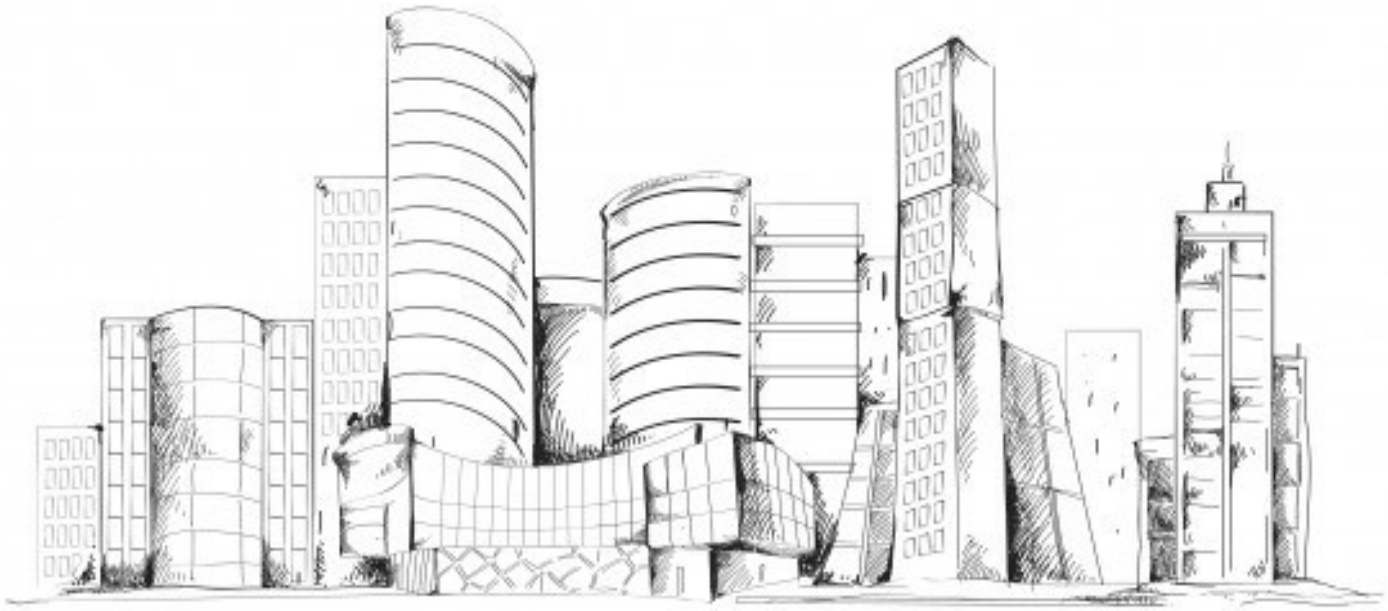

NEIGHBORHOOD PLAN:
ANNANYA RESIDENTIAL AREA

Bangladesh University of Engineering and Technology

A Report on

Neighborhood Plan: Annanya Residential Area

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ACKNOWLEDGEMENT

Doing neighborhood plan on Annanya Residential Area was interesting. But completing the study without the support of many people could have not been accomplished. So, we want to take the opportunity to acknowledge the generous help extended to us in our work. In particular, we are highly grateful to our teachers, Uttama Barua, assistant professor of department of Urban and Regional Planning, BUET and Paromita Nakshi, assistant professor of department of Urban and Regional Planning, BUET, for their suggestion, assistance and encouragement. Doing the study without the help of our classmates was difficult, our deepest gratitude to them. We would like to be thankful to many researchers, columnists and data providers, too numerous to mention by name, that helped us to understand many necessary conditions and requirements to do our task. We have not enough valuable words to express our heartfelt thanks, but our heart is still full of the favors received from every person.

Sincerely

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ABSTRACT

Annanya Residential Area is an area of about 170 acres designated for residential land use in Chittagong, Bangladesh. The study has developed a neighborhood plan for this site that contains all the essential facilities required to provide for the inhabitants following the standard mentioned in Abashik Prokolper Bhumi Unnayan Bihimala – 2004 (amended 2015). A large area of the neighborhood is designed to develop Residential Housing Blocks along with other facilities necessary to carry out daily lifestyle of the dwellers. Each housing block is facilitated with at least one nursery school and playing field or courtyard. Adequate number of Primary and High Schools as well as College are planned to serve the threshold population. To ensure essential services for its inhabitants, Commercial facilities such as super shop, Kachabazar, grocery, retail stores etc.; Religious facilities such as mosque, madrasa, mondir, church, Eidgah etc.; Health facilities such as clinic, pharmacy etc.; Community facilities such as club, orphanage, day care center, old age home etc.; Government facilities such post office, police station etc.; Recreational facilities such as amusement park, movie theatre, restaurants etc. are provided in adequate quantities at specific planned locations that is accessible from each housing block. Considering the necessity of maintaining a healthy environment for the people of all age groups, a large area of the neighborhood is dedicated to use as open space. The neighborhood plan sets a vision to develop the area in a way that will ensure housing, education, commerce, recreation and enjoyment to its inhabitants as well as an economical feasibility with safe and secure environment for upbringing the future generations.

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1. INTRODUCTION

1.1 Background of the Study: Neighbourhood refers to a geographical area in which inhabitants share all of the common services, social activities, and amenities that are necessary in the immediate proximity of their homes. It is a sub territory of a larger area which is large enough to recruit participants and support services, but small enough to maintain a shared identity. (Park and Rogers,2014). Although the neighbourhood is primarily focused on the construction of housing units, there are other additional projects and amenities that are required to support the residential developments. Facilities like serving the health, welfare, social, educational, spiritual, recreational, leisure, and cultural requirements of the community are the foundational elements of a neighbourhood. A neighbourhood should thus be planned and designed to ensure it functions in an orderly and harmonic way with the essential facilities. Neighbourhood design includes not only the shaping of layouts and determining of land uses, but also the integration of natural places into the community. So, neighbourhood planning prioritizes the selection of new residential, commercial and other projects, as well as the identification and conservation of local green areas. Residents living in a well-designed neighbourhood feel strong sense of belonging and enjoy a higher quality of life. The concept of neighbourhood design is not static. Experts in urban planning follow certain fundamental guidelines and plan the design in a creative way to meet the demands of society (RDCC, 2013). Clarence Perry suggested a six-factor design principle for a residential neighbourhood, which is a classic neighbourhood design. Perry's neighbourhood unit concept with other recent standards and requirements have been considered while designing Annanya RA.

The given area of Annanya Residential unit included a horizontally crossed Oxygen-Kuaish Road and vertically installed gas pipes where, eventually, all of the necessary facilities have been allocated maintaining principles and standards. Abashik Prokolper Bhumi Unnayan Bidhimala-2004, which is essentially a design standard for Dhaka, has served as a facility standard for the studying area.

1.2 Objectives and Aim of the Study: The aim of the plan was to supply facilities that a residential neighbourhood needs to be viable in the long run with allowing inhabitants to conveniently access and enjoy those that they require in their daily lives. The study attempts to justify the necessity of the neighbourhood's facilities too. So, the objectives of the study are

- To analyze why and where various facilities are allocated in the studying area
- To have a comprehensive understanding of the final plan

1.3 Study Area: Annanya Residential Area is the study area which is located in Chittagong, Bangladesh that has an area of 170 acres with a major road going through it from west to east, named Oxygen -Kuwaish Link Road.

