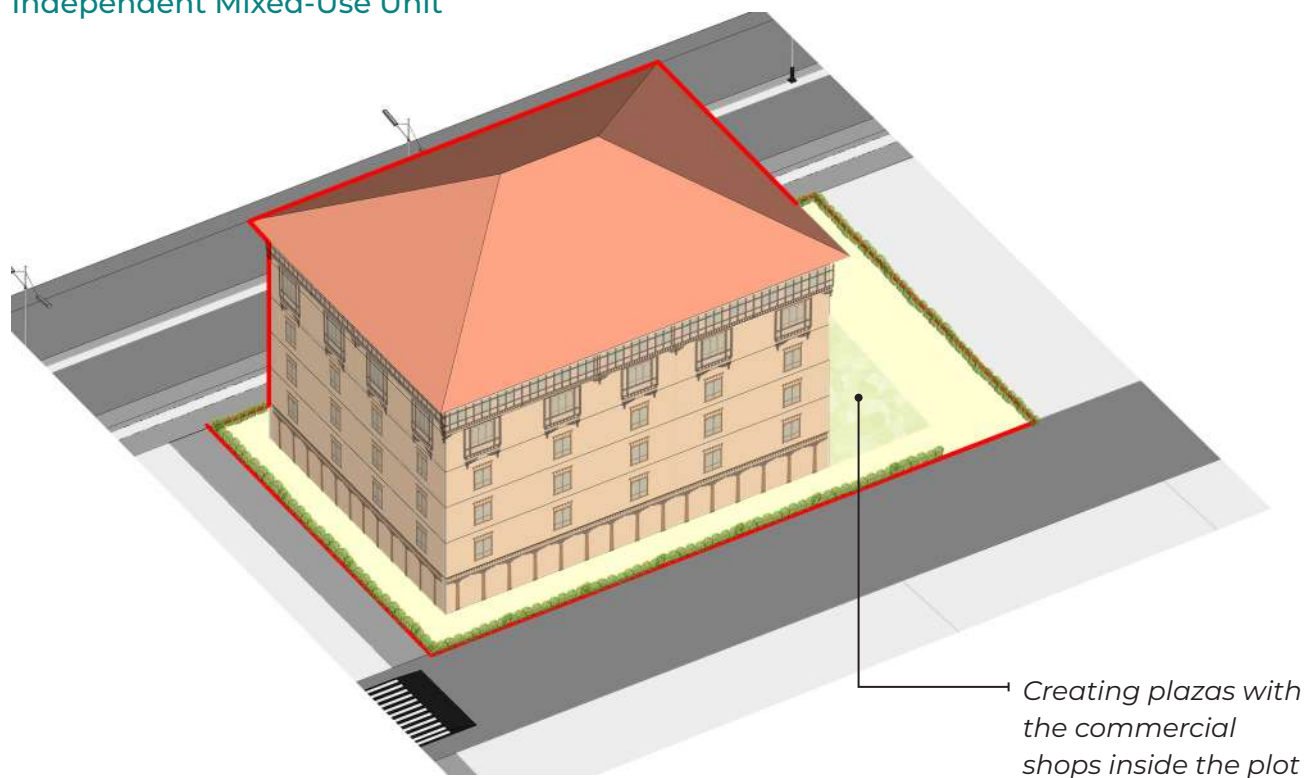
CHARACTER ZONE- 5

Public Monumental Unit
with Double heightened
arcade building



CHARACTER ZONE- 6

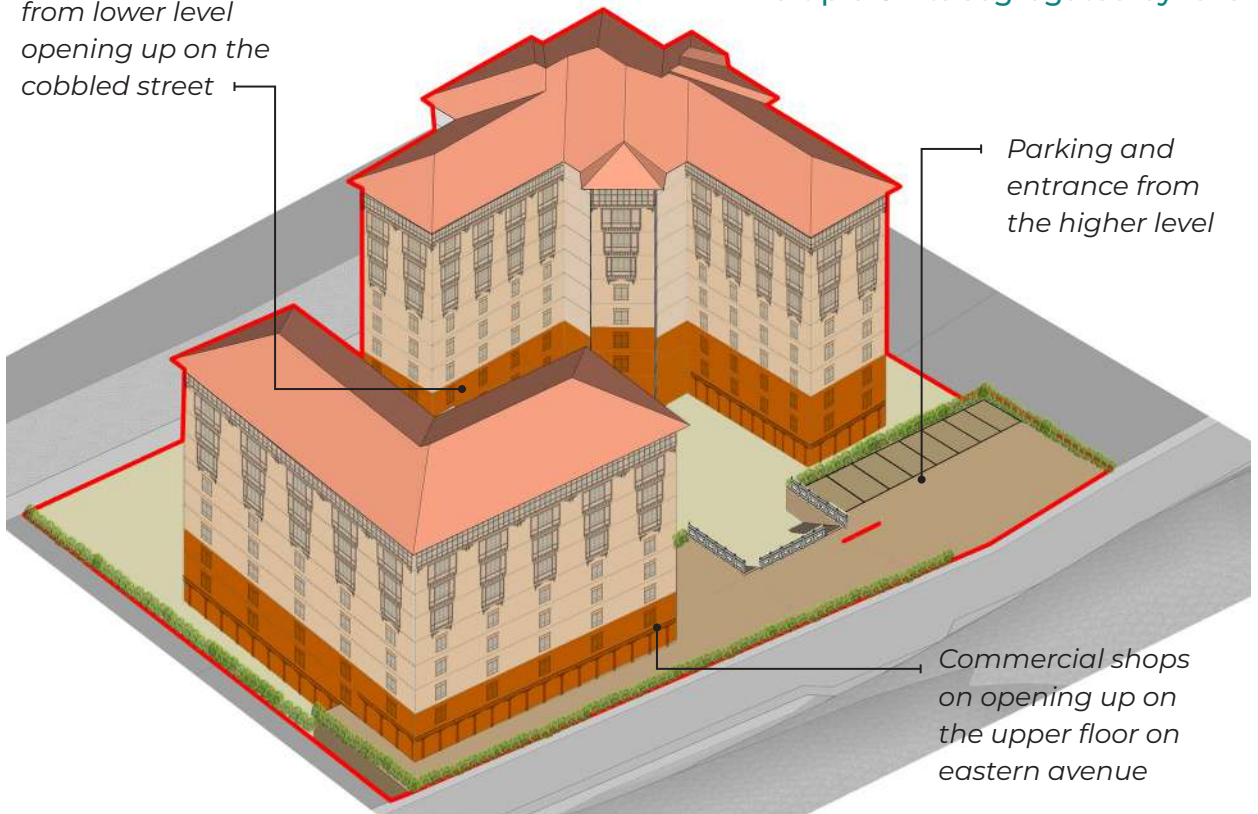
Independent Mixed-Use Unit



CHARACTER ZONE- 6

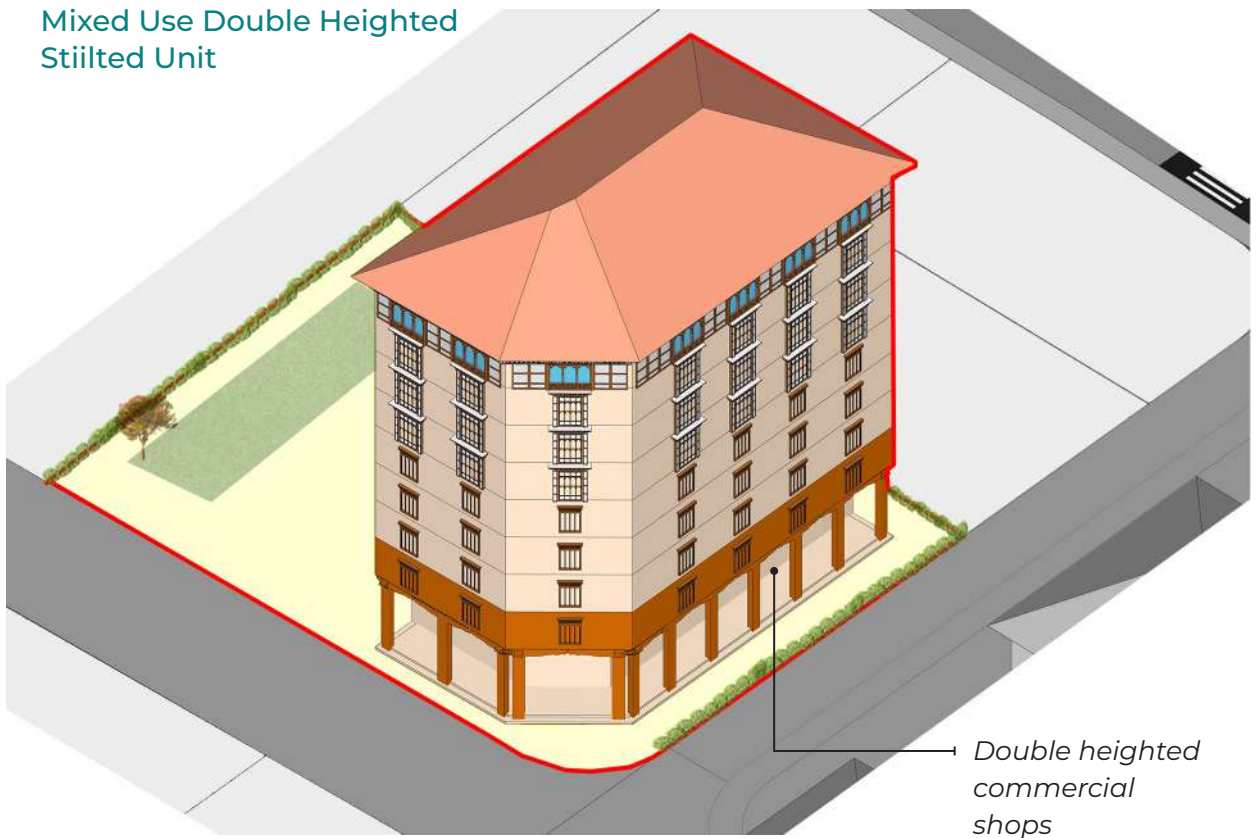
Multiple Units segregated by level

Access to commercial shops from lower level opening up on the cobbled street



CHARACTER ZONE- 6

Mixed Use Double Heighted Stilted Unit

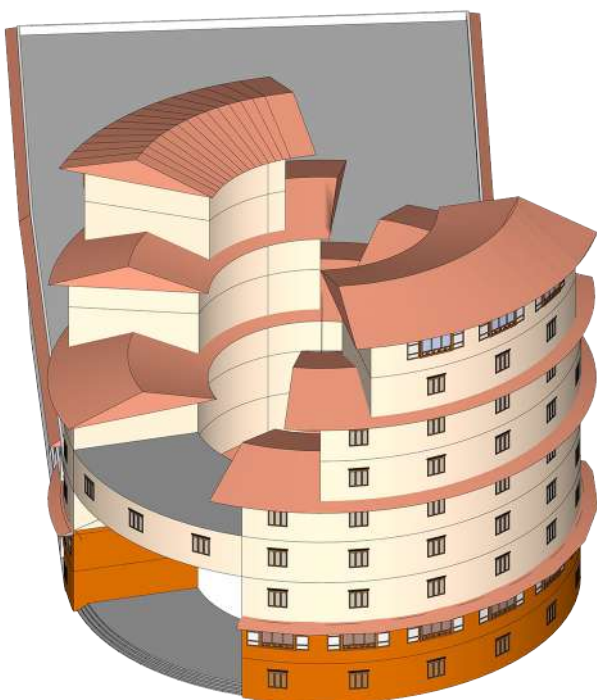


HIGHRISE TYPOLOGIES

Staggered Building
with roof

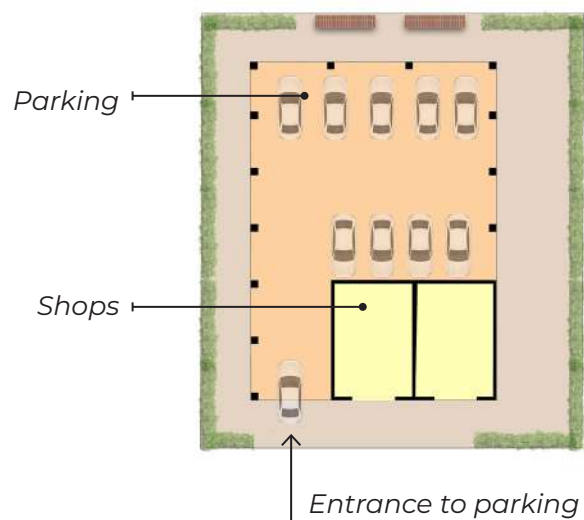


Staggered Building
with Balcony