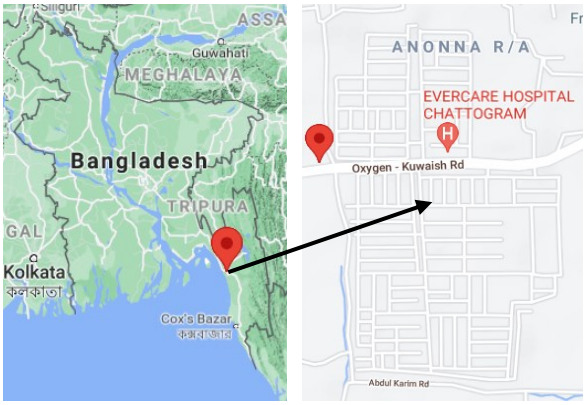

Figure1: Annanya Residential Area, Chittagong, Bangladesh

2. METHODOLOGY

The study is done mainly depending on secondary sources that gave various information on how a neighborhood should be designed. To accomplish the objectives, literatures related to neighborhood planning have been studied where many neighborhood designs from other countries have been overviewed too. To find out reliable literatures, authentic sources have been used. For example: Google Scholars, Elsevier, Science Direct, JSTOR, Springer, DOAJ, ResearchGate, IEEE Xplore, JBIP and so on. Besides, standards for facilities have been considered to allocate many facilities according to demand that can be appropriate for the considered populations. Finally, the whole design is done on AutoCAD.

3. LIMITATION and SCOPE of the STUDY

Before making any plan for any area, a reconnaissance survey is required to understand the area well. Having proper idea about the surrounding areas is important too to determine what kind of facilities should get emphasized for that place. None of the above is done for the study. Few information varied literature to literature that was actually confusing to figure out which one should be followed. Besides, few standards were not available in the context of Bangladesh. As the study is mainly secondary source based, it opens scope for further research depending on primary survey with having idea of the surrounding areas too.

4. LITERATURE REVIEW

To understand how a neighborhood should be designed, many literatures have been studied. 1st neighborhood design that is considered, is Burnside Gorge Neighborhood Plan - 2017 which was accomplished on Burnside neighborhood in Canada. 2nd considered neighborhood plan is Timp Neighborhood Plan in USA that was designed in 2017 – 2018. The 3rd one is Horsforth Neighborhood Plan in England. 4th neighborhood plan is Red Dear Neighborhood Plan. Reviewing the literatures, it can be said that standards vary from local to universal scales. But

all literatures are agreed on a point that a neighborhood should follow major 6/7 principles as follows to be a good and livable one.

STANDARD 1: SIZE - According to Perry, residential Neighborhood must have 5000 (up to 9000) where the area should have a radius of a quarter to half miles (Park and Rogers, 2014). Burnside neighborhood has 5860 residents (Community Planning Division, 2019). The population of Timp is 1341 with 59.52 acres land area (Provo Community Development, 2018). Population of Horsforth is 18,895 (Horsforth Town Council, 2019).

STANDARD 2: BOUNDARY - According to American Planning Association, natural/ man-made barrier like – mountain, river, railroads, transportation arteries or others should be used as boundary. Besides, the unit should be bounded with streets so that no children of that neighborhood have to cross major roads to go to the school (Allaire, 1960). Literatures show that Burnside is bounded by roads. But there goes a major route within the neighborhood, named Douglas St. (Community Planning Division, 2019). Timp is solely bounded by 4 roads on 4 borders (Provo Community Development, 2018). Horsforth follows the principle to some extent where a railway goes through the east side (Horsforth Town Council, 2019).

STANDARD 3: STREET SYSTEM – Allaire showed in his literature that a neighborhood must discourage through traffic with encouraging walkability, quiet, safe, low volume traffic and no major arterials may go through a residential neighborhood, rather these should work as boundary (Allaire, 1960). Literature of Burnside showed that there is mentionable through traffic in Buirnside (Community Planning Division, 2019). Timp plan depicted that a neighborhood should be highly walkable as it is (Provo Community Development, 2018). Horsforth plan encourages car parking to avoid haphazard condition (Horsforth Council, 2019).

STANDARD 4: INSTITUTION SITES – Red Dear neighborhood plan showed that school or other institutions should be grouped at the center/ common area that is usually called node which is highly dense (RDCC, 2013). Burnside has two schools at the node (Community Planning Division, 2019). Timp does not have any elementary school inside its boundary (Provo Community Development, 2018). Horsforth plan showed that there are 8 primary schools, 1 high school and 1 university are available in Horsforth. They considered that if a neighborhood is large enough like a community, then there can any university be developed.

STANDARD 5: LOCAL SHOPS and MIX LAND USE – Literature showed that mix and integration of land-use provides options to live, learn, work and play with ensuring

affordable/supported housing depending on income, family types that are encouraged in the universal standards. Standards supports that intensive land uses should be focused around transit and park so that daily shopping can be accessed easily (RDCC, 2013). Burnside has mixture of various land uses thus this literature encourages mix use of services and lands (Community Planning Division, 2019). Timp plan showed that Timp has shops near the road that may help the residents to buy their necessities while coming back to home (Provo Community Development, 2018). Horsforth has 3 shopping centers with 291 shops across the neighborhood area (Horsforth Town Council, 2019).

STANDARD 6: OPEN SPACE, PARK and RECREATION – Red Dear neighborhood planning showed that according to universal standards, a neighborhood should have small parks or recreation spaces within .25mile walking radius to meet the demand of only the residents with ensuring active and passive recreation spaces (RDCC, 2013). Wang depicted in his literature that a playground of 1.25 acre/1000 population is a must that should be adjacent to elementary school/center and Neighborhood Park space should be 1.5 acres/ 1000 population (Wang, 1965). Burnside has 5 parks (9.1 acre) within .25mile walking radius (Community Planning Division, 2019). Timp plan showed that Timp has lack of park inside the area (Provo Community Development, 2018). Horsforth has 108 parks that usually a community may have according to their local standards (Horsforth Town Council, 2019).

STANDARD 7: SAFE, SECURED and UNIQUE NEIGHBORHOOD - Literatures showed that CPED (Crime Prevention Through Environmental Design), social and community gathering spaces and design, traffic calming, preservation of natural, historic and heritage features, way findings (signage, gateways, landscape), public or street art- all these, together, may make a neighborhood a unique one (RDCC,2013). Reviewing literatures, it was seen that Burnside has such characteristics to some extent, but they have development plans focused on improving way finding signage, lighting few roads and enhancing landscape specially for pedestrian comfort (Community Planning Division, 2019). Timp is very walkable with a developed landscape (Provo Community Development, 2018). Horsforth focuses on preserving Local Heritage Areas, surviving historic buildings and features (Horsforth Town Council, 2019).

Literatures support to follow few standards to universal and local context that is actually required to make a neighborhood a unique and livable one. The standards may vary neighborhood to neighborhood. But general few standards are followed by all. According to

all the considered literatures, integrating necessary standards accordingly is essential to make a happy neighborhood that may serve its residents well.

5. ANALYSIS, RESULT AND DISCUSSION

5.1 Population Analysis: According to Abashik Prokolper Bhumi Unnayan Bihimala – 2004 (amended 2015), the density of population is 350/acre. As the area is 170 acres, the total population is gotten 170*350 or 59500. The plan finally has considered 60000 population to allocate facilities (Abashik Prokolper Bhumi Unnayan Bidhimala, 2004).

5.2 Standard Facilities: To develop a good neighborhood, the main 6 principles should be followed. Following those principles, various kinds of facilities should be ensured within the area. According to Forbes, a truly great neighborhood is the one that is in sync with the demand and current lifestyle of the residents (Forbes, 2014). To allocate many facilities in the context of Bangladesh, few facility standards were considered as follows.

Table 1: Total required area for any specific facility respectively

Facilities and Standard			
Column1	Facility	Total area (acre)	Toral area (Katha)
1	Nursery and primary school	2.28	137.94
2	High school and college	2.4	145.2
3	Clinic	1.8	108.9
4	Community center and club	1.2	72.6
5	Shop/super shop/Bajar	1.8	108.9
6	Bank/post office/ ATM booth	1.2	72.6
7	Religious facilities	1.2	72.6
8	Field	1.8	108.9
9	Park/lake	1.8	108.9
10	Road	3.6	217.8
11	Residential plot	171.42	10370.91

Source: (Abashik Prokolper Bhumi Unnayan Bidhimala, 2004)

5.3 Allocated Facilities: Location, Quantity and Reason behind Allocation: Many facilities are allocated within the area by maintaining standards. Abashik Prokolper Bhumi Unnayan Bidhimala, 2004 is considered to calculate the required quantity. The Bidhimala has standard area for various facilities according to the population. The study has considered standards for 60000 population (table 1). Dividing the total area of any facility by its individual required area, the required quantity of that facility is calculated.

$$\text{Quantity of any facility} = \frac{Total\ area\ for\ that\ facility}{required\ individual\ area\ for\ that\ facility}$$

Facilities can be divided into 10 major categories. These are: transportation, residential. educational, commercial, religious, health, community, governmental, recreational facility and open space.

Transportation Facilities: The studying area has 2 major roads that are already given in the raw document. But the plan has suggested one more major road that divides the site into block D and block E. The access roads of the site are designed in such a way that the plan discourages dead end roads and through traffic. The plan encourages pedestrian movement and so the daily basic facilities are distributed in such a way that the residents have not use his car to get those. Besides, there are bicycle lanes to encouraged Nonmotorized Vehicles (NMV). Length of roads are considered according to Dhaka Imarat Nirman Bidhimala 2008 (table 2). Access roads are considered 6m and 9m, depending on the adjacent plot area.

Sub-Division Patterns: The area is mainly designed in grid iron pattern. As the whole area is almost rectangular in shape, allocating grid iron pattern is easier here that is also comfortable to allocate many facilities. Besides, to reduce the monotony of grid iron pattern, modified grid iron, cul-de-sac and swastika are considered too that has made the area an attractive one.

***Residential Facilities*:** For the residential plots, only 3, 5 and 7 Katha plots are considered. For allocating plots, the ratio of width and length is considered as 1.5. There are 276, 261 and 164 plots of 3, 5 and 7 Katha respectively. Both 1 and 2unit plots (table3) are considered to encourage mix and integration of different types to provide options to live, work and play with affordable/ supported housing depending on income or family type. For height, 4, 5 and 6 floored buildings are designed. The required area for residential plot is more than 80% because of high population density that might bring problem to allocate other facilities. By increasing heights of the building of residential units, the problem is addressed.

Table 2: Calculation of residential plots (part 1)

Area (Katha)	Area (sq inch) 1katha = 103680.006 sq inch	Width, w (inch) [w= sq rt {area/constant}]	Length, l=1.5w (w/l must be within 1:1.5 to 2) (inch)	Road in front the plot (m)	Road in front the plot (foot) (1m = 3.28foot)
3	311040.018	455.3679962	683.0519944	6	19.68
5	518400.03	587.8775553	881.8163329	6	19.68
7	725760.042	695.5861039	1043.379156	9	29.52

Source: Roads are considered according to Nirman Bidhimala, 2008

Table 3: Calculation of residential plots (part 2)

Area	Total plot number	1 unit	2 unit	4 floors	5 floors	6floors	Total area (Katha)
3	276	112	164	140	90	46	3858
5	261	150	121	120	85	56	6205
7	164	-	164	80	46	38	5446
							15509

Educational Institutions: In this neighborhood area, there are six nursery schools, three primary schools, two high schools, two colleges and two madrasas in total. Educational institutions are located away from major roads to ensure safety. So that, students do not have to cross the major roads. By following the standards of RDCC of having a common zone of common facilities at any point, the plan has developed one too. There is a common zone point at block D where a library, stationary, field, high school and a college are allocated. Similar types of facilities are allocated near the educational institutions (library and stationary) so that the students may get their necessities easily. All the schools and colleges are distributed equally among 5 blocks in a way that all residents can get easy access and they do not have to travel far from their living area. Five blocks have 5 nursery schools. In block A and B, there are one primary school, one high school, one college and one madrasa. Block C, D and E have three nursery schools, two primary schools, one high school, one college and one madrasa. All the housing blocks have fair number of educational facilities for the inhabitants. There are also play fields and parks near schools to ensure green environment for the students.

Religious Facilities: In this neighborhood area, there are six mosques, one mandir, one church and one cemetery in total. There are open fields near the mosques. Residents can utilize one

open field at block E as 'Eidgah' during Eid occasions. Also, madrasa is located near the mosque. Considering the area as Muslim dominating one, number of mosques is kept higher than others. Besides a Mandir is allocated at the corner of block E as there is often higher noise during any festivals.

Commercial Facility: The neighbourhood has a total of 68 commercial establishments. Kachabazar, grocery store, super store, laundry, studio, shopping centre, bank, ATM Booth, saloon, local shop, courier service and small service industries are some of the commercial amenities accessible in the area. The neighbourhood node contains some of the important commercial facilities of the neighbourhood. The Kachabazar in Block A is located near the node of the neighbourhood and is one of the key commercial facilities that can be reached from the above 2 blocks of the neighbourhood. The second Kachabazar is located on Block D which is sufficient for the residents of block C, D and E. The node also holds one of the two super shops and a grocery store. The second super shop is located in the residential Block D. This one is located near park by following RDCC's 5th standard so that people may shop their necessities while going back to home. Aside from the neighbourhood node, shops are distributed all over the neighbourhood, with easy access from all residential blocks. As a result, no one needs to come to the node merely to buy their daily necessities. There are 18 local stores, 6 laundries, and 4 studios spread over the five residential blocks. Near the node, there is a neighbourhood-scale shopping centre. People visit malls not just to buy, but also to eat and watch movies, and so a movie theatre is allocated there and a restaurant nearby. There are three coffee shops in the site, all of which are close to clubs or secondary school, allowing club members, children and teenagers to spend quality time there. Residents have access to financial services through a bank located at the neighbourhood node. On the node near the bank, there are two ATM booths that follow the bank's location. The remaining six ATM booths are situated across the five residential blocks, allowing residents to withdraw money without having to travel to the node. Again, there are eight small service industries available in the neighbourhood, all of which are stationed along the road so that people may fix their belongings while passing through if necessities arise. One courier service facility, located in Block C, is also located in the neighbourhood.