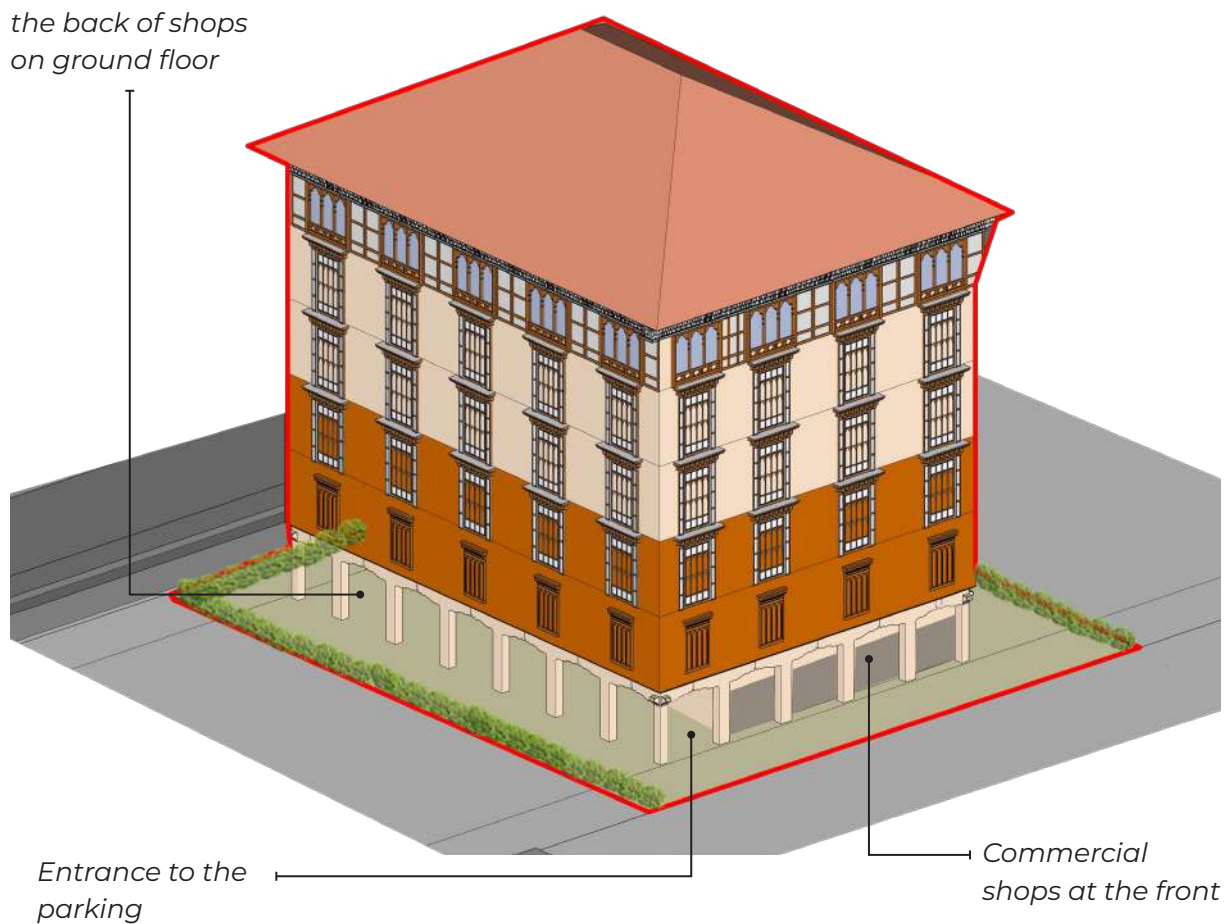


Circular Building with
Staggering at different
levels

STILTED TYPOLOGY



*Provision of
stilted parking
the back of shops
on ground floor*



Street Typology

Neighborhood streets

These are local streets. All streets other than mobility and feeder streets are neighborhood streets. These are mostly narrow access streets which form connectivity between feeder roads and individual properties or residences. It is essential to safeguard the privacy and calmness of these streets.



Shared streets

Some mobility corridors where pedestrian footfall is more are also expected to be designed with preference to NMT and thus they are purposely categorized as a different typology.



Provision of Parking

The proposed standard for parking provision according to Spatial Planning Standards by Department of Human Settlements, Ministry of Works and Human Settlements is given in table below:

Land uses	Minimum parking requirement (m)
Housing	1 car parking space per dwelling
Hotel	0.5 car parking space per hotel room
Office	1 car parking space per 50 sq. m of GFA
Commerce	1 car parking space per 25 sq. m of commercial GFA
Handicraft	1 car parking space per 80 sq. m of GFA
Industry	1 car parking space per 80 sq. m of GFA
Warehouse	1 car parking space per 200 sq. m of GFA
Education	1 car parking space per 10 children/students
Health	1 car parking space per doctor, dentist or vet 1 car parking space per 2 other staff 4 car parking spaces per consulting or treatment room 1 ambulance space per Health Centre (minimum)
Theaters, cinemas and concert halls	1 car parking space per 10 fixed seats
Indoor/outdoor sports ground	1 car parking space per 10 fixed seats
Public open space	4 car parking space per hectare
Any other public service	1 car parking space per 50 sq. m of GFA

*GFA- Ground Floor Area