Community Facility: The neighborhood has a total of 27 community establishments such as orphanage, old home, day care center, hostel, stationary, club, community center and gymnasium are some of the community amenities available in the area. Community center is located at the corner of block A so that the residents do not get disturbed by the noise because

of any arrangement of any ceremony. Bock A and block D have 2 gymnasiums near the road so that resident can easily get the access. Two orphanages are allocated at block B and C respectively. There are two day-care centers at block A and D. Block A, block B and block D provide hostels near the college and high schools to benefit the students. A old age home is located at block E near a water body that may give the old age people a better environment.

Government Facility: The three main government facilities provided in the Annanya Residential Area are Police Station, Post Office and Gas Line. The police station and the post office both are placed in the left corner of just beside the main road (Oxygen-Kuaish Road) at block C. The reason working behind their placement is that these are local services which may serve for more than one neighborhood. So, placing them in corner of the main road will give access to people from surrounding neighborhood as well. The gas line is located underground in a direction from north to south, to serve the entire neighborhood.

Recreational Facility: To ensure recreational opportunities for the inhabitants, one amusement park is provided in Block E, just beside a nursery and day-care center, to ensure access for the children of the community. A large park is designed in D Block, near the main road. The location of the park will ensure access from all the Blocks of the neighborhood and the area is also designed in a way to serve the threshold population. Another Park is allocated at block B.

Open Space: A large area of the neighborhood plan is dedicated for the purpose of open space. In total, there are 10 fields and courtyards and 2 waterbodies in the entire neighborhood plan. Each housing block is provided with fields. There are playing fields adjacent to educational institutes. The waterbody located in Block A is designed in a natural way rather than rigid pattern and sitting arrangements are provided near the waterbody. Another waterbody is located in Block E, near an old age home to ensure recreation for its dwellers.

The above categories can be divided into few major categories. Besides them, there are few other important features too. Like- several mixed buildings have been placed in the plan to serve the inhabitants. The service provided in the mixed used buildings could be diversified, for example: Coaching centers, Doctors' chamber, Diagnostic centers and many others. The entire neighborhood is covered with sufficient trees and greeneries. The node, commercial and educational areas are separated from the residential areas by using buffer areas filled with greenery. The periphery of the neighborhood is covered with greenery to separate the area from other surrounding neighborhoods. There is a large water body at block E that also works at periphery Thus, it will provide a separate identity for Annanya Residential Area from top view.

5.4 The Final Plan: By allocating various facilities by following the standards the final plan is as follows.

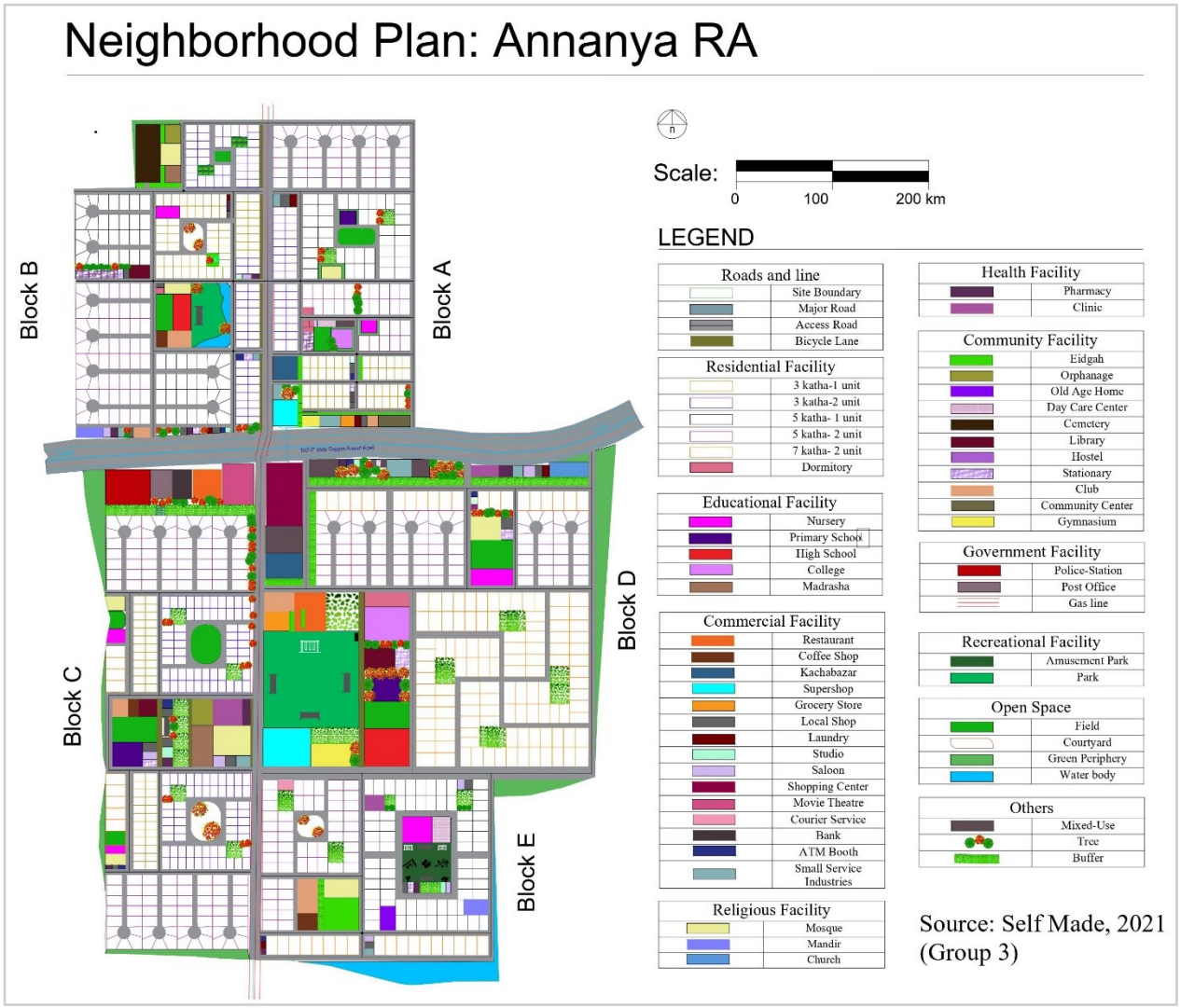

Figure2: The Final Neighborhood Plan

6.Conclusion

The neighborhood plan for Annanya residential area outlines a vision for the area's development that includes housing, education, commerce, leisure and enjoyment for its residents, as well as a safe and secure environment for future generations to grow up in. The plan maintains the main six principles where necessary standard facilities have been provided. In conclusion, it can be said that the final plan ensures that Annanya residential area has all of the services that it needs to remain sustainable in the long run, as well as it allows its residents to access easily with enjoying the amenities that they need in their everyday lives by what it may ensure the residents a good, livable, economic and feasible neighborhood with a good and heathy environment.

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GLOSSARY

Green Areas: Green areas are any place prepared with grass, flowers, trees, benches or other decorative or urban furniture elements, used as decoration or for public use.

Reconnaissance Survey: To explore site conditions and availability of infrastructures.

Mixed Land Use: Mixed land use enables a range of land uses including residential, commercial, and industrial to be co-located in an integrated way that supports sustainable forms of transport such as public transport, walking and cycling, and increases neighborhood amenity.

Landscape: A landscape is the visible features of an area of land, its landforms, and how they integrate with natural or man-made features

Gateway: The urban gateway is an entrance, a gathering place which acts as a transition between different spaces as well as a nexus for the people who inhabit and frequent these places.

Non- motorized Vehicles: Non-motorized Transportation that is also known as Active Transportation and Human Powered Transportation) includes Walking and Bicycling, and variants such as Small-Wheeled Transport (skates, skateboards, push scooters and hand carts) and Wheelchair travel.

Grid Iron Pattern: A gridiron is a pattern of city streets which are all made at right angles to one another.

Modified Grid Iron Pattern: The neighborhood's grid pattern is modified to prevent through traffic and create identifiable.

Cul-de-sac: The term 'cul-de-sac' refers to a short, dead-end street, a road that has only one inlet and outlet. Typically, a cul-de-sac has a rounded end onto which houses face, allowing cars to move in and out, turn around, and so on.

APPENDIX

Considered Subdivision Pattern

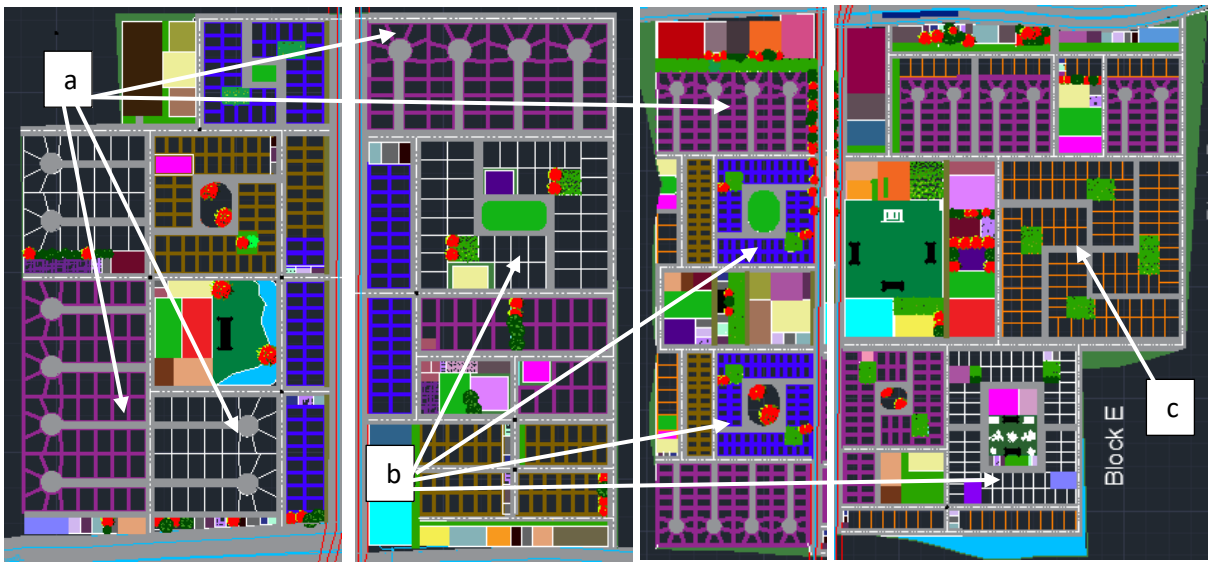

Figure: Grid Iron Base with Cul-de-sac (a), Modified Grid Iron (b) and Swastika (c)

Street System

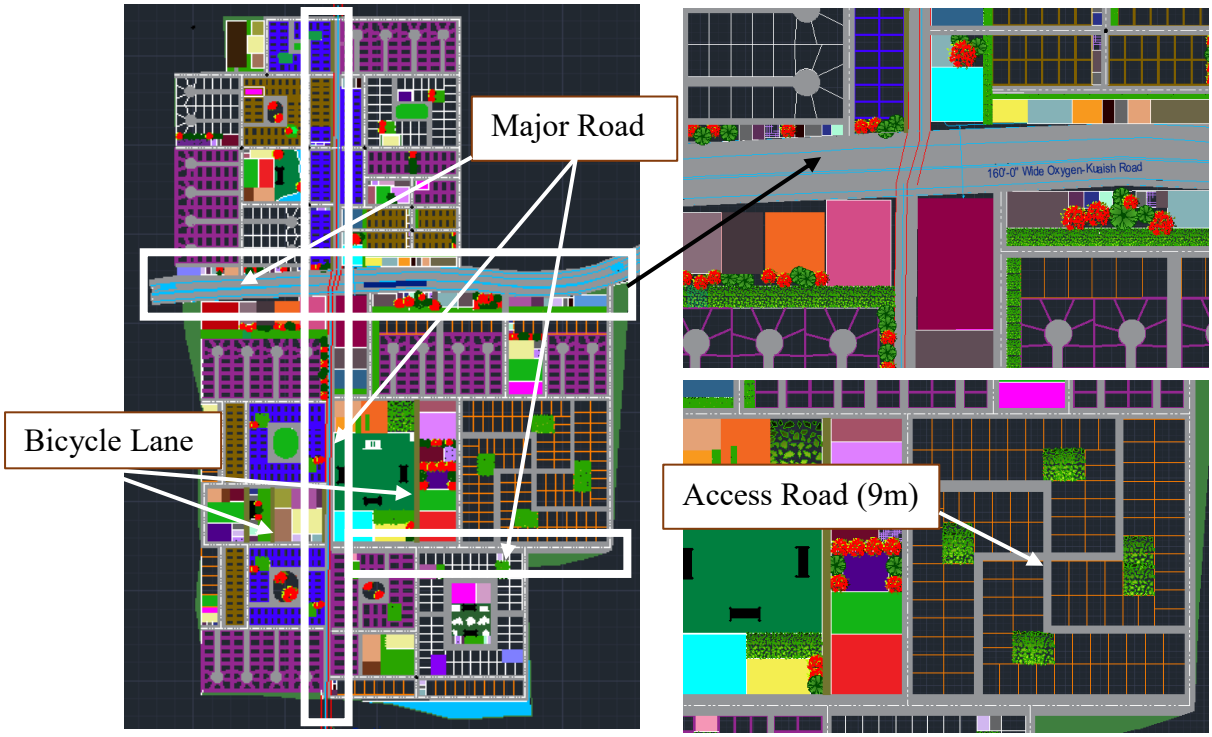

Figure: Roads

Node

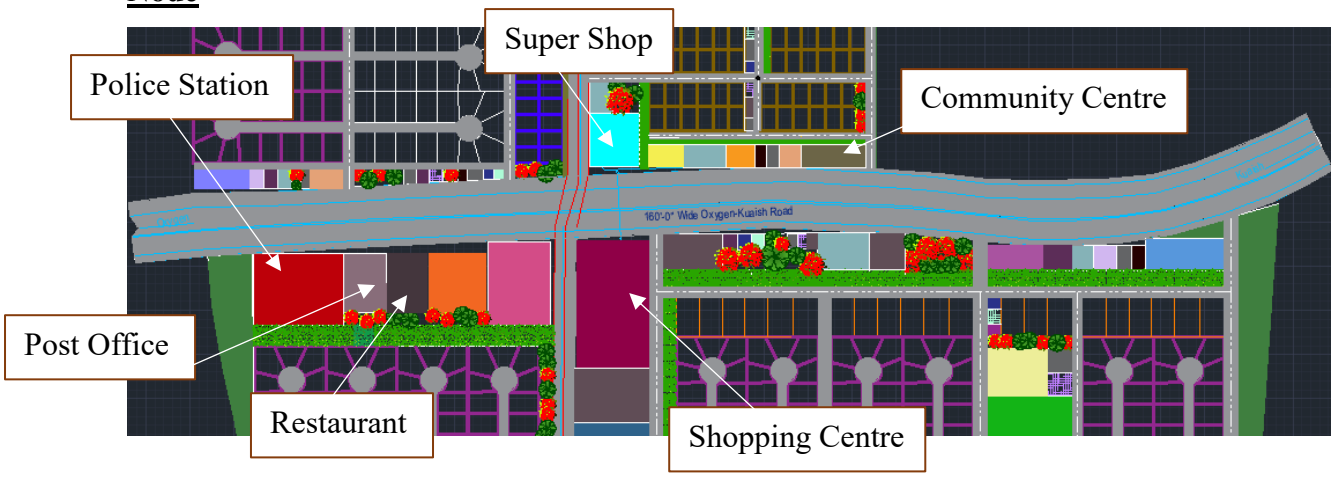

Figure: Node with many facilities

Block A

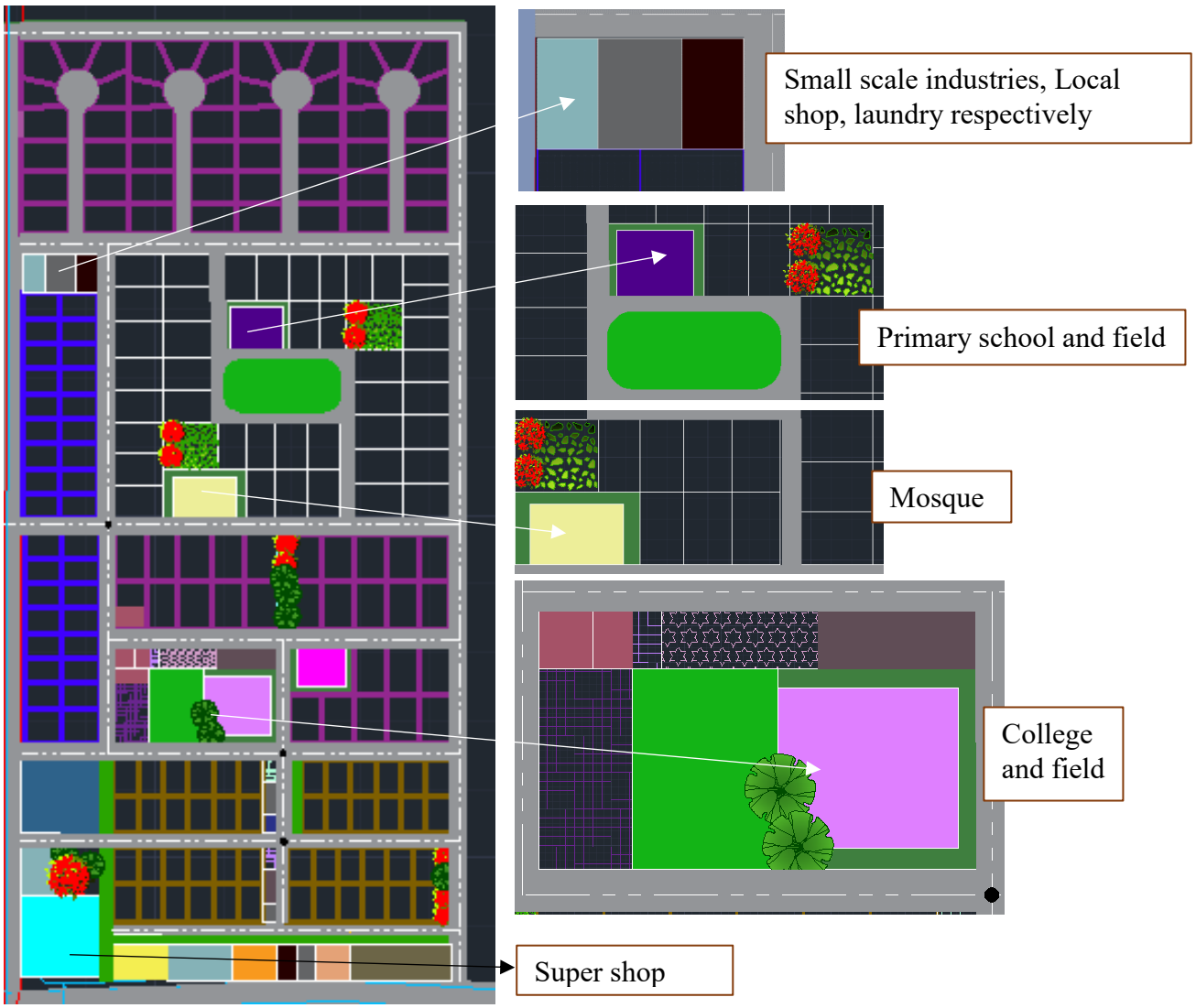

Figure: Facilities provided in block A

Block B

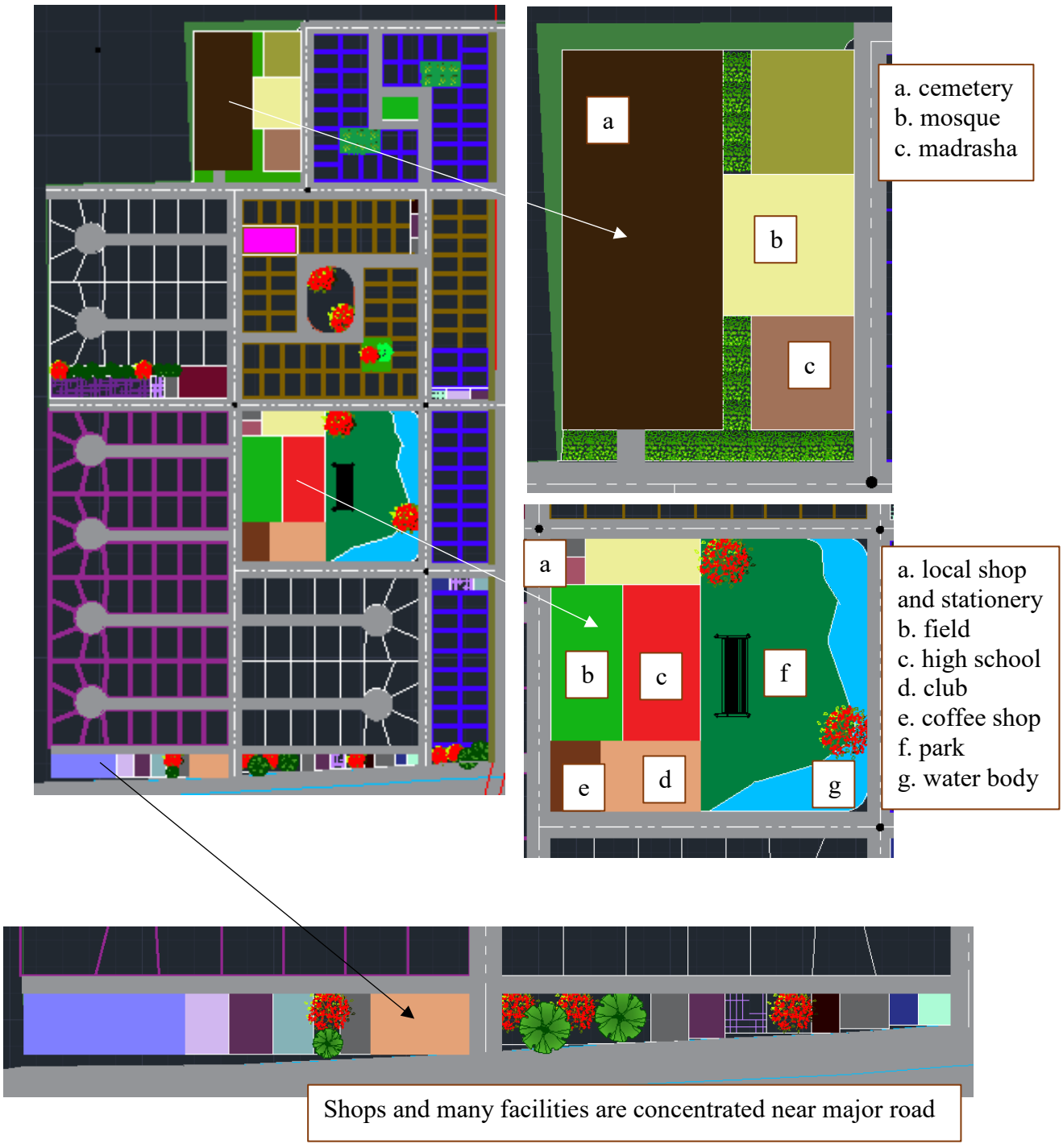

Figure: Facilities provided in block B

Block C

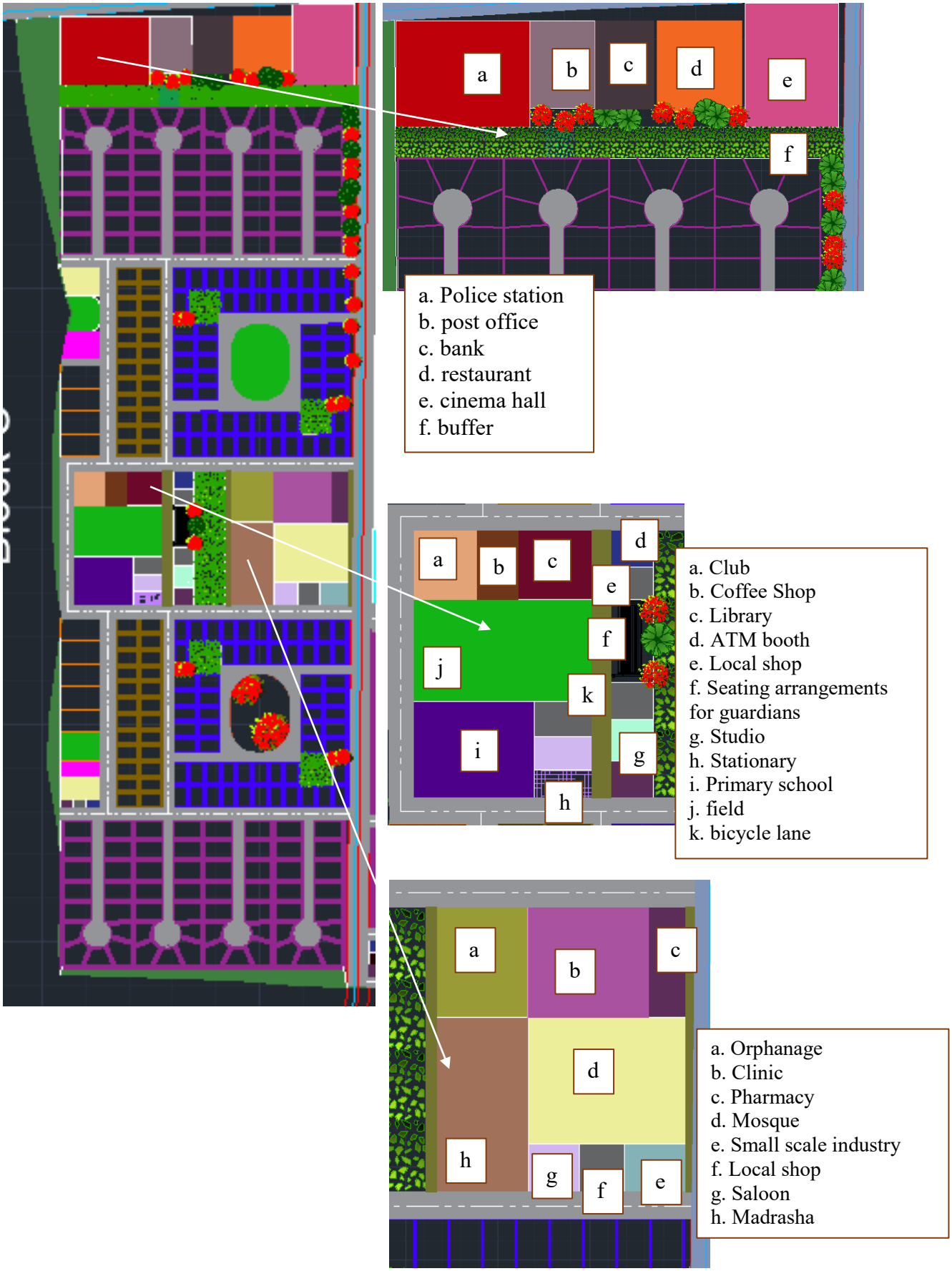

Figure: Facilities provided in block C

Block D

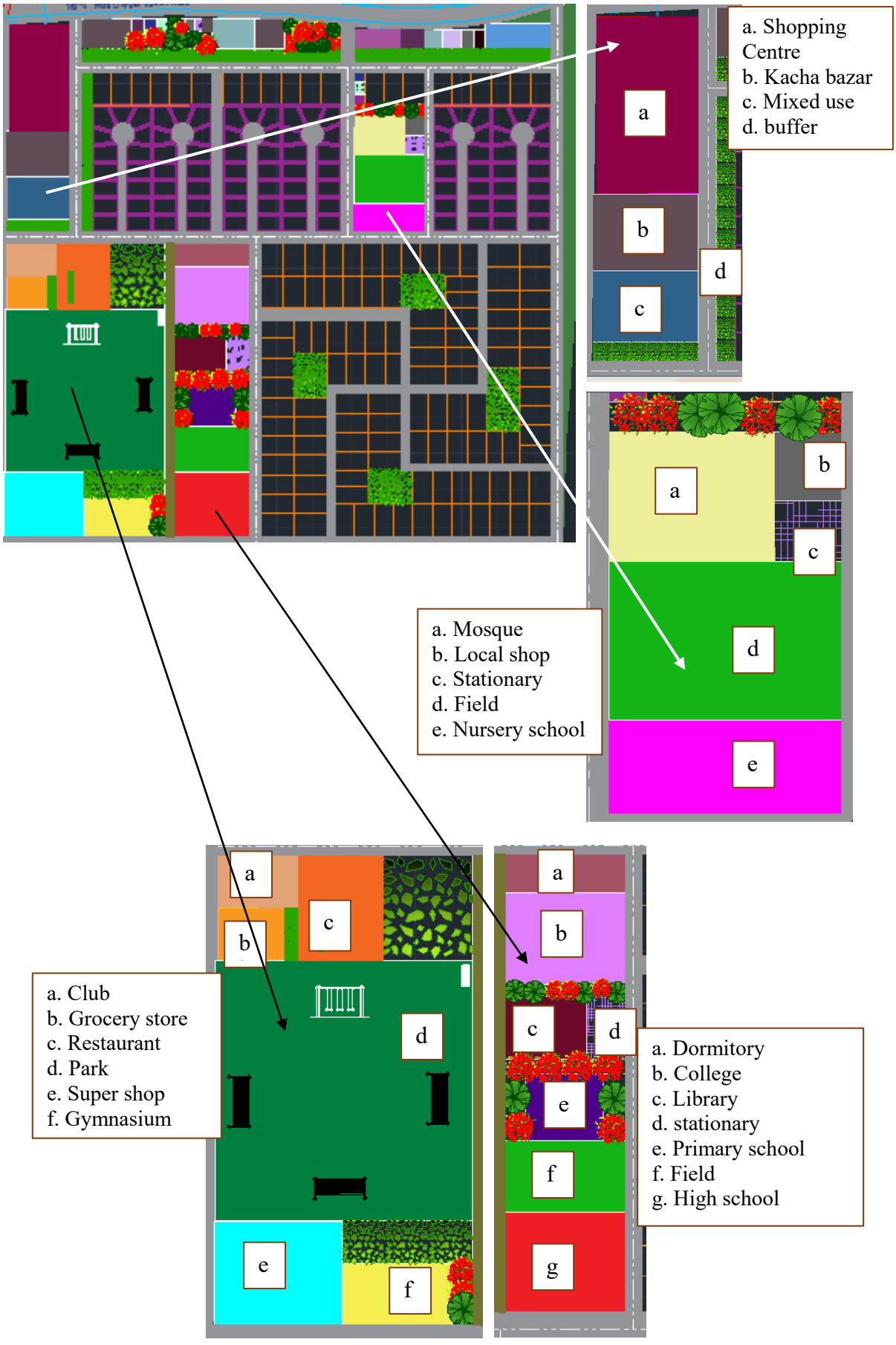

Figure: Facilities provided in block D

Block E

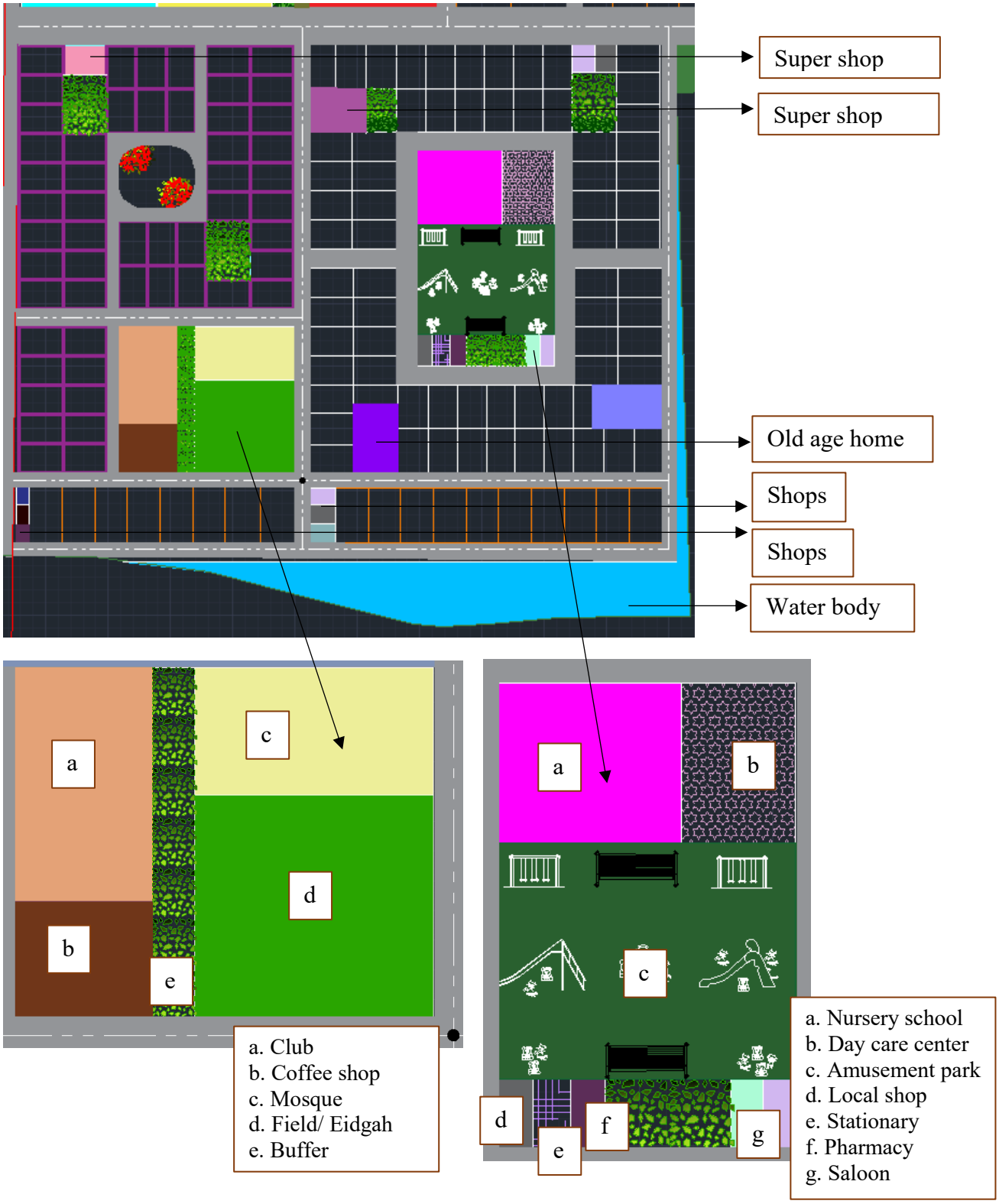

Figure: Facilities provided in block E